



كلية الهندسة والعلوم التطبيقية

اللائحة الداخلية

لمرحلة البكالوريوس

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الباب الأول

برامج الكلية والدرجات العلمية

مادة (١): مقدمة

كلية الهندسة والعلوم التطبيقية هي إحدى كليات جامعة النيل الأهلية والتي تنظم العملية التعليمية بها من خلال برامج أكاديمية والتي تختص بطرح وتدريب المقررات في التخصص. وتهتم الجامعة بالبحث العلمي وتولي له مخصصات محددة ويقوم أعضاء هيئة التدريس القائمون بالتدريس في البرامج المختلفة بالكلية بإجراء البحوث العلمية من خلال وحدات بحثية مستقلة مستقلة عن البرامج الأكاديمية. وقد تم تصميم الهيكل الأكاديمي للجامعة على هذا الأساس لدعم مبدأ البحوث البيئية والتي أصبحت السمة المميزة للبحث العلمي والذي تندمج فيه مجالات وموضوعات متعددة تتفاعل وتتداخل بهدف تطوير وإبداع نظريات حديثة ومنتجات مبتكرة.

مادة (٢): رؤية الكلية

مادة (٣): رسالة الكلية

مادة (٤): الهيكل الأكاديمي والإداري بالجامعة

يتكون الهيكل الأكاديمي والإداري بالجامعة من ثلاث فروع رئيسية:

1. الفرع الأكاديمي: ويرأسه المدير التنفيذي للمجال الأكاديمي وهو بمثابة نائب لرئيس الجامعة للشئون الأكاديمية (Provost) ويختص بإدارة العملية التعليمية في كليات الجامعة ويتبعه عمداء الكليات وعميد قسم متطلبات الجامعة ومدير شئون الطلاب والمكتبة الجامعية.
2. الفرع البحثي: ويرأسه مدير البحوث وهو بمثابة نائب لرئيس الجامعة لشئون البحث العلمي (Director of Research) ويختص بإدارة شئون البحث العلمي بالجامعة ويتبعه مديري الوحدات البحثية ومكتب إدارة المشروعات والمنح البحثية.

3. الفرع الإداري: ويرأسه الأمين العام للجامعة (Secretary General) ويختص بإدارة الشؤون الإدارية والمالية بالجامعة ويتبعه مديري الإدارة المالية وإدارة الموارد البشرية وإدارة المشتريات والمخازن والإدارة الهندسية وإدارة الأمن والخدمات بالجامعة.

مادة (٥): الدرجات العلمية

طبقاً للقرار الجمهوري بإنشاء جامعة النيل رقم ٢٥٥ لعام ٢٠٠٦ والقرار الجمهوري رقم ١٢٣ لعام ٢٠١٤ تمنح جامعة النيل درجات البكالوريوس والماجستير والدكتوراة والدبلومات المهنية في التخصصات المختلفة بالكلية. وعليه تمنح جامعة النيل الأهلية بناءً على طلب مجلس كلية الهندسة والعلوم التطبيقية الدرجات العلمية الآتية:

1. درجة البكالوريوس في أحد الفروع المبينة في المادة (٤) من هذه اللائحة.
2. درجة ماجستير الهندسة
3. درجة ماجستير العلوم في الهندسة
4. درجة دكتوراه الفلسفة في الهندسة

مادة (٦): البرامج الأكاديمية بالكلية

تتكون كلية الهندسة والعلوم التطبيقية من البرامج الآتية كما هو الوضع في عام ٢٠١٨:

أولاً: مرحلة البكالوريوس

1. برنامج الهندسة الصناعية (Industrial Engineering - IENG)
2. برنامج الهندسة الميكانيكية (MENG - Mechanical Engineering)
 - شعبة هندسة الميكاترونيات (Mechatronics)
 - شعبة هندسة العلوم الحرارية والطاقة (Thermal Science and Energy)
 - شعبة التصميم الميكانيكي (Mechanical Design)
3. برنامج هندسة الحاسبات (CE - Computer Engineering)
4. برنامج الإلكترونيات و هندسة الاتصالات (Electronics and Communications)
5. برنامج هندسة وإدارة البنية التحتية المدنية (Civil and Infrastructure Engineering)
6. برنامج الهندسة المعمارية (تحت الإنشاء) (CIEM - and Management)

ثانياً: مرحلة الماجستير

1. ماجستير العلوم في هندسة الميكاترونيات (Master of Science in Mechatronics Engineering).
2. ماجستير العلوم في تصميم المنظومات الميكروالكترونية

ثالثاً: مرحلة الدكتوراه

لا توجد

رابعاً: الدبلومات المهنية

1. دبلوم مهني في الميكاترونيات والتحكم الصناعي (FESTO Professional Diploma in Mechatronics and Industrial Automation)

مادة (٧): الهيكل التعليمي بالكلية ومستويات المقررات

حيث أن الجامعة تم تصميمها وإنشائها بمبدأ البرامج الأكاديمية والوحدات البحثية فلا توجد أقسام علمية بالكلية وتتولى البرامج الأكاديمية المهام العلمية والإدارية لإدارة الشؤون الأكاديمية (كل في مجاله وتخصصه) ويشترك أعضاء هيئة التدريس بالبرامج الأكاديمية المختلفة في الوحدات البحثية المستقلة عن البرامج في إجراء البحوث وتنفيذ المشاريع البحثية. هذا ويدخل في اختصاص كل برنامج تدريس المقررات في تخصصه والذي سيتجلى في كود المقررات الدراسية كما سيرد لاحقاً. وتم تصميم الهيكل التعليمي بالجامعة وبالتبعية لكلياتها المختلفة ومنها كلية الهندسة والعلوم التطبيقية إلى مستويات أكاديمية للمقررات تشمل:

4. مقررات دراسية تحقق متطلبات الجامعة

5. مقررات دراسية تحقق متطلبات الكلية

6. مقررات دراسية تحقق متطلبات التخصص العام (متطلبات البرنامج)

7. مقررات دراسية تحقق متطلبات التخصص الدقيق (متطلبات التخصص)

مادة (٨): الإشراف على مقررات (متطلبات الجامعة)

تشارك كلية الهندسة والعلوم التطبيقية مع باقي كليات جامعة النيل في عدد 10 من المقررات (16 ساعة معتمدة والتي تكافئ 25 نقطة معتمدة أوروبية) والتي تمثل متطلبات الجامعة. وتعهد الكلية إلى قسم متطلبات الجامعة لتدريس هذه المقررات.

مادة (٩): الإشراف على مقررات (متطلبات الكلية)

تشارك برامج كلية الهندسة والعلوم التطبيقية في عدد 16 من المقررات (48 ساعة معتمدة والتي تكافئ 82 نقطة معتمدة أوروبية) والتي تمثل متطلبات الكلية.

مادة (١٠): الساعات المعتمدة لبرامج الكلية

يختص كل برنامج من برامج كلية الهندسة والعلوم التطبيقية بعدد من المقررات يكافئ (96 ساعة معتمدة أو 163 نقطة معتمدة أوروبية مقسمة بين متطلبات البرنامج ومتطلبات التخصص كما سيرد تفصيلاً في الباب الثالث من اللائحة).

الباب الثاني

نظام الساعات المعتمدة الأمريكي CH ونظام النقاط المعتمدة الأوروبية ECTS

تعريفات:

- **نظام الساعات المعتمدة الأمريكي (US Credit Hour System)**
نظام يحتسب وزن المقرر من احتساب ساعات الاتصال الأسبوعية للطالب بحيث تمثل 50 دقيقة اتصال مباشر مع عضو هيئة بمثابة CH 1 و لمدة 15 أسبوع.

- **نظام النقاط المعتمدة الأوروبي (European Credit Transfer and Accumulation System - ECTS)**

نظام يحتسب وزن المقرر من احتساب حمل الطالب الدراسي (- Student Work Load (SWL) بحيث يمثل 1 ECTS حمل دراسي للطالب (يشمل ساعات الاتصال المباشر وغير المباشر سواء في الكلية أو خارجها) بمقدار 30 - 25 ساعة خلال الفصل الدراسي (15 أسبوع).

• ملحوظة:

تم احتساب حمل الطالب الدراسي لجميع المقررات بكلية الهندسة والعلوم التطبيقية بواقع 25 SWL لكل 1 ECTS فيما عدا مقرري مشروع التخرج بحيث تم احتسابهما بواقع 30 SWL لكل 1 ECTS.

نظام احتساب وزن المقرر طبقاً لنظام ECTS

نظام احتساب الحمل الدراسي للطالب (SWL) في كلية الهندسة والعلوم التطبيقية يشمل بعض أو كل المكونات التالية:

- (A) Lectures (hrs)
- (B) Exercise work (hrs)
- (C) Laboratory work (hrs)
- (D) Independent study (hrs)
- (E) Assignments (hrs)
- (F) Office hours (hrs)
- (G) Field visits (hrs)
- (H) Exams (hrs)

(I) Other (specify)

- بحيث يحتسب وزن المقرر بنظام الساعات المعتمدة الأمريكية من نتاج $(A + B/3 + C/3)$ ، ويحتسب الحمل الدراسي للطالب (SWL) من نتاج $(A+B+C+D+E+F+G+H+I)$ ، وزن المقرر بنظام النقاط الأوروبية من نتاج (SWL) مقسوماً على (25 - 30).
- مجمل حمل الطالب الدراسي الأسبوعي (SWL/week) 50 – 60 ساعة منهم 25 ساعة اتصال كحد أقصى.
- للحصول على متطلبات درجة البكالوريوس يلزم الطالب أن يجتاز عدد 270 ECTS بما يعادل 160 CHs في 9 فصول دراسية.
- فصل دراسي بمقررات تكافئ 30 ECTS في المتوسط:
 - يناظر: مجمل حمل دراسي للطالب يساوي 900 SWL/Semester – 750.
 - يناظر: متوسط 17.78 CHs (ساعة معتمدة أمريكية)

الباب الثالث

درجة البكالوريوس

مادة (١): درجات البكالوريوس

تمنح جامعة النيل الأهلية بناءً على طلب مجلس كلية الهندسة والعلوم التطبيقية درجة البكالوريوس في الفروع الآتية:

1. الهندسة الصناعية
2. الهندسة الميكانيكية
 - شعبة هندسة الميكاترونيات
 - شعبة العلوم الحرارية والطاقة
 - شعبة التصميم الميكانيكي
3. هندسة الحاسبات
4. الإلكترونيات وهندسة الاتصالات
5. برنامج هندسة وإدارة البنية التحتية المدنية
 - شعبة هندسة وإدارة نظم النقل
 - هندسة وإدارة نظم المياه والصرف
 - هندسة وإدارة التشييد

مادة (٢): مدة الدراسة

مدة الدراسة للحصول على إحدى الدرجات المبينة في المادة (٤) من الباب الأول هو ٩ فصول دراسية رئيسية (٤ سنوات ونصف).

مادة (٣): شروط القيد

1. يسمح بالقيد للحاصلين على شهادة الثانوية العامة شعبة رياضيات، أو ما يعادلها ، ممن تم قبولهم طبقاً لقواعد ولوائح مجلس الجامعات الخاصة.
2. تضع الكلية قواعد عامة للقبول بحيث تكون رغبة الطالب ومبدأ تكافؤ الفرص هي الأساس في قبول طلاب بنظام الدراسة في هذه اللائحة.

مادة (٤): نظام الدراسة

1. تحتسب الدراسة بنظام الساعات المعتمدة وكذلك بنظام النقاط المعتمدة الأوروبية على النحو التالي:
 - الساعة المعتمدة CH:

- تعادل ساعة محاضرة أسبوعياً لمدة ١٣ أسبوع (غير مشتملة فترة الامتحانات) أو
- تعادل 2-3 ساعة تمارين أو معمل أسبوعياً لمدة ١٣ أسبوع (غير مشتملة فترة الامتحانات).
- الساعة المعتمدة الأوروبية ECTS:
- (1 ECTS) تعادل 25 - 30 ساعة (إجمالي حمل دراسي للطلاب) Student Work Load (SWL) على مستوى الفصل الدراسي.
- الفصل الدراسي يشمل حوالي عدد 30 ECTS في المتوسط.
- الفصل الدراسي يشمل 750 – 900 ساعة عمل مجملة للطلاب (SWL)
- 2. الدراسة باللغة الإنجليزية، ويتم عقد امتحان لتحديد مستوى الطالب وتحديد المقررات التأهيلية التي يحتاجها في اللغة.

مادة (٥): مواعيد الدراسة والقيّد

- تقسم السنة الدراسية إلى ثلاثة فصول دراسية على النحو التالي:
1. الفصل الأول: لمدة 15 أسبوع (شاملة فترة الإمتحانات)
 2. الفصل الثاني: لمدة 15 أسبوع (شاملة فترة الإمتحانات)
 3. الفصل الصيفي: لمدة 6 أسابيع (شاملة فترة الإمتحانات)
- يتم القيد لأي مرحلة خلال أسبوعين قبل بدء أى فصل دراسي بعد استيفاء شروط القيد ودفع الرسوم المقررة.

مادة (٦): رسوم الدراسة

1. يتم تحديد رسوم الخدمة التعليمية المقررة ، لكل ساعة معتمدة ، بمعرفة الجامعة بناء على اقتراح مجلس الكلية سنوياً.
2. يوقع الطلبة على تعهد بالالتزام بدفع رسوم الخدمة التي تقترحها الكلية، وتوافق عليها الجامعة، مع الالتزام بنفس الرسوم للطلاب منذ التحاقه وحتى تخرجه أو مع زيادة سنوية مقررة يوافق عليها الطالب وقت تسجيله في الجامعة أول مرة.
3. تحصل رسوم الخدمة التعليمية كل فصل دراسي، وتقدر قيمة رسوم الخدمة التعليمية بعدد الساعات التي يسجل فيها الطالب كل فصل دراسي (الفصل الأول والفصل الثاني) ، وبحد أدنى ما يقابل رسوم خدمة تعليمية لعدد 12 ساعة معتمدة فصلياً. وتكون رسوم الخدمة التعليمية للفصل الصيفي معتمدة على عدد الساعات المعتمدة التي سجل فيها الطالب.
4. يضاف إلى رسوم الخدمة التعليمية رسوم إضافية ثابتة نظير:
 - استهلاك المعامل والمعدات
 - مصاريف التسجيل للطلاب في مجلس الجامعات الخاصة والأهلية وما يشابهها
 - مصاريف التربية العسكرية وما يشابهها
 - مصاريف أخرى مقررة لاستيفاء متطلبات التخرج

مادة (٧): شروط التسجيل

1. يمكن للطلاب التسجيل في الفصل الأول أو الثاني في مقررات تصل ساعاتها المعتمدة الى 18 ساعة. ويمكن للطلاب التسجيل في الفصل الصيفي في مقررات لاتزيد ساعاتها المعتمدة عن 7 ساعات ، وبحيث يستوفى شروط التسجيل في كل مقرر، وبعد استشارة المرشد الأكاديمي ، وفي المواعيد المحددة بتوقيات التسجيل وقواعده التي تصدرها الكلية سنويا وتنشر في دليل الطالب ، ولا يعتبر التسجيل نهائيا إلا بعد دفع رسوم الخدمة التعليمية المقررة كل فصل دراسي .
2. يجوز السماح للطلاب وبموافقة المرشد الأكاديمي التسجيل في ساعات معتمدة إضافية بحد أقصى 21 ساعة معتمدة بشرط أن يكون المعدل التراكمي للطلاب أعلى من 3.00 وألا يكون ذلك خلال السنة الأولى.
3. الطالب الذي يقل معدل التراكمي عن 2.00 يسمح له بالتسجيل في مواد بحد أقصى 12 ساعة معتمدة في الفصل الدراسي الواحد. وفي هذه الحالة يوضع الطالب تحت الملاحظة.
4. الطالب المتأخر عن مواعيد التسجيل ، لا يعد تسجيله في المقررات الدراسية نهائيا ، إلا إذا كان هناك مكان ، ويدفع رسوم تأخير تسجيل بالإضافة إلى رسوم الخدمة التعليمية المقررة.
5. لا يجوز للطلاب التسجيل في مقرر له متطلبات سابقة ، قبل استيفاء شروط النجاح في المقررات السابقة.
6. يمكن تسجيل طلاب كمستمعين في بعض المقررات ، لو كان هناك مكان لهم ، وذلك بعد تسجيل الطلاب النظاميين ، ولا يحق لهم دخول الامتحان أو الحصول على شهادة بالمقررات.
7. يمكن لمجلس الكلية تعديل المتطلبات السابقة للمقررات إذا اقتضت الحاجة لذلك .

مادة (٨): اشتراطات اللغة الانجليزية

- يطلب من جميع الطلاب المتقدمين للحصول على درجة البكالوريوس من جامعة النيل تقديم دليل على إتقان اللغة الإنجليزية:
1. للالتحاق بالجامعة في السنة الأولى يجب أن يقدم الطالب المتقدم درجة 6 أو أكثر في IELTS أو ما يعادلها:
 - درجة 61 أو أعلى في TOEFL IBT .
 - درجة 500 أو أكثر في TOEFL ITP .
 - درجة 6 أو أكثر في IELTS .
- وتكون نتائج الاختبارات صالحة لمدة عام واحد على الأكثر قبل تاريخ القبول.

2. إذا كان الطالب المتقدم حاصلا على درجة 4.5 إلى 5.5 في IELTS أو ما يعادلها، يتعين عليه الالتحاق ببرنامج اللغة المكثف بالجامعة (ENGL 001) حتى يصل إلى المستوى المطلوب.

3. للتخرج يجب أن يكون مستوى الطالب في اللغة الانجليزية على درجة 6.5 أو أعلى في IELTS أو ما يعادلها. للوصول لذلك المستوى يستطيع الطالب التسجيل في دورات اللغة الإنجليزية بجامعة النيل ENGL 101 و ENGL 102 أو بمراكز تعليم اللغة الإنجليزية الأخرى.

مادة (٩): متطلبات الدراسة

تم تصميم مقررات برامج كلية الهندسة والعلوم التطبيقية بما يتناسب مع NARS ولجنة قطاع التعليم الهندسي وما تحتويه من نسب لفئات المقررات المختلفة من حيث المعارف والمهارات المطلوبة للخريج على مستوى

- كافة الكليات (متطلبات الجامعة)،
- كافة البرامج بالكلية (متطلبات الكلية)،
- كافة الشعب والتخصصات بالبرنامج (متطلبات التخصص - عام)،
- التخصص داخل البرنامج (متطلبات التخصص - دقيق) على النحو التالي:

متطلبات الجامعة (University Core Requirements)

هي مجموعة من المقررات المفروضة على مستوى الجامعة ويشترك فيها جميع الطلاب على مختلف تخصصاتهم وتهدف هذه المقررات إلى تنمية الجوانب الثقافية والمعرفية بالمجتمع المصري والحضارة المصرية وتساهم بشكل كبير في تشكيل شخصية طالب الجامعة وانتماؤه للوطن وتعمل على ترسيخ وتعميق المهارات اللغوية والتي يُبنى عليها جميع مقررات كلية الهندسة.

متطلبات الكلية (Engineering Core Requirements)

هي مجموعة من المقررات المفروضة على مستوى كلية الهندسة والعلوم التطبيقية ويشترك فيها جميع الطلاب على اختلاف تخصصاتهم الهندسية وتوجهاتهم وتهدف هذه المقررات إلى تنمية المعارف والمهارات الأساسية لأي خريج من كليات الهندسة في العلوم الأساسية، والثقافة الهندسية والعلوم الهندسية الأساسية حول كافة التخصصات.

متطلبات التخصص - عام (Discipline General Requirements)

هي مجموعة من المقررات المفروضة على مستوى جميع التخصصات والشعب داخل البرنامج وتهدف هذه المقررات إلى تنمية المعارف والمهارات الأساسية في العلوم الهندسية الأساسية ومبادئ التصميم والتطبيقات في التخصص العام (معلومات عن جميع التخصصات الدقيقة).

متطلبات التخصص - دقيق (Discipline General Requirements)

هي مجموعة من المقررات المفروضة على مستوى التخصص داخل البرنامج وتهدف هذه المقررات إلى تنمية المعارف والمهارات في العلوم الهندسية والتصميمات والتطبيقات الهندسية التخصصية.

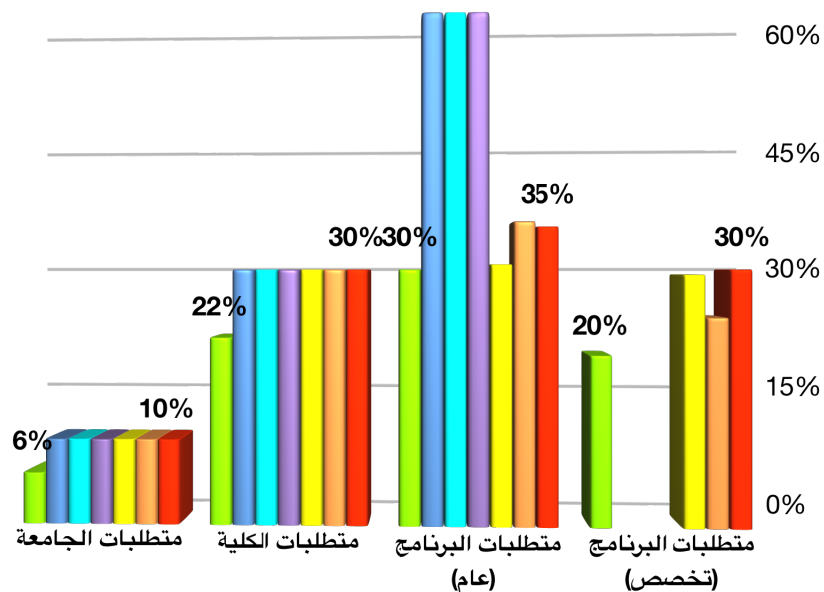
ويوضح الجدول والبيان التاليان توزيع المقررات في كلية الهندسة والعلوم التطبيقية على مستوى المتطلبات المختلفة وتوافقها مع النسب المقررة في NARS ولجنة قطاع التعليم الهندسي

Course Levels for Engineering Programs at NU (SCU)

Requirements		NARS (Min%)	NARS (Max%)	IENG	ECE	CE	MENG	CIEM
University	(%)	6%	10%	10%				
	CH	9.6	16	16				
	ECTS	16.2	27	25				
School	(%)	22%	30%	30%				
	CH	35.2	48	48				
	ECTS	59.4	81	82				
Program	(%)	30%	35%	60.0%	60.0%	60.0%	30.6%	35.6%
	CH	48	56	96	96	96	49	57
	ECTS	81	94.5	163	163	163	85	98
Specialization	(%)	20%	30%	0.0%	0.0%	0.0%	29.4%	24.4%
	CH	32	48	NA			47	39
	ECTS	54	81	NA			78	65
		78%	105%	100%	100%	100%	100%	100%

كما يتم توزيع المقررات في البرامج المقدمة بالكلية على 7 فئات طبقاً لتوصيف لجنة قطاع التعليم الهندسي لمجال الهندسة على النحو التالي:

■ NARS (min) ■ IENG ■ ECE ■ CE ■ MENG ■ CIEM ■ NARS (max)



Course Categories for Engineering Programs at NU (NARS)

Course Category		NARS (Min%)	NARS (Max%)	IENG	ECE	CE	MENG	CIEM
Humanities & Social Sciences	%	8%	12%	10.00%	10.00%	10.00%	10.00%	10.00%
	CH	12.8	19.2	16	16	16	16	16
	ECTS	21.6	32.4	25	25	25	25	25
Business Administration	%	2%	4%	3.75%	3.75%	3.75%	3.75%	3.75%
	CH	3.2	6.4	6	6	6	6	6
	ECTS	5.4	10.8	10	10	10	10	10
Mathematics & Basic Sciences	%	18%	22%	18.13%	18.13%	18.13%	18.13%	18.13%
	CH	28.8	35.2	29	29	29	29	29
	ECTS	48.6	59.4	49	49	49	49	49
Engineering Culture	%	4%	6%	3.75%	3.75%	3.75%	3.75%	3.75%
	CH	6.4	9.6	6	6	6	6	6
	ECTS	10.8	16.2	10	10	10	10	10
Basic Engineering Sciences	%	25%	30%	28.75%	28.75%	26.88%	28.75%	28.75%
	CH	40	48	46	46	43	46	46
	ECTS	67.5	81	78	78	73	78	78
Engineering Applications & Design	%	25%	30%	30.00%	30.00%	31.88%	30.00%	30.00%
	CH	40	48	48	48	51	48	48
	ECTS	67.5	81	60	80	85	80	80
Project & Practical Training	%	4%	6%	5.63%	5.63%	5.63%	5.63%	5.63%
	CH	6.4	9.6	9	9	9	9	9
	ECTS	10.8	16.2	18	18	18	18	18
		86%	110%	100%	100%	100%	100%	100%

مادة (٩): متطلبات الحصول على درجة البكالوريوس

- للحصول على درجة البكالوريوس في العلوم الهندسية ، لابد أن يجتاز الطالب عدد (160 ساعة معتمدة CH وتكافئ 270 ساعة معتمدة أوروبية ECTS)، طبقاً للمتطلبات التي تعرضها هذه اللائحة، وبمتوسط نقاط لا يقل عن 2.00

2. يطلب من الطالب تقديم مشروع للتخرج ، كما هو موضح فى هذه اللائحة ، ويجوز أن يكون المشروع مقسما على فصلين دراسيين متتاليين، ولا يتخرج الطالب إلا بعد أن يستوفي شروط النجاح فى المشروع.
3. يؤدى الطالب تدريبا عمليا تحت إشراف الكلية.

مادة (١٠): المرشد الأكاديمي

1. يعين مجلس الكلية ، لكل طالب ، عند التحاقه بالدراسة ، مرشدا أكاديميا من بين أعضاء هيئة التدريس مع منسق البرنامج الأكاديمي، يمكن أن يستمر معه حتى نهاية الدراسة.
2. يلتزم المرشد الأكاديمي بمتابعة أداء الطالب ، ومعاونته فى اختيار المقررات كل فصل دراسي ، وأن يطلب وضع الطالب تحت الملاحظة لفصلين دراسيين، مع خفض عدد الساعات المسجل فيها وبعد أدنى 13 ساعة معتمدة وذلك فى حالة حصول الطالب على معدل تراكمي أقل من 2.00.

مادة (١١): شروط التعديل والإلغاء والانسحاب

1. يحق للطالب. تغيير مقررات ، سجل. فيها ، بأخرى ، خلال أسبوعين من- بدء الدراسة. ، ولا يسرى ذلك على الفصل الصيفي.
2. يحق للطالب الانسحاب من المقرر (ويرد للطالب 70% من الرسوم) خلال الفترة بعد أسبوعين من بدء الدراسة وقبل مرور 8 أسابيع على بدء الدراسة
3. يحق للطالب الانسحاب من المقرر (لا ترد له أي رسوم) خلال الفترة بعد مرور 8 أسابيع على بدء الدراسة وقبل مرور 80% من مدة الفصل الدراسي.
4. الطالب الذي يرغب فى الانسحاب من فصل دراسي ، لظروف المرض أو بعذر تقبله الكلية، عليه التقدم بطلب لشئون الطلاب ، ويحصل على موافقة على الانسحاب ولاتدخل له هذه المقررات في حساب المتوسط العام ، على أن يقوم بإعادة المقررات التى سجل فيها فى فصل دراسي لاحق .
5. يحق للطالب إعادة التسجيل في أى مقرر رسب فيه ، ويعيد المقرر دراسة وامتحانا ، بعد دفع رسوم الخدمة التعليمية المقررة .

مادة (١٢): تقديرات مقررات متطلبات الدراسة

1. تقدر نقاط كل ساعة معتمدة على النحو التالي:

GPA, Letter Grades and Grade Percentages

عدد النقاط	التقدير	النسبة المئوية الحاصل عليها الطالب
4.00	A+	97% فأعلى
4.00	A	93% حتى أقل من 97%
3.70	-A	89% حتى أقل من 93%
3.30	+B	84% حتى أقل من 89%
3.00	B	80% حتى أقل من 84%
2.70	-B	76% حتى أقل من 80%
2.30	+C	73% حتى أقل من 76%
2.00	C	70% حتى أقل من 73%
1.70	-C	67% حتى أقل من 70%
1.30	+D	64% حتى أقل من 67%
1.00	D	60% حتى أقل من 64%
0.00	F	أقل من 60%

ملحوظة: التقدير A+ يحتسب بعدد نقط 4.00 مماثل للتقدير A ويعتبر هذا التقدير تكريماً للطالب المتميز تميزاً غير اعتيادياً.

مادة (١٣): حساب متوسط النقاط

1. لا يعتبر الطالب ناجحاً في أى مقرر إلا إذا حصل على تقدير D على الأقل.
2. لابد من نجاح الطالب في المقررات التي تعتبر متطلبات لمقررات تالية ، قبل التسجيل في تلك المقررات.
3. لا يحصل الطالب على البكالوريوس إلا إذا حقق متوسط نقاط قدره 2.00 على الأقل.
4. يحسب مجموع النقاط التي حصل عليها الطالب في أى فصل دراسي، على أنها مجموع نقاط كل المقررات التي درسها في هذا الفصل الدراسي.
5. يحسب متوسط نقاط أى فصل دراسي، على أنه ناتج قسمة مجموع النقاط التي حصل عليها الطالب في هذا الفصل، مقسوماً على مجموع الساعات المعتمدة لهذه المقررات.
6. المقرر الذي يحصل فيه الطالب على أقل من D ، يتم اعتباره في متوسط النقاط ولا يعتد به ضمن الساعات المعتمدة المقررة ، إلا إذا أعاده ونجح فيه فتحسب الأخيرة فقط وبحد أقصى B.

7. يسمح للطالب بإعادة مواد مختلفة بحد أقصى 12 ساعة معتمدة. إذا استهلك الطالب الحد المسموح للإعادة وحصل على (C)، يحق له الإعادة مرة أخرى ولكن في هذه الحالة تدخل درجتى الإعادة في حساب متوسط الدرجات وتظهر الاثنان في الشهادة.
8. يسمح للطالب ، فيما عدا حالات الغش، بإعادة مادة أو استبدالها بأخرى مرة واحدة لتحسين درجته فيها بعد موافقة رئيس مجلس القسم المختص بتلك المادة. وفي هذه الحالة تدخل الدرجة الجديدة في حساب مجموع الدرجات، وتظهر الدرجة السابقة في الشهادة ولكن لا تدخل في حساب متوسط مجموع الدرجات.
9. يحق للطالب الراسب بسبب الغش إعادة المادة ولكن تظهر الدرجتان في شهادته حتى إذا لم يستهلك 12 ساعة معتمدة من المواد المعادة.
10. يحسب متوسط نقاط التخرج (بعد نجاحه في مجمل متطلبات التخرج)، على أنها ناتج قسمة مجموع كل نقاط المقررات التي درسها الطالب (بغض النظر عن نتيجة الامتحان ، سواء نجح أو رسب فيها) على مجموع الساعات المعتمدة لهذه المقررات.

مادة (١٤): تقديرات المقررات التي لا تحسب ضمن المتطلبات

- المقررات التي يسجل فيها الطالب كمستمع ، أو التي يطلب فيها النجاح فقط ، أو لم يكملها لسبب قبلته الكلية ، ولا تدخل في حساب متوسط النقاط ، ويرصد له أحد التقديرات التالية:

Student Audit Grades

التقدير	المداول	
S	Satisfactory	مرضى
U	Unsatisfactory	غير مرضى
W	Withdrew	انسحاب
AU	Audit	مستمع
F	Fail	راسب
P	Pass	ناجح

مادة (١٥): تعريف حالة الطالب

كلما أكمل الطالب 20% من متطلبات التخرج ، كلما اعتبر منتقلا من مستوى إلى مستوى أعلى منه ، ولا يتطلب ذلك تحديد نوعية أو مستوى المقررات التي أكملها الطالب ، ويعتبر ذلك نوعا من تعريف لموقع الطالب بالكلية حسب ما يلي:

Student Academic Levels

المستوى الدراسي	تعريف موقع الطالب بنظام الدراسة	نسبة الساعات المعتمدة التي اجتازها الطالب بنجاح	
		من	إلى
0	Freshman	0% (0 CH / 0 ECTS)	20% (36 CH / 54 ECTS)
1	Sophomore	20% (36 CH / 54 ECTS)	40% (64 CH / 108 ECTS)
2	Junior	40% (64 CH / 108 ECTS)	60% (96 CH / 162 ECTS)
3	Senior 1	60% (96 CH / 162 ECTS)	80% (128 CH / 216 ECTS)
4	Senior 2	80% (128 CH / 216 ECTS)	100% (160 CH / 270 ECTS)

مادة (١٦): أسلوب تقييم الطالب

- توزع درجات كل مقرر بنسب مئوية بين المكونات الآتية:
 - الأعمال الفصلية من أبحاث وتقارير وامتحانات مفاجئة...إلخ،
 - امتحانات العملي/الشفوي،
 - امتحان (امتحانات) نصف الفصل الدراسي،
 - الامتحان التحريري النهائي،
 - مشروع على مستوى المقرر.
- يتم تحديد مكونات المقرر ومكونات التقويم طبقاً لتوصيف المقرر والذي يتم توضيحه للطالب في بداية الفصل الدراسي.
- يعقد لكل مقرر امتحان تحريري نهائي في نهاية الفصل الدراسي، ويتم عقد عدد 1 أو 2 امتحان نصف فصليين (طبقاً لطبيعة المقرر) باستثناء مشروع التخرج.
- لا تزيد نسبة أي مكون من مكونات التقويم للطالب عن 33.3%.
- يجب حصول الطالب على نسبة لا تقل عن 40% من درجات الامتحان التحريري النهائي لكي يعد ناجحاً حتى لو كان مجموع درجاته في المقرر أعلى من الحد الأدنى للنجاح. ويجوز في المواد العملية والتي تتبنى أسلوب Project-Based Learning أن يحل مشروع المقرر محل الامتحان التحريري النهائي ويتعين على أستاذ المادة أن يقوم بنفسه بتقييم المشروعات.
- بالنسبة لمشروع التخرج فيتم توزيع أحمال المشروع وتقييمه على فصلين دراسيين متتاليين حيث يعمل الطلبة في مجموعات ويشرف عليهم عضو من أعضاء هيئة التدريس ويتناول مشكلة هندسية متعلقة بالتخصص ويتم تقسيم درجاته بالتساوي بين الفصلين الدراسيين (3 ECTS ↔ 6 CH لكل فصل). ويتم عقد امتحان شفوي في نهاية الفصل الدراسي الثاني ويمكن أن يحضره ممتحن خارجي من جامعة أو من الصناعة ويتم حجب درجة المشروع في الفصل الدراسي الأول حتى الانتهاء من الامتحان الشفوي في نهاية الفصل الدراسي الثاني ويتم تقسيم الدرجات بنسبة 30% للامتحان الشفوي النهائي و 70% لأعمال السنة لمشروع التخرج

ككل ويتمنح التقدير النهائي لمادة المشروع فى الفصلين الدراسيين بالتساوى بعد الانتهاء من مناقشته.

- بالنسبة للتدريب العملى فإن الطالب يقوم بتقديم تقرير نهائى بعد انتهاء التدريب موضحاً فيه المهارات المكتسبة وما قام بالتدريب عليه ويتم تقييم هذا التقرير عن طريق عضو هيئة التدريس فى التخصص الذى قام المتدرب بالعمل به ويتم منح الطالب درجة للتدريب العملى من قبل عضو هيئة التدريس بعد عقد امتحان شفوى للمتدرب. هذا ويراعى أن عدد النقاط المحسبة للتدريب العملى تكون (6 ECTS ↔ 3 CH) للتدريب العملى بعد الانتهاء من الفصل الدراسى السادس خلال العطلة الصيفية. ولا تقل فترة التدريب العملى عن 4 أسابيع.
- لابد أن يحضر الطالب نسبة لا تقل عن 75% من المحاضرات والتمارين والمعامل وإلا يعد الطالب محروم من دخول الامتحان.
- يعد الطالب راسباً إذا حصل فى مجموع درجات المقرر على تقدير F.
- عند إعادة الطالب لأى مقرر، فإنه يعيده دراسة وامتحاناً، ويقيم مرة أخرى بالكامل، وتحسب له نقاط المقرر فى الإعادة بحد أقصى (B) ولا بد أن يحضر الطالب نسبة لا تقل عن 75% من المحاضرات والتمارين والمعامل وإلا يعد الطالب راسباً ويحصل على تقدير (F).
- يجوز للمرشد الأكاديمى طلب إعادة الطالب لبعض المقررات التى نجح فيها من قبل أو إضافة مقررات جديدة له ، بغرض رفع متوسط النقاط ليحقق متطلبات التخرج.

مادة (١٧): مراتب الشرف ومنح التفوق

تمنح مرتبة الشرف للطالب الذى لا يقل معدله التراكمى عن 3.30 مع تحقيق مثل هذا المعدل على الأقل خلال جميع فصول الدراسة، ويشترط ألا يكون الطالب قد حصل على تقدير F فى أى مقرر خلال دراسته بالكلية.

مادة (١٨): التحويل بين البرنامج

يجوز للطالب طلب التحويل إلى البرامج محل هذه اللائحة ، من البرامج التى تطرحها نفس الكلية أو كليات أخرى بالجامعة ، وذلك قبل وصول الطالب إلى مرحلة الـ Senior ويجوز تحويل الساعات المعتمدة المشتركة بين البرنامجين ، وبعد موافقة مجلسى القسمين و مجلسى الكليتين.

مادة (١٩): التحويل من جامعات أخرى

- لتحويل الساعات المعتمدة لمادة من جامعة أخرى ، يجب على الطالب أن يكون حاصلًا على الأقل على 2.0 فى المادة. ويقرر القسم المختص عدد الساعات الدراسية المحسبة للتحويل. ويعود قرار قبول الطالب فى نفس التخصص إلى رئيس القسم.
- إذا كان الطالب محولاً من جامعة لا تستخدم نظام الساعات الدراسية المعتمدة، يتم حساب درجاته فى المواد المحولة وفقاً للجدول التالى:

Conversion from Semester-based Systems

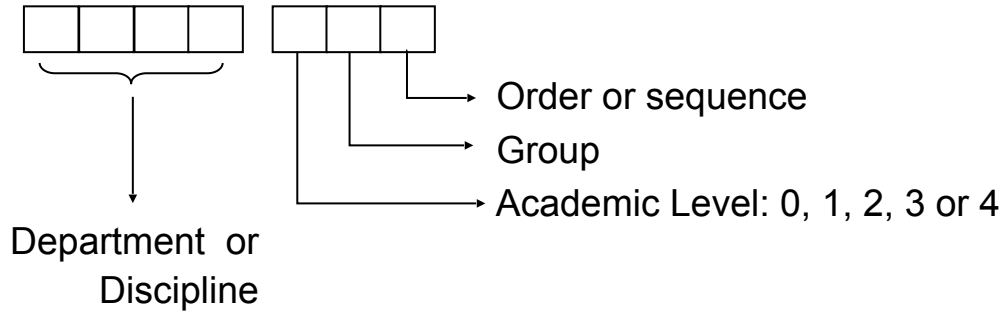
نظام الساعات المعتمدة		نظام الفصلين الدراسيين
التقدير	عدد النقاط	النسبة المئوية
A+	4.00	95% إلى أقل من 100%
A	4.00	90% إلى أقل من 95%
-A	3.70	85% إلى أقل من 90%
+B	3.30	80% إلى أقل من 85%
B	3.00	75% إلى أقل من 80%
-B	2.70	71% إلى أقل من 75%
+C	2.30	68% إلى أقل من 71%
C	2.00	65% إلى أقل من 68%

و لا يتم قبول طلبات تحويل لمواد يكون تقدير الطالب فيها أقل من 65%

مادة (٢٠): تشكيل لجان الممتحنين:

يتم تشكيل لجان الممتحنين من أستاذ المادة ومن يختاره أستاذ المادة من أعضاء هيئة التدريس القائمين بالتدريس فعلياً.

مادة (٢١): جدول النظام الكودى للمقررات الدراسية



Course Coding at NU

Code	Program/Discipline	No
ENGL	English language	1
HUMA	Humanities	2
SSCI	Social Sciences	3
NSCI	Natural Sciences	4
CSCI	Computer Science	5
MATH	Mathematics	6
PHYS	Physics	7
CHEM	Chemistry	8
ENGR	General Engineering	9
ECEN	Electrical & Computer Engineering	10
IENG	Industrial Engineering	11
MENG	Mechanical Engineering	12
CIEM	Civil Engineering	13
ENTR	Entrepreneurship	14

الباب الرابع

متطلبات الجامعة ومتطلبات الكلية

يحتوي الجدول التالي على بيان بمقررات متطلبات الجامعة ومتطلبات الكلية موضحاً فيه ساعات المقررات بنظام الساعات المعتمدة الأمريكية ونظام النقاط المعتمدة الأوروبية.

University and Engineering Requirements Courses

Course Code	Course Title	University Core Requirements		Engineering Core Requirements	
		CH	ECTS	CH	ECTS
ENGL 001	Intensive English	0	0		
ENGL 101	English I	0	0		
ENGL 102	English II	0	0		
ENGL 201	Writing Skills	3	5		
ENGL 202	Communication and Presentation Skills	3	5		
HUMA 101	Introduction to Scientific & Critical Thinking	2	3		
HUMA 102	Introduction to Ethics	2	3		
HUMA 103	Selected Topics in Humanities & Arts	2	3		
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3		
SSCI 103	Selected Topics in Social Sciences	2	3		
CHEM 101	Chemical Principles			3	5
CSCE 101	Computer & Information Skills			3	5
CSCE 201	Introduction to Programming			3	5
ECEN 101	Electric Circuits			3	5
ENGR 101	Introduction to Engineering Disciplines			3	5
ENGR 102	Engineering Design			3	5
MATH 111	Analytical Geometry & Calculus I			3	5
MATH 112	Calculus II			3	5
MATH 202	Probability & Statistics for Engineers			3	5
MATH 203	Differential Equations			3	5
MATH 301	Linear Algebra			3	5
MATH 303	Numerical Methods			3	5
MENG 101	Engineering Mechanics I - Statics			2	4
MENG 102	Engineering Mechanics II - Dynamics			2	4
PHYS 101	Physics I			4	7
PHYS 102	Physics II			4	7
		16	25	48	82

يحتوي الجدول التالي على بيان بمقررات متطلبات الجامعة ومتطلبات الكلية موزعة طبقاً لفئات المهارات الموضحة في NARS بنظام الساعات المعتمدة الأمريكية ونظام النقاط المعتمدة الأوروبية وهي:

1. Humanities and Social Sciences
2. Business Administration
3. Mathematics and Basic Sciences
4. Engineering Culture
5. Basic Engineering Sciences
6. Engineering Applications
7. Project and Practical Training

Mapping Uni & Eng. Requirements Courses to Course Categories

Course Code	Course Title	Hum. & Social		Business Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.		Eng. App. & Design		Project & PT	
		C	EC	C	EC	C	EC	C	EC	C	EC	C	EC	C	EC
		H	TS	H	TS	H	TS	H	TS	H	TS	H	TS	H	TS
	University Requirements														
ENGL 001	Intensive English														
ENGL 101	English I	0	0												
ENGL 102	English II	0	0												
ENGL 201	Writing Skills	3	5												
ENGL 202	Communication and Presentation Skills	3	5												
HUMA 101	Introduction to Scientific & Critical	2	3												
HUMA 102	Introduction to Ethics	2	3												
HUMA 103	Selected Topics in Humanities & Arts	2	3												
SSCI 101	Selected Topics in Egyptian & Arab	2	3												
SSCI 103	Selected Topics in Social Sciences	2	3												
	Total University Requirements	16	25	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering Requirements														
CHEM 101	Chemical Principles					3	5								
CSCE 101	Computer & Information Skills									3	5				
CSCE 201	Introduction to Programming									3	5				
ECEN 101	Electric Circuits									3	5				
ENGR 101	Introduction to Engineering Disciplines							3	5						
ENGR 102	Engineering Design									3	5				
MATH 111	Analytical Geometry & Calculus I					3	5								
MATH 112	Calculus II					3	5								
MATH 202	Probability & Statistics for Engineers					3	5								
MATH 203	Differential Equations					3	5								
MATH 301	Linear Algebra					3	5								
MATH 303	Numerical Methods					3	5								
MENG 101	Engineering Mechanics I - Statics									2	4				
MENG 102	Engineering Mechanics II - Dynamics									2	4				
PHYS 101	Physics I					4	7								
PHYS 102	Physics II					4	7								
	Total Engineering Requirements	0	0	0	0	29	49	3	5	16	28	0	0	0	0

توصيف مقررات متطلبات الجامعة ومتطلبات الكلية

متطلبات الجامعة

(UC) - ENGL 001

Course Title	Intensive English	
Course Code	ENGL 001	
Prerequisites	A minimum score of 400 on TOEFL ITP, 4.5 on IELTS, 32 on TOEFL IBT or B1 on APTIS. Students sometimes will also be required to pass a written NU writing exam.	
Classification within the curriculum	Depends on Admission Level in English	
Course Position in Study Plan	Fall/Spring	
Contact Hours (weekly)	Lectures	
	Tutorials	
	Labs	
	TOTAL	0
EG Credit Hours		
ECTS		
Student Workload (SWL) / semester		
Topic Category	NONE	
Topic Level	University Requirements	
Description This is a preparatory foundation course designed to build students’ proficiency in the reading, listening and writing skills. This course will cover the mechanics of writing with special emphasis on grammar, sentence structure and paragraph organization. It also focuses on the reading skills of skimming, scanning, reading for gist, predicting and reaching conclusions, as well as summarizing and note-taking. Students are also required to write three to five paragraph academic essays.		
Lab and Tutorials NONE		

Literature

Course Textbook:

- **Textbook relevant to the selected course topic:**

1. Reading & Study skills:

- Cox, K & Hill, D (2011). EAP NOW!. English for Academic purposes, 2nd edition. Australia: Pearson.
- Rogers, L. (2011). Reading Skills. England: Delta Publishing.
- Baker, L. et al (2007). Interactions 2: Integrated Skills Edition. New York: McGraw-Hill/Contemporary.
- Vocabulary: (Supplementary material)
- Schmitt, D, Schmitt, N & Mann, D (2011). Focus on Vocabulary 1 Bridging Vocabulary. Pearson Education, NY

2. Writing & Grammar:

- Oshima, A. & Hogue, A. (2007). Introduction to Academic Writing, Third Edition. New York: Addison Wesley Longman.

Grammar:

- Azar, B. Hagen, A. (2009) Understanding and Using English Grammar, Fourth edition, Pearson Education ESL

3. Supplementary material

- Prepared by the teacher as required.

Additional References

- **Textbook relevant to the selected course topic**

(UC) - ENGL 101

Course Title	English I	
Course Code	ENGL 101	
Prerequisites	A minimum score of 500 on the TOEFL. Students will also be required to pass a written NU test (essay).	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	
	Tutorials	
	Labs	
	TOTAL	0
EG Credit Hours		
ECTS		
Student Workload (SWL) / semester	50	
Topic Category	Humanities and Social Sciences	
Topic Level	University Requirements	
Description This course introduces students to the process of writing through reading. It uses an integrated approach to teaching the skills of thinking, reading and writing that first year students need in order to succeed in their academic work. Students are challenged to be independent thinkers by showing them how to organize information, interpret different perspectives, solve challenging problems, analyze complex issues and communicate their ideas clearly by drawing heavily on exciting topics to stimulate their interests and guide them into thinking and writing critically.		
Lab and Tutorials NONE		
Literature Course Textbook: • Textbook relevant to the selected course topic: 1. Reading: -Lockwood, R.B & Sippell, K. (2012). Four point Reading and Writing Intro: English for Academic purposes. U.S.A. -Flemming, L. (2009). Reading for Thinking, Sixth Edition, U.S.A: Heinle, Cengage Learning. -Flemming, L. (2011). Reading for Results, Eleventh Edition, Canada: Wadsworth, Cengage Learning. 2. Writing: -Oshima, A. & Hogue, A. (2006). Writing Academic English, Fourth Edition, New York: Addison Wesley, Longman. -Davis, J. & Liss, R. (2006). Effective Academic Writing 3, New York: OUP. (Recommended for supplementary material). 3. Supplementary Material		
Additional References • Textbook relevant to the selected course topic		

(UC) - ENGL 102

Course Title	English II	
Course Code	ENGL 102	
Prerequisites	ENGL 101 - English I	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	
	Tutorials	
	Labs	
	TOTAL	0
EG Credit Hours		
ECTS		
Student Workload (SWL) / semester	50	
Topic Category	Humanities and Social Sciences	
Topic Level	University Requirements	

Description

This course builds on the skills introduced in English 101. It is developed to help students as they move to more formal, academic discourse, focusing on writing meaningful essays and developing their skills, through observation, analysis, critical reading and thinking. Emphasis is placed on the arts of style, organization and thoughtful content as well as sharpening the skills of logical reasoning and problem analysis through the development of reading comprehension strategies for informative and expository texts with focus on summarizing, analyzing and synthesizing textual material. Students will examine selected readings and stylistic strategies as a means of developing effective argument-based writing.

Lab and Tutorials

NONE

Literature

Course Textbook:

- **Textbook relevant to the selected course topic:**

-Vandermeij, R., Meyer, V., Van Rys, J., & Sabranek, P. (2012). *The College Writer: A guide to Thinking, Writing, and Researching. International Edition, 4th Edition*. U.S.A: Wadsworth, Cengage Learning.

-Smalley, R.L. Ruetten, M.K. & kozyrev, J.R. (2012). *Refining Composition Skills, Sixth Edition*. U.S.A: Heinle, Cengage Learning.

-*Supplementary material*

Additional References

- **Textbook relevant to the selected course topic**

(UC) - ENGL 201

Course Title	Writing Skills	
Course Code	ENGL 201	
Prerequisites	ENGL 102 - English II - or IELTS 6.5 or equivalent	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	3.75
	Tutorials	0
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Humanities and Social Sciences	
Topic Level	University Requirements	
Description This course focuses on the development and use of research, critical analysis, organization and revision within the writing process. Students are given instructions in library and online research and methods of documentation, using quotations and source citations for professional papers using inductive and deductive reasoning, developing the skills of scientific argumentation, persuasion, evaluation and criticism needed for a research paper. Most of the course work focuses on students' work. Each student completes one minor and one major project during the term as well as a series of short response essays.		
Lab and Tutorials NONE		
Literature Course Textbook: • Textbook relevant to the selected course topic: -Vandermey, R., Meyer, V., Van Rys, J., & Sabranek, P. (2012). <i>The College Writer: A guide to Thinking, Writing, and Researching. International Edition, 4th Edition.</i> U.S.A: Wadsworth, Cengage Learning. -Dollahite, N.E, & Haun, J. (2012). <i>Source Work, Second Edition.</i> U.S.A: Heinle, Cengage Learning. -Supplementary material Additional References • Textbook relevant to the selected course topic		

(UC) - ENGL 202

Course Title	Communication and Presentation Skills	
Course Code	ENGL 202	
Prerequisites	ENGL 201 - Writing Skills	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	3.75
	Tutorials	0
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Humanities and Social Sciences	
Topic Level	University Requirements	

Description

The ability to communicate effectively through the use of the written and spoken word is a requirement in today's increasingly complex world. This course helps students learn and practice the skills of interpersonal and professional communication, improving on their skills in oratory and public presentations by introducing them to writing professional documents, including technical/ scientific reports, business letters, faxes, resumes, etc. It also helps them understand the report writing process by practicing techniques of writing a well structured report as well as delivering a well structured presentation in a formal setting. It focuses on inter-personal and professional communication with special consideration given to the cultural and linguistic aspects. Attention is also given to human perceptions, interpersonal dynamics, the art of listening and convincing as well as the value of verbal and visual symbols.

Lab and Tutorials

NONE

Literature

Course Textbook:

- **Textbook relevant to the selected course topic:**

-Vandermeij, R., Meyer, V., Van Rys, J., & Sabranek, P. (2012). *The College Writer: A Guide to Thinking, Writing, and Researching. International Edition, 4th Edition*. U.S.A: Wadsworth, Cengage Learning.

-Supplementary Material

Additional References

- **Textbook relevant to the selected course topic**

(UC) - HUMA 101

Course Title	Introduction to Scientific & Critical	
Course Code	HUMA 101	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0
	Labs	0
	TOTAL	2.5
EG Credit Hours	2	
ECTS	3	
Student Workload (SWL) / semester	75	
Topic Category	Humanities and Social Sciences	
Topic Level	University Requirements	
Description The course aims to develop a broad understanding of logical and critical thinking method; it also works between science and society in our daily lives, such as studying the characteristics of the method of scientific inquiry and to give an overview of the role of scientific communities. It can be regarded as an applicable method for helping students to develop a reliable persuasive method.		
Lab and Tutorials None		
Literature Course Textbook: Textbook relevant to the selected course topic: Kirby, G. (2004). Thinking, New Jersey: Prentice Hall Ruggiero Carey, S., (1997).A Beginner's guide to scientific method, Belmont , Calif.: Wadsworth Publishing Company Selected articles from different social-science journals.		
Additional References Textbook relevant to the selected course topic		

(UC) - HUMA 102

Course Title	Introduction to Ethics	
Course Code	HUMA 102	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0
	Labs	0
	TOTAL	2.5
EG Credit Hours	2	
ECTS	3	
Student Workload (SWL) / semester	75	
Topic Category	Humanities and Social Sciences	
Topic Level	University Requirements	
Description The emphasis of the course is on ethical issues and problems that arise in professional and business environments, such as integrity, civic responsibility, ethical conduct and misconduct, employee and corporate rights and responsibilities, and on issues concerning social and economic justice in a global economy.		
Lab and Tutorials None		

Literature

Course Textbook:

- **Textbook relevant to the selected course topic:**

-Hartman L.P., DesJardins J. (2008), *Business Ethics: Decision Making for Personal Integrity & Social Responsibility*, McGraw Hill Higher Education Division (ISBN: 9780071264600)

-DesJardins J. (2011), *An introduction to Business Ethics*, McGraw Hill Higher Education Division (ISBN: 139780073535814)

-Weiss J.W. (2009), *Business Ethics: A Stakeholder & Issues Management Approach*, 5th Edition, South-Western Cengage Learning (ISBN: 978-0-324-59704-2)

-Martin, M.W., and Schinzinger, R.(2005), *Ethics in Engineering*, 4th edition, McGraw-Hill (ISBN: 0-07-283115-4)

Additional References

- **Textbook relevant to the selected course topic**

Additional teaching materials (PPT presentations, references ...) can be downloaded from the course *Moodle* site accessible via the following URL: www.courses.nileu.edu.eg. The enrolment key to access the site will be provided by the NU IT or registrar Department prior to the first class.

(UC) - HUMA 103

Course Title	Selected Topics in Humanities & Arts	
Course Code	HUMA 103	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0
	Labs	0
	TOTAL	2.5
EG Credit Hours	2	
ECTS	3	
Student Workload (SWL) / semester	75	
Topic Category	Humanities and Social Sciences	
Topic Level	University Requirements	
Description A course in any of the fields of Literature, Philosophy, Art, Music, or Sports.		
Lab and Tutorials None		
Literature Course Textbook: - Textbook relevant to the selected course topic: Additional References - Textbook relevant to the selected course topic		

(UC) - SSCI 101

Course Title	Selected Topics in Egyptian & Arab Heritage	
Course Code	SSCI 101	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0
	Labs	0
	TOTAL	2.5
EG Credit Hours	2	
ECTS	3	
Student Workload (SWL) / semester	75	
Topic Category	Humanities and Social Sciences	
Topic Level	University Requirements	
Description		
A course highlighting aspects of the extraordinarily rich Ancient Egyptian, Coptic and Islamic heritage of		
Lab and Tutorials None		
Literature		
Course Textbook:		
• Textbook relevant to the selected course topic:		
Additional References		
• Textbook relevant to the selected course topic		

(UC) - SSCI 103

Course Title	Selected Topics in Social Sciences	
Course Code	SSCI 103	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0
	Labs	0
	TOTAL	2.5
EG Credit Hours	2	
ECTS	3	
Student Workload (SWL) / semester	75	
Topic Category	Humanities and Social Sciences	
Topic Level	University Requirements	
Description A course in any of the fields of sociology, economics, education, history, anthropology, psychology, or		
Lab and Tutorials None		
Literature Course Textbook: - Textbook relevant to the selected course topic: Additional References - Textbook relevant to the selected course topic		

(EC) - CHEM 101

Course Title	Chemical Principles	
Course Code	CHEM 101	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Mathematics and Basic Sciences	
Topic Level	Engineering Requirements	
Description The course starts with an introduction to chemistry in order to joint all students to the same level of chemistry principles whether they studied chemistry before or not. Then the course proceeds with exploring mandatory topics for engineering students including introductions to other courses which require chemistry as a prerequisite course.		
Lab and Tutorials This is a theoretical course that includes tutorials for discussion and lab applications on the topic.		
Literature Course Textbook: - Textbook relevant to the selected course topic: - Course Textbook: Chemistry for Engineering students (second edition, Lawrence S. Brown , Thomas A. Holme) - Additional Resources: - Applied chemistry for Engineers(Third edition ,R M E Diammant) Provided lecture and laboratory notes Additional References - Textbook relevant to the selected course topic		

(EC) - CSCE 101

Course Title	Computer & Information Skills	
Course Code	CSCE 101	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	1.25
	Tutorials	0
	Labs	3.75
	TOTAL	5
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Engineering Requirements	
Description This course serves as an introduction to computers and information skills to enable efficient use of computers and to prepare student for lifelong learning in information technology. The course focuses on basic understanding of operating-systems, hardware, networks, software applications, as well as a basic understanding of system development, and social implications of information technology. The course also introduces students to standard office software applications for information formatting and web-page design, and database management. Through a series of assignments and projects.		

(EC) - CSCE 201

Course Title	Introduction to Programming	
Course Code	CSCE 201	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	1.25
	Tutorials	0
	Labs	3.75
	TOTAL	5
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Engineering Requirements	
Description This course serves as an introduction to the process of program design and analysis using a modern programming language. The objective of the course is to teach the fundamental principles of programming. Towards this end, the course provides a basic understanding of programming concepts; constructs, data types, looping, nesting, functions, and arrays. The topics covered also include good programming practices, modularity, reusability and ease of maintenance. Hands on experience will be emphasized throughout the course. We will use the Python programming language. The course will prepare students from Computer Science and Engineering majors to make use of programming knowledge in their chosen field.		

(EC) - ECEN 101

Course Title	Electric Circuits	
Course Code	ECEN 101	
Prerequisites	PHYS 101 - Physics I	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Engineering Requirements	
Description Basic electrical concepts and network theorems, circuit laws, resistance, capacitance, inductance; response of RC, RL and RLC circuits to initial conditions and constant forcing functions; AC steady-state analysis and AC power. Computer applications (using SPICE or similar tools).		
Lab and Tutorials This is a theoretical course that includes lab applications on the topic.		
Literature Course Textbook: - Textbook relevant to the selected course topic: - Course Textbook: - Charles K. Alexander and Matthew Sadiku, “Fundamentals of Electric Circuits”, 5th Edition, McGrawHill, 2013. - Additional Resources: J. W. Nilsson and S. A. Riedel, “Electric Circuits”, 9th Edition. Upper Saddle River, NJ: Prentice Hall, 2011. J.A. Svoboda and R.C. Dorf, “Introduction to Electric Circuit”, Wiley, 9th edition		
Additional References Textbook relevant to the selected course topic		

(EC) - ENGR 101

Course Title	Introduction to Engineering Disciplines	
Course Code	ENGR 101	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Culture	
Topic Level	Engineering Requirements	
Description The course gives freshmen an overview of the main engineering disciplines thus helping them make the right choice regarding their future careers. Case studies in engineering are used to illustrate engineering and scientific principles. The students are also familiarized with some of the important engineering tools for problem solving such as MATLAB.		
Lab and Tutorials This is a theoretical course that includes lab applications on the topic.		
Literature Course Textbook: - Textbook relevant to the selected course topic: Additional References - Textbook relevant to the selected course topic		

(EC) - ENGR 102

Course Title	Engineering Design	
Course Code	ENGR 102	
Prerequisites	ENGR 101 - Introduction to Engineering Disciplines	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Engineering Requirements	
Description An introduction to the methods, tools, and processes related to engineering design. The course gives the student the ability to communicate by means of engineering drawing, including Orthographic representation of shapes, to develop three-dimensional imagination of forms and methods of presenting them in the plane, acquiring the skill of dealing with complex figures and study their geometrical properties. The students are also familiarized with some of the important engineering tools for graphical modeling including Computer-Aided Drawing (CAD) and Computer-Aided Manufacturing (CAM). Group projects and case studies in engineering are used to illustrate engineering and scientific principles.		
Lab and Tutorials This is a theoretical course that includes lab applications on the topic.		
Literature Course Textbook: Textbook relevant to the selected course topic: Engineering Drawing and Design, Cecil H. Jensen, Jay D. Helsel, Dennis Short		
Additional References Textbook relevant to the selected course topic		

(EC) - MATH 111

Course Title	Analytical Geometry & Calculus I	
Course Code	MATH 111	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 1)	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Mathematics and Basic Sciences	
Topic Level	Engineering Requirements	
Description This course is an introductory course in calculus and the students will study the concepts and theorems of Differentiation. The students learn inverse trigonometric functions, Hyperbolic functions, Inverse Hyperbolic functions. Differentiation rules for any given function are presented. L’Hôpital rule is used to solve limits problems using differentiations. Properties of different conic sections including circle, parabola, ellipse, and hyperbola are studied. Also, the equation of planes, lines and spheres are introduced. The students study the function of several variables and their partial derivatives as well as its applications. The concepts of convergent and divergent series are discussed. The course illustrates the power series expansion of		
Lab and Tutorials This is a theoretical course that includes tutorials for discussion on all topics		
Literature Course Textbook: George B.. Thomas, et al. <i>Thomas Calculus</i> . Pearson/Addison Wesley, 2014.		

(EC) - MATH 112

Course Title	Calculus II	
Course Code	MATH 112	
Prerequisites	MATH 111 - Analytical Geometry & Calculus I	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring (Semester 2)	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Mathematics and Basic Sciences	
Topic Level	Engineering Requirements	
Description In this course the students will study the definite and indefinite integrals. Different integration techniques are discussed. The course also introduces the concept of numerical integration and improper integrals. The course illustrates some various applications including plane area, volume of revolution, length of a plane curve, and area of surfaces of revolution.the students will understand the concept of Multiple integral, line integral including their applications. Finally, different types of coordinates like polar coordinates, cylindrical coordinates and spherical coordinates are investigated.		
Lab and Tutorials Examples are discussed in detail during the tutorial as well as only one week for Matlab software		
Literature Course Textbook: George B.. Thomas, et al. <i>Thomas Calculus</i> . Pearson/Addison Wesley, 2014.		

(EC) - MATH 202

Course Title	Probability & Statistics for Engineers	
Course Code	MATH 202	
Prerequisites	MATH 112 - Calculus II	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Third Semester)	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Mathematics and Basic Sciences	
Topic Level	Engineering Requirements	
Description This course is an introduction and overview of probability and statistics where the students will discuss organization and presentation of statistical data– Measures of central tendency– Measures of dispersion– Definition of the probability- Conditional probability - Independence of events and Bayes theorem - Definition of the random variable- discrete and continuous distribution – some special probability distributions (Binomial distribution, Poisson distribution, Geometric distribution, Hypergeometric distribution, Uniform distribution, Normal distribution and Exponential distribution).		
Lab and Tutorials Examples are discussed in detail during the tutorial as well as only one week for Matlab software		
Literature Course Textbook:- Ronald E Walpole and et al. “Probability and Statistics for Engineers and Scientists” Boston : Prentice Hall 9th edition.		

(EC) - MATH 203

Course Title	Differential Equations	
Course Code	MATH 203	
Prerequisites	MATH 112 - Calculus II	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 3)	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Mathematics and Basic Sciences	
Topic Level	Engineering Requirements	
Description This course is an introductory course in Ordinary Differential Equations (ODEs) and their engineering applications in different fields. The course focuses initially on finding the solutions of ODEs by different ways which cover analytical and numerical techniques for linear and nonlinear ODEs. Then the concept of time-frequency transformation has been introduced by Laplace transform followed by its ability to solve many ODEs easily. The modelling of different dynamical engineering applications has been discussed through the course as well as undergraduate research competition related to the importance of ODEs in science and engineering disciplines is applied by the end of the semester. Along the way students will study		
Lab and Tutorials Examples are discussed in detail during the tutorial as well as only one week for Matlab software		
Literature Course Textbook: Dennis G. Zill, "A first Course in Differential Equations with Modeling Applications," 10 th Edition, Publisher: Brooks/Cole.		

(EC) - MATH 301

Course Title	Linear Algebra	
Course Code	MATH 301	
Prerequisites	MATH 112 - Calculus II	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring (Semester 4)	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Mathematics and Basic Sciences	
Topic Level	Engineering Requirements	
Description This course is an introductory course in linear systems and their engineering applications in different fields. The course focuses initially on finding the solutions of linear systems by different ways. Then the concept of vector and inner product spaces with different examples such as Gram-Schmidt and Fourier series expansion. Furthermore, the matrix function will be introduced via the diagonalization process of the eigenvalue problem. The modelling of different engineering applications has been discussed through the course as well as undergraduate research competition related to the importance of linear systems in science and engineering disciplines is applied by the end of the semester. Along the way students will study		
Lab and Tutorials Examples are discussed in detail during the tutorial as well as only one week for Matlab software		
Literature Course Textbook: R. Larson and D. C. Falvo “Elementary Linear Algebra”, 6th Edition.		

(EC) - MATH 303

Course Title	Numerical Methods	
Course Code	MATH 303	
Prerequisites	MATH 203 - Differential Equations	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring (Sixth Semester)	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Mathematics and Basic Sciences	
Topic Level	Engineering Requirements	
Description This course is an introductory course in Special function and numerical analysis and their engineering applications in different fields. The course focuses initially on finding properties of Gamma, Beta and Bessel function and numerical solutions on different kinds mathematical problems (nonlinear equations, differentiation, integration,... etc)		
Lab and Tutorials This course includes tutorials for discussion on the topic and Labs to solve application problems by using MATLAB software.		
Literature Course Textbook: - - Steven C. Chapra “Applied Numerical Methods with MATLAB for Engineers and Scientists” McGraw-Hill 3rd Edition. - MARY L. BOAS “Mathematical Methods in the Physical Sciences” John Wiley & Sons, Inc		

(EC) - MENG 101

Course Title	Engineering Mechanics I - Statics	
Course Code	MENG 101	
Prerequisites	MATH 111 - Analytical Geometry & Calculus I	ENGR 101 - Introduction to Engineering Disciplines
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0
	Labs	0
	TOTAL	2.5
EG Credit Hours	2	
ECTS	4	
Student Workload (SWL) / semester	100	
Topic Category	Basic Engineering Sciences	
Topic Level	Engineering Requirements	
Description Fundamentals of mechanics and concept of equilibrium. Drawing free body diagrams and associated equations of equilibrium. Reactions due to different types of supports. Forces in space. Equivalent force-couple systems. Equilibrium of rigid bodies. Centroids. Second moment of area (Area moment of inertia). Analysis of simple trusses by method of joints and method of sectioning. Analysis of statically determinate beams and drawing shear-force and bending moment diagrams. Friction.		
Lab and Tutorials		
Literature “Vector Mechanics for Engineers – Statics and Dynamics”, F. P. Beer, E. R. Johnston, J. T. DeWolf, and David F. Mazurek. McGraw-Hill, New York, 10th edition. - Class notes prepared by instructor and uploaded on Moodle.		

(EC) - MENG 102

Course Title	Engineering Mechanics II - Dynamics	
Course Code	MENG 102	
Prerequisites	MENG 101 - Engineering Mechanics I - Statics	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0
	Labs	0
	TOTAL	2.5
EG Credit Hours	2	
ECTS	4	
Student Workload (SWL) / semester	100	
Topic Category	Basic Engineering Sciences	
Topic Level	Engineering Requirements	
Description Kinematics of particles: planar rectilinear, curvilinear, and relative motions. Tangential-normal and radial-transverse components of accelerations. Kinetics of particles: Newton’s second law of motion (initially expressed through rate of change of linear momentum). Angular momentum. Principle of work and kinetic energy and conservation of energy. Principle of impulse and momentum. Direct and central impact. Systems of particles (transitional chapter between particles and rigid bodies). Kinematics of rigid bodies: planar translation, rotation, and general plane motion (kinematics of slider-crank and four bar linkage mechanism for velocity and acceleration with emphasis on instantaneous center of zero rectilinear velocity). Kinetics of rigid bodies: equations of motion including mass moment of inertia and radius of gyration. Principle of work and energy. Principle of Impulse and momentum. Impact. Applications.		
Lab and Tutorials This is a theoretical course that includes tutorials for discussion on the topic.		
Literature “Vector Mechanics for Engineers – Statics and Dynamics”, F. P. Beer, E. R. Johnston, J. T. DeWolf, and David F. Mazurek. McGraw-Hill, New York, 10th edition. - Class notes prepared by instructor and uploaded on Moodle.		

(EC) - PHYS 101

Course Title	Physics I	
Course Code	PHYS 101	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	1.25
	TOTAL	5
EG Credit Hours	4	
ECTS	7	
Student Workload (SWL) / semester	175	
Topic Category	Mathematics and Basic Sciences	
Topic Level	Engineering Requirements	
Description Measurements: Standards of length, mass, and time, dimensional analysis, the International system of units SI, conversion of units. Mechanics: Newton’s laws and applications, potential and kinetic energy, satellite motion and Kepler’s laws. Electrostatics: electric charge and Coulomb’s law: insulators and conductors, electrostatic field, Gauss’ law, potential, potential energy, dielectrics and capacitances, displacement vector, energy stored in the electrostatic field. Electrodynamics: electromotive force, voltage, electric current, resistance, Ohm’s law, electric power, direct current circuits, Kirchhoff’s laws, multi loop circuits. Magnetism: magnets, magnetic field, force on a current-carrying conductor, Ampere’s law and applications, induction, Faraday’s law, Lenz’s law, inductors, energy stored in a magnetic field, mutual induction, magnetism of matter. Relevant lab experiments will be conducted.		
Lab and Tutorials This is a theoretical course that includes tutorials for discussion and lab applications on the topic.		
Literature Course Textbook: - Textbook relevant to the selected course topic: Additional References - Textbook relevant to the selected course topic		

(EC) - PHYS 102

Course Title	Physics II	
Course Code	PHYS 102	
Prerequisites	PHYS 101 - Physics I	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall/ Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	1.25
	TOTAL	5
EG Credit Hours	4	
ECTS	7	
Student Workload (SWL) / semester	175	
Topic Category	Mathematics and Basic Sciences	
Topic Level	Engineering Requirements	
Description Optics: Interference, Diffraction, Polarization, electric and magnetic properties of light. Fluid Dynamics: hydrostatic pressure, Pascal’s principle, Archimedes’ principle, Dynamics of ideal fluids: continuity equation, Bernoulli’s equation, viscosity. Thermodynamics: The nature of heat, the laws of thermodynamics, temperature, thermal expansion, absorption of heat by solids and liquids, heat transfer mechanisms, kinetic theory of gases, ideal gases, distribution of molecular speed, molar specific heat, degrees of freedom, entropy, reversible and irreversible processes. Solid state physics: conductors, insulators and semiconductors. Modern Physics: atoms and molecules, nuclear structure, nuclear fission and fusion and the quantum. ~~Relevant lab experiments will be conducted~~		
Lab and Tutorials This is a theoretical course that includes tutorials for discussion and lab applications on the topic.		
Literature Course Textbook: - Textbook relevant to the selected course topic: Additional References - Textbook relevant to the selected course topic		

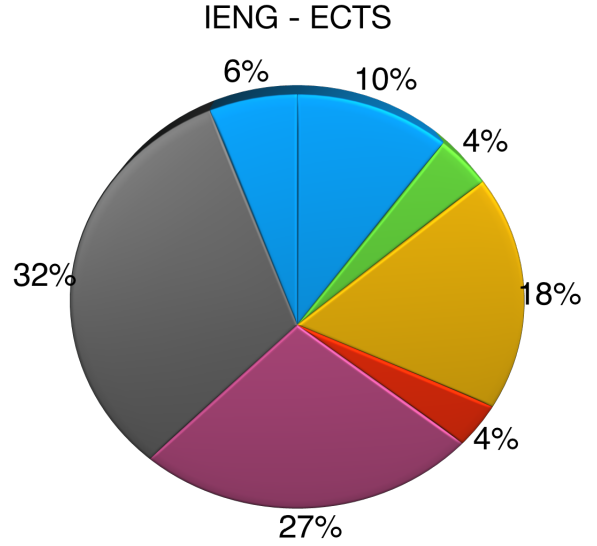
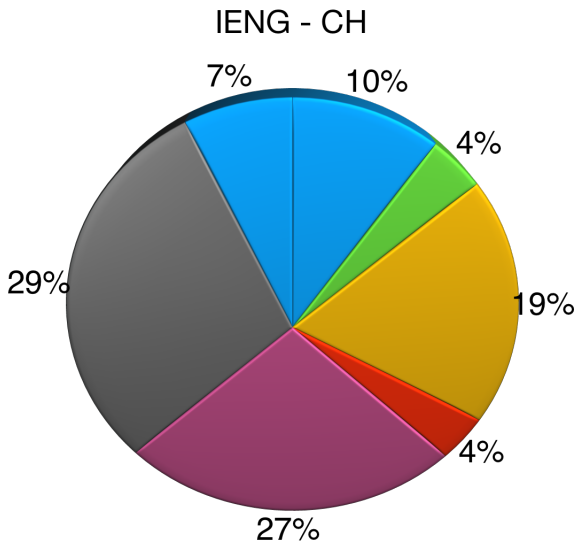
الباب الخامس

برنامج الهندسة الصناعية

الهندسة الصناعية			اسم البرنامج
لا يوجد			اسم التخصصات
الهندسة والعلوم التطبيقية			الكلية
جامعة النيل الأهلية			الجامعة
معمل	تمارين	محاضرات	عدد ساعات الاتصال
21.25	43	135	
160			(CH) الساعات المعتمدة
250			(ECTS) النقاط المعتمدة
58			عدد المقررات
توزيع المقررات طبقاً لمتطلبات مستويات التعلم			
ECTS	CH		
25	16	متطلبات الجامعة	
82	48	متطلبات الكلية	
163	96	متطلبات التخصص العام	
لا يوجد			متطلبات التخصص الدقيق
توزيع المقررات طبقاً لفئات المهارات والمعارف			
ECTS	CH		
25	16	العلوم الاجتماعية والانسانية	
10	6	إدارة الأعمال	
49	29	الرياضيات والعلوم الأساسية	
10	6	الثقافة الهندسية	
78	46	العلوم الهندسية الأساسية	
60	48	التطبيقات الهندسية والتصميم	
18	9	المشروعات والتدريب الميداني	

بيانات إحصائية:

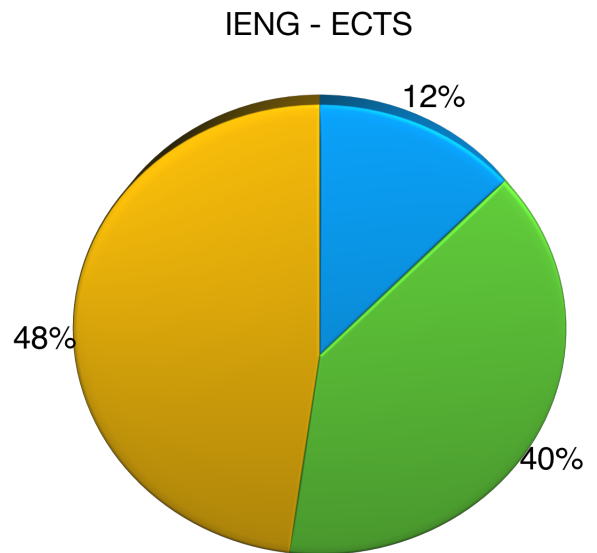
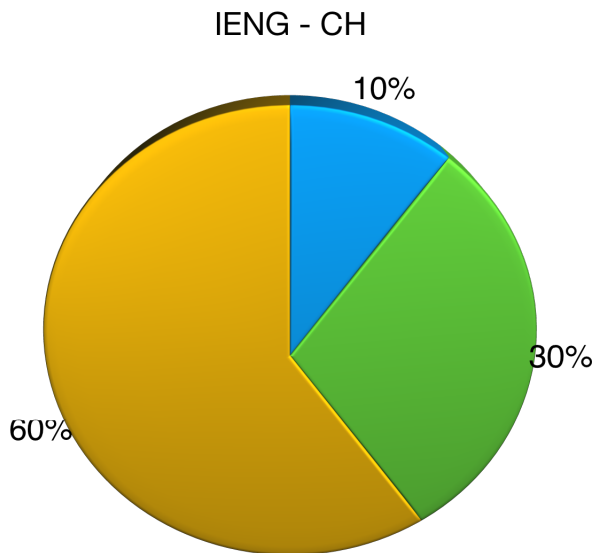
● Hum-SC ● BA ● Math-BS ● Eng-Cult ● Eng-BS ● Eng-App ● Projects-PT



● University

● School

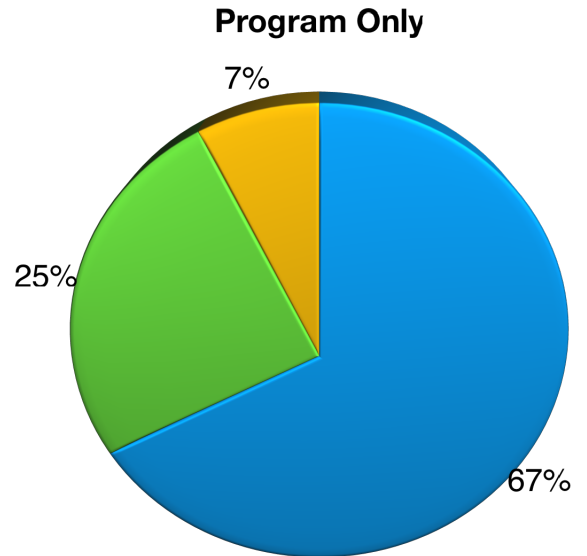
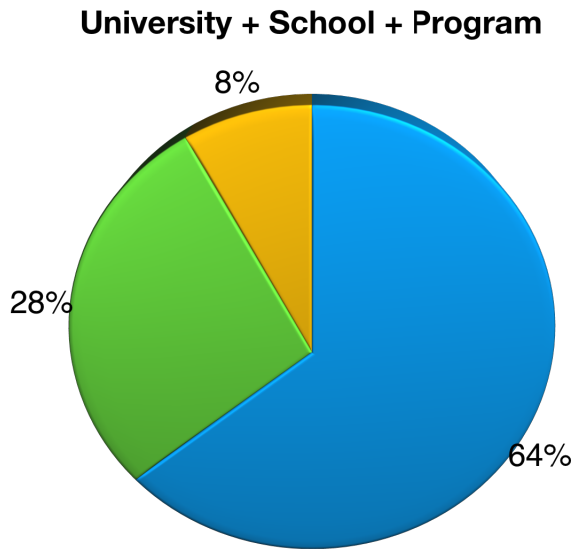
● Program - Gen



● Lectures

● Tutorials

● Labs



مادة (1): رسالة البرنامج:

يركز برنامج الهندسة الصناعية على تخريج جيل من المهندسين القادرين على تصميم وتطوير وتشغيل وإدارة الأنظمة الصناعية والأنظمة الخدمية بكفاءة بهدف تعظيم الانتاجية وخفض التكاليف ورفع مستوى جودة الانتاج أو الخدمة المقدمة. ويهتم البرنامج بتسليح الخريجين بكافة الوسائل والأدوات الحديثة والمعارف الهندسية الضرورية لتواكب التطور في الأنظمة الصناعية والخدمية على مستوى العالم.

مادة (2): توصيف البرنامج الدراسي:

يتميز البرنامج الدراسي في الهندسة الصناعية بجامعة النيل بالمرونة والشمولية من خلال طرح قاعدة عربية من المقررات الدراسية للطلاب تشمل العلوم الرياضية والطبيعية والكيمياء والاحصاء وعلوم الحاسب الآلي والاقتصاد بالإضافة الى العلوم الهندسية الأساسية الى جانب المقررات المتخصصة في الهندسة الصناعية وتشمل هندسة التشغيل واستخدامات الحاسب الآلي وتطبيقاته فيها والقياسات الدقيقة وبحوث العمليات والنمذجة والمحاكاة وتحليل وتصميم مكان العمل والارگونوميا والتخطيط والتحكم في الانتاج و إدارة الجودة و إدارة النظم المتكاملة

مادة (3): أهداف البرنامج:

يهدف البرنامج لتعليم الطلاب الجامعيين المبادئ الأساسية والممارسات الحديثة في مجال الهندسة الصناعية، وتدريب الطلاب على التفكير النقدي والابتكاري، واتقان المنهجية السليمة لحل المشكلات، وتنمية الوعي بدور الهندسة في مجتمع تكنولوجي حديث.
الهدف الرئيسي للبرنامج هو إنتاج وتأهيل خريجين:

1. قادرين على تصميم وتطوير وتنفيذ وتحسين النظم المتكاملة التي تشمل الأشخاص والمواد والمعلومات والمعدات والطاقة،
 2. ملمين بالعلاقات الهندسية بين المهام الإدارية، التخطيط، التنظيم والقيادة، والمتابعة والعناصر البشرية في منظومات الإنتاج والبحث والخدمات،
 3. قادرين على التعامل مع العناصر التكنولوجية المتكاملة في المشاريع التجارية من أجل القدرة على المنافسة والاستدامة،
- هذا ويهدف البرنامج إلى توفير علاقات قوية بين القطاعات الاقتصادية المحلية والمجتمعات الصناعية مع خريجي القسم في المجالات المتعلقة بالبحث والتدريب العملي والتحقيقات الميدانية والتأكيد على تقييم المخاطر وأثر القرارات المتعلقة بالقرارات الاقتصادية والعملية في القطاعات الصناعية والخدمية.
- هذا مع فهم أهمية السلامة والتنمية الاقتصادية والبيئية المستدامة وتحسين مستوى المعيشة وفهم عميق لقيمة الابتكار وريادة الأعمال وخلق مشاريع جديدة.
- ويتم تحقيق هذه الأهداف من قبل أعضاء هيئة التدريس في الهندسة الصناعية ذوي الخبرة في إدارة الأنشطة الهندسية والتقنية.

مادة (4): مواصفات الخريج:

- المخرج الرئيسي للبرنامج المقترح هو جيل من المهندسين المتخصصين في الهندسة الصناعية بحيث يكون الخريج قادراً على:
1. تصميم وتطوير وتنفيذ وتحسين النظم المتكاملة التي تشمل الناس والمواد والمعلومات والمعدات والطاقة.
 2. فهم العلاقات الهندسية بين المهام الإدارية للتخطيط والتنظيم والقيادة والمراقبة والعناصر البشرية في منظومات الإنتاج والبحث والخدمات.
 3. فهم التعامل مع تكامل نظم الإدارة في سلسلة من البيئات التكنولوجية المختلفة.
 4. توفير علاقات قوية بين القطاعات الاقتصادية المحلية والمجتمعات الصناعية مع خريجي القسم في المجالات المتعلقة بالبحث والتدريب العملي والتحقيقات الميدانية.
 5. تقييم المخاطر وأثر عدم اليقين المرتبط بالقرارات الاقتصادية والعملية في القطاعات الصناعية والخدمية.
 6. التأكيد على الأدوار الرئيسية لأبعاد السلامة ، والتكنولوجيا المستدامة ، التوافق البيئي ، وتدابير الإنتاج الأنظف في التصنيع والمواد والبدايل الإدارية والاقتصادية.

مادة (5): المعايير الأكاديمية للبرنامج:

يلتزم البرنامج المقدم بالمعايير الأساسية المقترحة من قبل الهيئة القومية لضمان جودة التعليم والاعتماد كحد أدنى . والمعايير الأكاديمية لبرنامج الهندسة الصناعية يحدد المستوى والإمكانيات والقدرات المتوقعة للخريج كالاتي:

الإمكانيات المعرفية والفهم:

The graduates of the Industrial Engineering program should be able to demonstrate the knowledge and understanding of:

1. technologies that are used in that field. In addition to, the most important materials used in industry, their structure, and their modes of failure.
2. The key issues of industrial engineering such as production planning and control, production scheduling, and inventory management.
3. Organizations, their internal structures and their management, including the management of human resources, financial resources and operations.
4. Globalization and its effect on the different operations of an organization and the importance of industrial data systems in that regard.
5. The key concepts of quality engineering and reliability and their importance in the production of goods and services.
6. The different analytical and computer methods that can be applied to the various areas of industrial and management engineering.

المهارات الفكرية:

The graduates of Industrial Engineering program should be able to:

1. Select and apply appropriate computer based methods, mathematical and scientific principles for analyzing general systems.
2. Solve a wide range of problems related to the analysis, design, and construction of production systems.
3. Identify a range of solutions and critically evaluate and justify proposed design solutions.
4. Analyze and solve the problems presented by industrial entities.

المهارات العملية والفنية:

The graduates of Industrial Engineering program should be able to:

1. Apply the acquired skills in a commercial or industrial environment.
2. Plan and undertake a major individual project.
3. Prepare and deliver coherent and structured verbal and written technical reports.
4. Give technical presentations suitable for the time, place and audience.
5. Use the scientific literature effectively and make discriminating use of Web resources.
6. Use appropriate computer-based support tools for problem-solving and analysis of results.
7. Apply the acquired skills in a commercial or industrial environment.
8. Display an integrated approach to the deployment of communication skills.
9. Use IT skills and display mature computer literacy.

10. Work effectively with and for others.
11. Display personal responsibility by working to multiple deadlines in complex activities.
12. Demonstrate significantly enhanced group working abilities.
13. Further develop career plans and personal objectives.

المهارات العامة:

The graduates of Industrial Engineering program should be able to:

1. Collaborate effectively within multidisciplinary team.
2. Work in stressful environment and within constraints.
3. Communicate effectively.
4. Demonstrate efficient IT capabilities.
5. Lead and motivate individuals.
6. Effectively manage tasks, time, and resources.
7. Search for information and engage in life-long self learning discipline.
8. Acquire entrepreneurial skills.
9. Refer to relevant literatures.

مادة (6): تفاعل البرنامج مع احتياجات السوق:

من الأهداف الرئيسية للبرنامج المقترح هو التفاعل المستمر مع احتياجات سوق العمل حيث أن ذلك السوق هو ما يمثل المستهلك الحقيقي وتماشياً مع نظام الجودة الشاملة فإن مخرجات البرنامج لابد وأن تتوافق مع متطلبات المستهلك وعليه فإن الجامعة ملتزمة بالتواصل مع الغرف التجارية والصناعية والممثلة للمجتمع الصناعي والخدمي للتعرف على الاحتياجات الحقيقية للخريجين من البرنامج وكذلك لتشكيل قنوات مستمرة لتدريب الطلاب في تلك المصانع والخدمات. لقد تم تصميم البرنامج ليتوافق مع ما يشهده العصر من إحتياج لتطبيق أنظمة زيادة الإنتاجية مع المحافظة على المواصفات العالمية مع الحفاظ على سعر إنتاجي ملائم. هذا مع تنامي مستويات الطلب وإرتفاع مستويات المعيشة والإحتياجات الصناعية المتزايدة مع الأخذ في الإعتبار معايير التصميمات القابلة للتعديل بتكلفة مقبولة ومنافسة مما يساهم في توافق تخصص الخريجين مع احتياجات السوق الفعلية.

مادة (7): التشابه والتمايز عن البرامج المشابهة:

يقدم البرنامج نموذجاً للإسلوب المنهجي في التعليم الجامعي في تخصص الهندسة الصناعية حيث يستفيد البرنامج من الخبرات المتراكمة في البرامج المشابهة على المستوى المحلي والمستوى الدولي لتقديم برنامج دراسي يعتمد على:

1. توفير الأساس النظري المناسب للتخصص بما يواكب ما يتم تدريسه في الجامعات العريقة محلياً وعالمياً وينقسم هذا إلى شقين أساسيين:

- تقديم الأساس النظري الذى يخدم فئة المهندسين الصناعيين بصفة عامة لتكوين الأرضية الثابتة للتقدم فى علوم التخصص.
- تقديم الأساس النظري والذى يرتفع بمستوى الطلاب إلى مستوى التخصص معتمداً على دراسة لما يتم تدريسه بالأقسام المماثلة فى مصر وخارجها.
- 2. توفير نظام الساعات المعتمدة والذى يتيح للطلبة الاختيار من مجموعة من المقررات.
- 3. توفير معامل متكاملة للتطبيقات العملية المصاحبة للدراسة النظرية.
- 4. توفير خطة تدريب عملى داخل وخارج الجامعة لتتماشى مع متطلبات المقررات الدراسية والتطور المستمر فى إحتياجات السوق.

مادة (8): مخرجات البرنامج المستهدفة Program ILOs

لقد تم تصميم برنامج الهندسة الصناعية فى جامعة النيل لكى يتميز خريجو القسم بخصائص تمكنهم من التكامل بنجاح مع أقرانهم فى مجال العمل المهنى والأكاديمى. وعليه فإنه كان من الضرورى تحديد مخرجات البرنامج المستهدفة والتي تؤدى إلى خريجى بمواصفات وقدرات كما تم توصيفها سابقاً. ويتم تقسيم مخرجات البرنامج المستهدفة إلى 4 أقسام كالتالى:

الإمكانات المعرفية والفهم:

- E. متوقع ان يكون خريج برنامج الهندسة الصناعية ملماً بالآتى:
- E.1. مفاهيم ونظريات الرياضيات والعلوم ، والمناسبة للتخصص.
 - E.2. أساسيات تكنولوجيا المعلومات والاتصالات (ICT).
 - E.3. خصائص المواد الهندسية المتعلقة بالتخصص.
 - E.4. مبادئ التصميم بما فى ذلك تصميم العناصر والعملية ومنظومات متعلقة بمجالات محددة.
 - E.5. منهجيات حل المشكلات الهندسية وجمع البيانات وتفسيرها.
 - E.6. أنظمة ضمان الجودة والمعايير ومتطلبات الصحة والسلامة والقضايا البيئية.
 - E.7. مبادئ الأعمال والإدارة ذات الصلة بالهندسة.
 - E.8. التقنيات الهندسية الحالية المتعلقة بالاختصاصات.
 - E.9. موضوعات متعلقة بالمصالح الإنسانية والقضايا الأخلاقية.
 - E.10. اللغة الفنية وكتابة التقارير.
 - E.11. الأخلاقيات المهنية وتأثير الحلول الهندسية على المجتمع والبيئة.
 - E.12. موضوعات هندسية معاصرة.
 - E.13. عمليات التصنيع الأساسية وأحدث التقنيات المستخدمة فى هذا المجال. بالإضافة إلى أهم المواد المستخدمة فى الصناعة وهيكلها وطرق فشلها.
 - E.14. أساسيات الهندسة الصناعية مثل تخطيط الإنتاج والتحكم وجدولة الإنتاج وإدارة المخزون.

- E.15. المنظمات وهياكلها الداخلية وإدارتها ، بما في ذلك إدارة الموارد البشرية والموارد المالية والعمليات.
- E.16. العولمة وتأثيرها على العمليات المختلفة للمنظمة وأهمية نظم البيانات الصناعية في هذا الصدد.
- E.17. المفاهيم الأساسية للجودة وأهميتها في إنتاج السلع والخدمات.

المهارات الفكرية:

- F. متوقع أن يكون خريج برنامج الهندسة والإدارة الصناعية والخدمية قادراً على الآتي:
- F.1. تحديد الأساليب الرياضية المناسبة لنمذجة المشكلات وتحليلها.
- F.2. تحديد الحلول المناسبة للمشاكل الهندسية القائمة على التفكير التحليلي.
- F.3. التفكير بطريقة مبتكرة في حل المشكلات والتصميم.
- F.4. دمج وتبادل وجهات النظر المختلفة والأفكار والمعرفة من مجموعة متنوعة من المصادر.
- F.5. تقييم خصائص وأداء المكونات والنظم والعمليات.
- F.6. تحليل أسباب انهيار المكونات والأنظمة والعمليات.
- F.7. حل المشكلات الهندسية، غالباً على أساس معلومات محدودة وربما متناقضة.
- F.8. اختيار وتقييم أدوات تكنولوجيا المعلومات والاتصالات المناسبة لمجموعة متنوعة من المشاكل الهندسية.
- F.9. اتخاذ قرارات هندسية بشأن التكاليف المتوازنة ، الفوائد ، السلامة ، الجودة ، الموثوقية ، التأثير البيئي.
- F.10. دمج الأبعاد الاقتصادية والاجتماعية والبيئية وإدارة المخاطر في التصميم.
- F.11. تحليل نتائج النماذج العددية وتقييم حدودها.
- F.12. التعامل بمنهجية مع التكنولوجيا الجديدة والمتقدمة.
- F.13. حل مجموعة واسعة من المشاكل المتعلقة بتحليل وتصميم وبناء نظم الإنتاج.
- F.14. تحديد مجموعة من الحلول بالتقييم النقدي وتبرير حلول التصميم المقترحة.
- F.15. تحليل وحل المشكلات التي تقدمها الكيانات الصناعية.

المهارات العملية والفنية

- G. متوقع أن يكون خريج برنامج الهندسة والإدارة الصناعية والخدمية قادراً على الآتي:
- G.1. تطبيق المعرفة في الرياضيات والعلوم وتكنولوجيا المعلومات والتصميم وسياق الأعمال والممارسة الهندسية بشكل متكامل لحل المشاكل الهندسية.
- G.2. دمج المعرفة والفهم والملاحظات الهندسية بشكل مهني لتحسين التصميم والمنتجات والخدمات.
- G.3. إنشاء وإعادة تصميم عملية أو مكون أو نظام ، وتنفيذ تصاميم هندسية متخصصة.
- G.4. ممارسة الدقة والإبداع في التصميم والنهج.
- G.5. استخدام المرافق والتقنيات الحسابية وأدوات القياس وورش العمل ومعدات المختبرات لتصميم التجارب وجمع وتحليل وتفسير النتائج.

- G.6. استخدام مجموعة واسعة من الأدوات والتقنيات والمعدات وحزم البرامج التحليلية المتعلقة بالمجال وتطوير برامج الكمبيوتر المطلوبة.
- G.7. تطبيق أساليب النمذجة العددية للمشاكل الهندسية.
- G.8. تطبيق الأنظمة الآمنة في العمل ومراقبة الخطوات المناسبة لإدارة المخاطر.
- G.9. إظهار المهارات الأساسية التنظيمية وإدارة المشاريع.
- G.10. تطبيق إجراءات ضمان الجودة واتباع الرموز والمعايير.
- G.11. تبادل المعرفة والمهارات مع المجتمع والصناعة.
- G.12. تحضير وتقديم التقارير الفنية.
- G.13. استخدام المؤلفات العلمية بفعالية.
- G.14. استخدام أدوات الدعم المعتمدة على الكمبيوتر المناسبة لحل المشكلات وتحليل النتائج.
- G.15. تطبيق المهارات المكتسبة في بيئة تجارية أو صناعية.

المهارات العامة:

- H. متوقع أن يكون خريج برنامج الهندسة الصناعية قادراً على الآتى:
- H.1. التعاون بفعالية ضمن فريق متعدد التخصصات.
- H.2. العمل في بيئة مرهقة وضمن القيود.
- H.3. التواصل بفاعلية مع الآخرين.
- H.4. إثبات قدرات تكنولوجيا المعلومات الفعالة.
- H.5. قيادة وتحفيز الأفراد.
- H.6. إدارة المهام والوقت والموارد بشكل فعال.
- H.7. البحث عن المعلومات والانخراط في منظومة التعلم مدى الحياة.
- H.8. اكتساب مهارات تنظيم المشاريع.
- H.9. الرجوع إلى الآداب ذات الصلة.

مادة (9): مقارنة مخرجات البرنامج المستهدفة مع المرجعيات المحلية والعالمية

الجدول المرفق يستعرض مقارنة بين مخرجات البرنامج المقترح المستهدفة مع متطلبات الهيئة القومية لضمان جودة التعليم والاعتماد (NARS) ومتطلبات (ABET).

ISEM courses/ILOS mapped to NARS and ABET Graduates Attributes

Attributes of program graduates as per ABET Criterion (3) for program outcomes and assessment	Attributes of program graduates as per NARS Requirements for engineering programs, in general	Corresponding ILO's in Current Program	Courses Covering such ILO's
a. Ability to apply knowledge of	a. Ability to apply	A1-A17	ALL
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			اللائحة الداخلية - ٢٠١٨

a. Ability to design and conduct experiments, as well as to analyze and interpret data.	c. Ability to Design and conduct experiments as well as analyze and interpret data.	b1, b5, c1, c2, c6, c7, c14	CSCE 101, MATH 111, ENGR 101, ENGR 102, MATH 112, MATH 203, MATH 301, MATH 202, PHYS 101, PHYS 102, ECEN 101, CSCE 201, MENG 101, MENG 102, CHEM 101, MENG 202, IENG 241, NG 493, IENG 495, IENG 101, IENG 202, IENG 232, IENG 421, IENG 231, IENG 345, IENG 304, IENG 322, IENG 305, IENG 423, IENG 408, IENG 435, IENG 213, IENG 434, IENG 407, IENG 425
b. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	b. Ability to Design a system; component and process to meet the required needs within realistic constraints.	b1 to b8, b13, b14, b15	CSCE 101, MATH 111, ENGR 102, MATH 112, MATH 203, MATH 301, MATH 202, PHYS 102, ECEN 101, CHEM 101, IENG 241, NG 493, IENG 111, IENG 212, IENG 213, IENG 314, IENG 315, IENG 202, IENG 232, IENG 421, IENG 243, IENG 233, IENG 344, IENG 345, IENG 303, IENG 304, IENG 305, IENG 346, IENG 408, IENG 416, IENG 434, IENG 407, IENG 425
c. Ability to function on multi-disciplinary teams	f. Work effectively within multi-disciplinary teams	d1 to d3, d5, d8	ENGL 202, HUMA 101, ENGR 101, IENG 241, IENG 491, IENG 495, IENG 202, IENG 232, IENG 233, IENG 231, IENG 344, IENG 345, IENG 303, IENG 304, IENG 305, IENG 425, IENG 409
d. Ability to identify, formulate and solve engineering problems	d. Ability to Identify, formulate and solve fundamental engineering problems	b1 to b8, c7, c10, c15	ENGL 202, CSCE 101, MATH 111, HUMA 101, HUMA 102, NSCI 102, SSCI 102, HUMA 103, SSCI 101, ENGR 101, ENGR 102, MATH 112, MATH 203, MATH 301, MATH 202, PHYS 102, ECEN 101, CSCE 201, MENG 101, MENG 102, CHEM 101, MENG 202, IENG 241, NG 493, IENG 495, IENG 101, IENG 111, IENG 212, IENG 213, IENG 314, IENG 315, IENG 202, IENG 232, IENG 421, IENG 242, IENG 243, IENG 233, IENG 231, IENG 344, IENG 345, IENG 406, IENG 303, IENG 304, IENG 322, IENG 305, IENG 423, IENG 346, IENG 408, IENG 324, IENG 435, IENG 416, IENG 434, IENG 407, IENG 425, IENG 447

e. Understanding of professional and ethical responsibility	j. Ability to Display professional and ethical responsibilities; and contextual understanding	d3, a14, d6,d9	ENGL 101, ENGL 102, ENGL 201, ENGL 202, HUMA 101, HUMA102, NSCI 102, SSCI 102, HUMA 103, SSCI 101, MENG 202, IENG 493, IENG 495, IENG 101, IENG 111, IENG 212, IENG 213, IENG 314, IENG 315, IENG 202, IENG 421, IENG 242, IENG 243, IENG 233, IENG 231, IENG 344, IENG 345, IENG 406, IENG 303, IENG 304, IENG 322, IENG 423, IENG 408, IENG 324, IENG 435, IENG 416, IENG 425, IENG 447
f. Ability to communicate effectively	g. Ability to communicate effectively	d1 to d4, c12	ENGL 101, ENGL 102, ENGL 201, ENGL 202, CSCE 101, HUMA 101, HUMA 103, ENGR 101, ENGR 102, ECEN 101, CHEM 101, MENG 202, IENG 241, IENG 493, IENG 495, IENG 111, IENG 212, IENG 213, IENG 314, IENG 315, IENG 202, IENG 232, IENG 421, IENG 242, IENG 243, IENG 233, IENG 231, IENG 344, IENG 345, IENG 406, IENG 303, IENG 304, IENG 322, IENG 423, IENG 346, IENG 408, IENG 435, IENG 416, IENG 434, IENG 407, IENG 425, IENG 447
g. Having the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	h. Ability to Consider the impacts of engineering solutions on society & environment	d3, a14, c2,c11,	ENGL 101, ENGL 102, ENGL 201, ENGL 202, HUMA 101, HUMA103, ENGR 101, ENGR 102, PHYS 102, CSCE 201, MENG 101, IENG 241, IENG 495, IENG 101, IENG 111, IENG 212, IENG 213, IENG 314, IENG 315, IENG 232, IENG 242, IENG 233, IENG 231, IENG 344, IENG 345, IENG 406, IENG 303, IENG 304, IENG 322, IENG 305, IENG 423, IENG 346, IENG 408, IENG 435, IENG 416, IENG 434, IENG 425, IENG 447, MENG 324, MENG 423, MENG 305, MENG 302
h. Recognition of the need for, and ability to engage in life-long learning	k. Ability to Engage in self- and life-long learning	D7, c13	HUMA 101,HUMA102, NSCI 102, SSCI 102, HUMA 103, ENTR 301, SSCI 101, IENG 241, IENG 493, IENG 495, IENG 101, IENG 111, IENG 212, IENG 213, IENG 314, IENG 315, IENG 232, IENG 233, IENG 231, IENG 345, IENG 303, IENG 304, IENG 322, IENG 305, IENG 423, IENG 408, IENG 324, IENG 435, IENG 416, IENG 434, IENG 407, IENG 447

i. Knowledge of contemporary issues	i. Ability to Demonstrate knowledge of contemporary engineering issues	b5, b9, b10, b11, b12,	HUMA 101, NSCI 102, ENGR 101, ENGR 102, MATH 202, PHYS 102, CSCE 201, MENG 101, MENG 102, CHEM101, MENG 202, IENG 241, IENG 493, IENG 495, IENG 101, IENG 111, IENG 212, IENG 213, IENG 314, IENG 315, IENG 202, IENG 232, IENG 421, IENG 242, IENG 243, IENG 233, IENG 231, IENG 344, IENG 345, IENG 406, IENG 303, IENG 304, IENG 423, IENG 346, IENG 408, IENG 435, IENG 416, IENG 434, IENG 407, IENG 425, IENG 447
j. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	e. Ability to Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management	c1 to c9,c15	CSCE 101, MATH 111, HUMA 101, SSCI 102 ENGR 101, ENGR 102, MATH 112, MATH 203, MATH 301, MATH 202, MATH 303, PHYS 101, PHYS 102, ECEN 101, CSCE 201, ENTR301, MENG 101, MENG102, CHEM 101, MENG202, IENG 241, IENG 493, IENG 495 IENG 101, IENG 111, IENG 212, IENG213, IENG 314, IENG 315, IENG 202, IENG 232, IENG 421, IENG 242, IENG 243, IENG 233, IENG 231, IENG 344, IENG 345, IENG 406, IENG 303, IENG 304, IENG 322, IENG 305, IENG 423, IENG 346, IENG 408, IENG 324, IENG 435, IENG 416, IENG 434, IENG 407, IENG 425, IENG 447

مادة (10): مطابقة مخرجات البرنامج المستهدفة مع المعايير الأكاديمية طبقاً لمتطلبات (NARS)

الجدول المرفق يستعرض مدى تحقيق مخرجات البرنامج المستهدفة (Program ILOs) للمعايير الأكاديمية له طبقاً لمتطلبات (NARS):

مخرجات البرنامج المستهدفة المحققة للمعايير	المعايير الأكاديمية للبرنامج
	الامكانيات المعرفية والفهم
A3, A8, A12, A13	technologies that are used in that field. In addition to, the most important materials used in industry, their structure, and their modes of failure.
A14 - A16	The key issues of industrial engineering such as production planning and control, production scheduling, and inventory management.
A15, A18	Organizations, their internal structures and their management, including the management of human resources, financial resources and operations.
A1	Globalization and its effect on the different operations of an organization and the importance of industrial data systems in that regard.
A17	The key concepts of quality engineering and reliability and their importance in the production of goods and services.
A1-A17	The different analytical and computer methods that can be applied to the various areas of industrial and management engineering.
	المهارات الفكرية
B1	Select and apply appropriate computer based methods, mathematical and scientific principles for analyzing general systems.
B2, B3	Solve a wide range of problems related to the analysis, design, and construction of production systems.
B4, B7, B14	Identify a range of solutions and critically evaluate and justify proposed design solutions.
B15	Analyze and solve the problems presented by industrial entities.
	المهارات العملية والفنية
C1-C4	Select and apply appropriate computer based methods, mathematical and scientific principles for analyzing general systems.

مخرجات البرنامج المستهدفة للمعايير	المعايير الأكاديمية للبرنامج
C3 -C12	• Solve a wide range of problems related to the analysis, design, and construction of production systems.
C11, C12	• Identify a range of solutions and critically evaluate and justify proposed design solutions.
C12 ,C13	• Analyze and solve the problems presented by industrial entities.
C13 ,C14	• Select and apply appropriate computer based methods, mathematical and scientific principles for analyzing general systems.
C14 ,C12	• Solve a wide range of problems related to the analysis, design, and construction of production systems.
C15 .C16	• Identify a range of solutions and critically evaluate and justify proposed design solutions.
C11, C.12.	• Analyze and solve the problems presented by industrial entities.
C6-C8	• Select and apply appropriate computer based methods, mathematical and scientific principles for analyzing general systems.
C1-C11	• Solve a wide range of problems related to the analysis, design, and construction of production systems.
C9	• Identify a range of solutions and critically evaluate and justify proposed design solutions.
C1-C13	• Analyze and solve the problems presented by industrial entities.
C8-C12	• Select and apply appropriate computer based methods, mathematical and scientific principles for analyzing general systems.
المهارات العامة	
D1	• Collaborate effectively within multidisciplinary team.
D2	• Work in stressful environment and within constraints.
D3	• Communicate effectively.
D4	• Demonstrate efficient IT capabilities.
D5	• Lead and motivate individuals.
D6	• Effectively manage tasks, time, and resources.
D7	• Search for information and engage in life-long self learning discipline.
D8	• Acquire entrepreneurial skills.
D9	• Refer to relevant literatures.

مادة (11): المقررات الدراسية ومدى ملاءمتها لمخرجات البرنامج المستهدفة:

IENG University Core Requirements (10 courses = 16 CR)

Code No.	Course Title	No. of hours / week			CH	ECTS	SW L	ILOs
		Lec	Tut	Lab				
ENGL 001	Intensive English	0	0	0	0	0	0	A10
ENGL 101	English I	0	0	0	0	0	50	A10, C12, D13
ENGL 102	English II	0	0	0	0	0	50	A10 C12 D13
ENGL 201	Writing Skills	3.75	0	0	3	5	125	A10 C12 D13
ENGL 202	Communication and Presentation Skills	3.75	0	0	3	5	125	A10 B4 C9,12 D1,3
HUMA 101	Introduction to Scientific & Critical Thinking	2.5	0	0	2	3	75	A5 B2,4, D5,7
HUMA 102	Introduction to Ethics	2.5	0	0	2	3	75	A6,9,12 B4, C9 D5,7
HUMA 103	Selected Topics in Humanities & Arts	2.5	0	0	2	3	75	A9, B4 D3,5,9
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2.5	0	0	2	3	75	A9, B4 D3,5,9
SSCI 103	Selected Topics in Social Sciences	2.5	2.5	0	2	3	75	A9 C9,D5, D6, D8, D9
Total Number of Credits	10	20	3	0	16	25	725	

IENG Engineering Core Requirements (16 courses = 48 CR)

Code No.	Course Title	No. of hours / week			C H	EC TS	SW L	ILOs
		Lec	Tu t	Lab				
CHEM 101	Chemical Principles	2.5	0	1.25	3	5	125	A1,3, B5, C1,5
CSCE 101	Computer & Information Skills	1.25	0	3.75	3	5	125	A2,8, C1,5,6, D4
CSCE 201	Introduction to Programming	1.25	0	3.75	3	5	125	A2, B8, C1,5,6, D1
ECEN 101	Electric Circuits	2.5	0	1.25	3	5	125	A8, C1,2,3,6
ENGR 101	Introduction to Engineering Disciplines	2.5	0	1.25	3	5	125	A8,11, C1 ,4,5
ENGR 102	Engineering Design	2.5	0	1.25	3	5	125	A3, B3,5, C1,2,3
MATH 111	Analytical Geometry & Calculus I	2.5	1.25	0	3	5	125	A1, B1, C1
MATH 112	Calculus II	2.5	1.25	0	3	5	125	A1, B1, C1
MATH 202	Probability & Statistics for Engineers	2.5	1.25	0	3	5	125	A1,5, B1,11 C1,4,5,6
MATH 203	Differential Equations	2.5	1.25	0	3	5	125	A1, B1, C1
MATH 301	Linear Algebra	2.5	1.25	0	3	5	125	A1, B1, C1,7
MATH 303	Numerical Methods	2.5	1.25	0	3	5	125	C1, C5
MENG 101	Engineering Mechanics I - Statics	2.5	0	0	2	4	100	A1,12, B2,5 C2
MENG 102	Engineering Mechanics II - Dynamics	2.5	0	0	2	4	100	A5,12, B2,5, C2
PHYS 101	Physics I	2.5	1.25	1.25	4	7	175	A1, C1,5
PHYS 102	Physics II	2.5	1.25	1.25	4	7	175	A1, C1,5
Total Number of Credits	16	37.5	10	15	48	82	2050	

IENG Program Requirements (32 courses - 96 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	SW L	ILOs
		Le c	Tut	Lab				
ENTR 301	Selected Topics in Entrepreneurship	2.5	1.25	0.00	3	5	125	A7, 15, B10, D6, 8
IENG 101	Introduction to Industrial and Service Engineering	2.5	1.25	0.00	3	5	125	A6, B1, C2, D1,2,3
IENG 111	Introduction to Material Science	2.5	0.00	1.25	3	5	125	A1,4, B11,12, C1, D1
IENG 202	Operations research I	2.5	1.25	0.00	3	5	125	A13,14, B1 C1,14,15
IENG 212	Manufacturing processes 1	2.5	1.25	0	3	5	125	A 3,4,6,12,17 B11,12
IENG 213	Manufacturing processes 2	2.5	1.25	0.00	3	5	125	A13,14, B8, C2,14
IENG 231	Safety Engineering	2.5	1.25	0.00	3	5	125	A6, B10,15, C8,11 D2
IENG 232	Work System Analysis & Design	2.5	1.25	0.00	3	5	125	A5,6, B1,15, C1,2 D2
IENG 233	Human Factors Engineering	2.5	1.25	0.00	3	5	125	A4,9, B2,11,12, D5
IENG 241	Engineering Economics	2.5	1.25	0.00	3	5	125	A5,15, B7,9,10, D6
IENG 242	operations management	2.5	1.25	0.00	3	5	125	A4,7,8,15, D3,4,5
IENG 243	Statistical Quality Control	2.5	1.25	0.00	3	5	125	A5,7, B8,13,15, C10
IENG 303	Facilities Planning	2.5	1.25	0.00	3	5	125	A6, B1, C2,15
IENG 304	Modeling and Simulation	2.5	0.00	1.25	3	5	125	A5, B3,4, C1,2, D4
IENG 305	Management Information systems	2.5	1.25	0.00	3	5	125	A1,2, B15, C6, D7
IENG 314 / MENG 463	CAD/CAM	2.5	-	1.25	3	5	125	A4, B4,9, C13, D2,3
IENG 315	Manufacturing Systems	2.5	1.25	0.00	3	5	125	A3,6,17, B10, C3,4
IENG 322	Logistics and Supply chain management	2.5	1.25	—	3	5	125	A7,12, B1, C1,2, D2
IENG 324	Warehouse Science & Operations	2.5	1.25	0.00	3	5	125	A6,14,15, B1, C7, D7
IENG 344	Project management	2.5	1.25	0.00	3	5	125	A7, B14, C9,14,15 D8
IENG 391	Practical Training	-	-	-	3	6	150	B7,15, C11.15, D1,3

Code No.	Course Title	No. of hours / week			CH	EC TS	SW L	ILOs
		Le c	Tut	Lab				
IENG 406	Object oriented Modeling of Industrial Systems	2.5	0.00	1.25	3	5	125	A13,14, B8, C13,15 D6
IENG 408	Information and decision support	2.5	1.25	0.00	3	5	125	A1,2, C1,6, D7
IENG 421	Fundamentals of Service Engineering and Management	2.5	1.25	0.00	3	5	125	A6,9, C1,8,9, D2
IENG 493	Graduation Project I	2.5	-	-	3	6	180	A5, B1,3,8, C1,2
IENG 495	Graduation Project II	2.5	-	-	3	6	180	A5, B1,3,8, C1,2
IENG xxx	Elective (1)	2.5	1.25	—	3	5	150	From list below
IENG xxx	Elective (2)	2.5	1.25	—	3	5	150	From list below
IENG xxx	Elective (3)	2.5	1.25	—	3	5	150	From list below
IENG xxx	Elective (4)	2.5	1.25	—	3	5	150	From list below
MENG 202	Solid Modeling and Workshop	2.5	0	1.25	3	5	125	A4, C1,3,4,5, D4
NSCI 102	Selected Topics in Environmental Science	2.5	1.25	0.00	3	5	125	A6,A9,B4,B10,D9
Total Number	32	77.5	30.00	6.25	96	163	4235	

IENG list of Electives

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	Lab	Tut				
IENG 345	Engineering cost analysis	2.5	1.25	0.00	3	5	125	A5,7, 15 B9, 10,14
IENG 346	Introduction to Entrepreneurship & small business management	2.5	1.25	0.00	3	5	125	A7, 15, B10, D6, 8
IENG 402	Operations Research II	2.5	0	1.25	3	5	125	A 15, B1 C1,14,15
IENG 407	Systems Engineering	2.5	1.25	0.00	3	5	125	A9,16, B3,5
IENG 409	Selected Topics in Industrial Engineering	2.5	1.25	0.00	3	5	125	A,12, B3,15 C12
IENG 416	Product realization and Reverse Engineering	2.5	1.25	0.00	3	5	125	A13, B3,10, C2
IENG 423	Operations Management in Service Industries	2.5	1.25	0.00	3	5	125	A16,17, B7
IENG 425	Industrial Distribution Systems	2.5	1.25	0.00	3	5	125	A4,12, C2,D2
IENG 434	Reliability Engineering	2.5	1.25	0.00	3	5	125	A3,13, B1,6,9 C1
IENG 435	Maintenance Planning	2.5	1.25	0.00	3	5	125	A3,4, B6,9, C1,7
IENG 447	Design of Experiments	2.5	1.25	0.00	3	5	125	A4, B1,2
MENG 204	Mechanical Measurements	2.5	0.625	0.625	3	5	125	A8,12, B8, C11
MENG 305	Fluid Mechanics I	2.5	0.625	0.625	3	5	125	A8, 13, 12, C5, D1
MENG 323	Fundamentals of Mechatronics Engineering	2.5	1.25	0.00	3	5	125	A4, D1
MENG 325	Computer Control of Manufacturing Processes	2.5	0.00	1.25	3	5	125	A1,4,12,13, C14, D1

مادة (12): توزيع مقررات البرنامج على الفئات المقترحة في (NARS):

IENG Course Mapping to Subject Categories (NARS)

Course Code	Course Title	Hum. & Social Sci.		Busine ss Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.		Eng. App. & Design		Project & PT		
		C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	
	University Requirements															
ENGL 001	Intensive English															
ENGL 101	English I	0	0													
ENGL 102	English II	0	0													
ENGL 201	Writing Skills	3	5													
ENGL 202	Communication and Presentation Skills	3	5													
HUMA 101	Introduction to Scientific & Critical Thinking	2	3													
HUMA 102	Introduction to Ethics	2	3													
HUMA 103	Selected Topics in Humanities & Arts	2	3													
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3													
SSCI 103	Selected Topics in Social Sciences	2	3													
	Total University Requirements	16	25	0	0	0	0	0	0	0	0	0	0	0	0	
	Engineering Requirements															
CHEM 101	Chemical Principles					3	5									
CSCE 101	Computer & Information Skills									3	5					
CSCE 201	Introduction to Programming									3	5					
ECEN 101	Electric Circuits									3	5					
ENGR 101	Introduction to Engineering Disciplines							3	5							
ENGR 102	Engineering Design									3	5					
MATH 111	Analytical Geometry & Calculus I					3	5									
MATH 112	Calculus II					3	5									
MATH 202	Probability & Statistics for Engineers					3	5									
MATH 203	Differential Equations					3	5									
MATH 301	Linear Algebra					3	5									
MATH 303	Numerical Methods					3	5									
MENG 101	Engineering Mechanics I - Statics									2	4					
MENG 102	Engineering Mechanics II - Dynamics									2	4					
PHYS 101	Physics I					4	7									
PHYS 102	Physics II					4	7									
	Total Engineering Requirements	0	0	0	0	29	49	3	5	16	28	0	0	0	0	
	Program Requirements															
ENTR 301	Selected Topics in Entrepreneurship			3	5											
IENG 101	Introduction to Industrial and Service Engineering											3	5			
IENG 111	Introduction to Material Science									3	5					
IENG 202	Operations research I									3	5					
IENG 212	Manufacturing processes 1											3	5			
IENG 213	Manufacturing processes 2											3	5			
IENG 231	Safety Engineering									3	5					
IENG 232	Work System Analysis & Design											3	5			
IENG 233	Human Factors Engineering											3	5			
IENG 241	Engineering Economics			3	5											
IENG 242	operations management									3	5					
IENG 243	Statistical Quality Control											3	5			
IENG 303	Facilities Planning											3	5			
IENG 304	Modeling and Simulation									3	5					

Course Code	Course Title	Hum. & Social Sci.		Business Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.		Eng. App. & Design		Project & PT	
		C	EC	C	EC	C	EC	C	EC	C	EC	C	EC	C	EC
IENG 305	Management Information systems									3	5				
IENG 314 / MENG 463	CAD/CAM											3	5		
IENG 315	Manufacturing Systems									3	5				
IENG 322	Logistics and Supply chain management											3	5		
IENG 324	Warehouse Science & Operations											3	5		
IENG 344	Project management									3	5				
IENG 391	Practical Training													3	6
IENG 406	Object oriented Modeling of Industrial Systems											3	5		
IENG 408	Information and decision support									3	5				
IENG 421	Fundamentals of Service Engineering and Management											3	5		
IENG 493	Graduation Project I													3	6
IENG 495	Graduation Project II													3	6
IENG xxx	Elective (1)											3			
IENG xxx	Elective (2)											3			
IENG xxx	Elective (3)											3			
IENG xxx	Elective (4)											3			
MENG 202	Solid Modeling and Workshop									3	5				
NSCI 102	Selected Topics in Environmental Science							3	5						
Total Program Requirements		0	0	6	10	0	0	3	5	30	50	48	60	9	18
TOTAL IENG		16	25	6	10	29	49	6	10	46	78	48	60	9	18
Course Category %		10.0%		3.8%		18.1%		3.8%		28.8%		30.0%		5.6%	

**مادة (13): مصفوفة مخرجات المقررات الدراسية ومدى ملائمتها للمخرجاتها
المستهدفة للبرنامج:**

IENG Course - ILOs matrix - Part 1

IENG program	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	b1	b2	b3	b4	b5	b6	b7	b8	b9
University Requirements																										
ENGL 001										x																
ENGL 101										x																
ENGL 102										x																
ENGL 201										x																
ENGL 202										x												x				
HUMA 101					x														x			x				
HUMA 102									x		x											x				
HUMA 103									x													x				
SSCI 101									x													x				
SSCI 103									x													0				
School Requirements																										
CHEM 101	x		x																			x				
CSCE 101		x						x																		
CSCE 201		x																							x	
ECEN 101								x																		
ENGR 101								x			x															
ENGR 102			x																		x		x			
MATH 111	x																		x							
MATH 112	x																		x							
MATH 202	x				x														x							
MATH 203	x																		x							
MATH 301	x																		x							
MATH 303																										
MENG 101	x											x							x				x			
MENG 102					x							x							x				x			
PHYS 101	x																									
PHYS 102	x																									
Program Requirements																										
ENTR 301								x							x											
IENG 101						x													x							
IENG 111	x			x																						
IENG 202														x	x				x							
IENG 212			x	x								x						x								
IENG 213													x	x												x
IENG 231						x																				
IENG 232					x	x													x							
IENG 233				x					x										x							
IENG 241					x										x									x		x
IENG 242				x			x																			x
IENG 243					x	x													x							
IENG 303						x															x					
IENG 304					x																x	x				
IENG 305	x	x																								
IENG 314 / MENG 463				x																		x				
IENG 315			x			x													x							
IENG 322							x					x							x							
IENG 324					x										x	x				x						

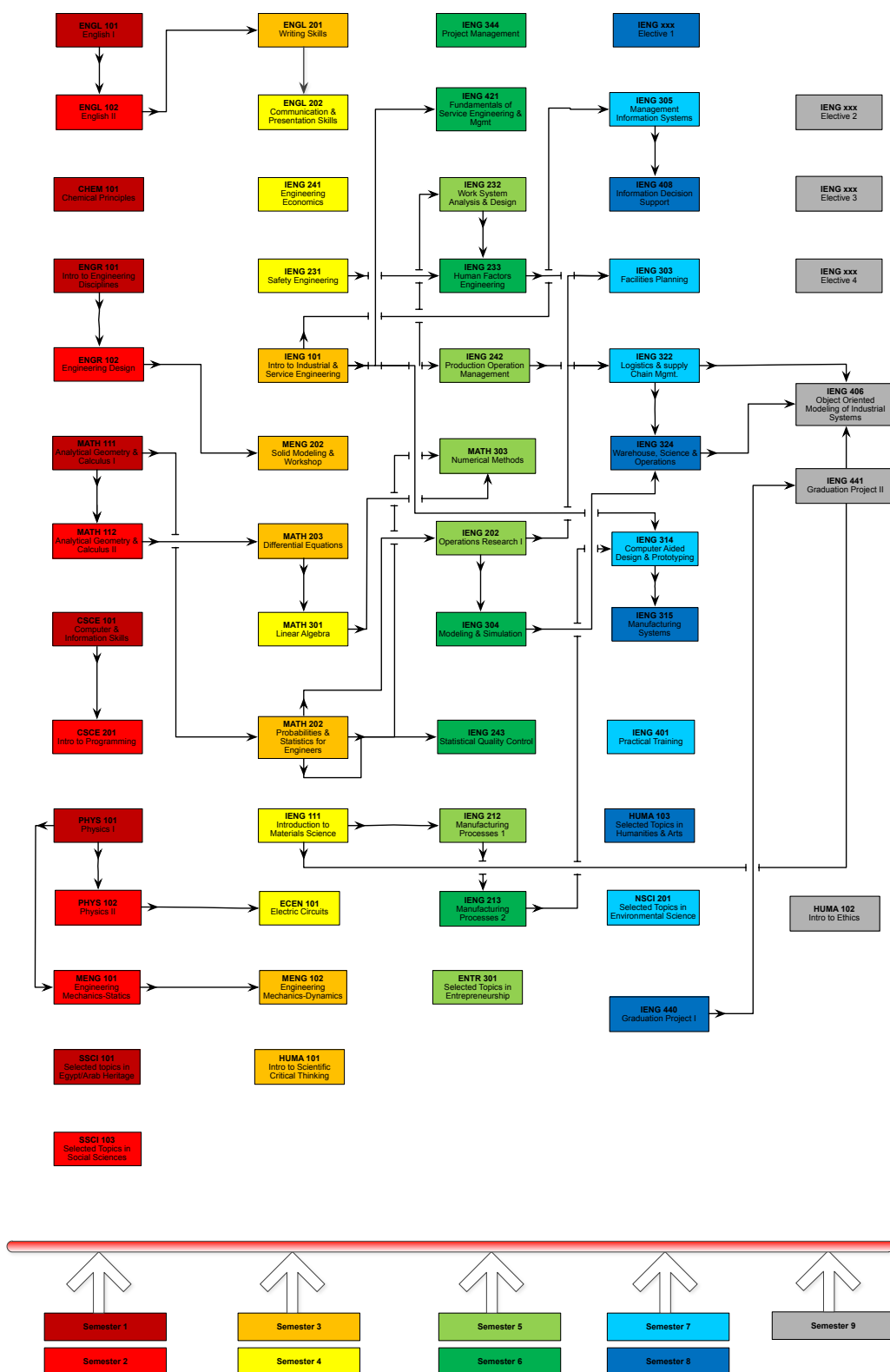
IENG program		a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	b1	b2	b3	b4	b5	b6	b7	b8	b9	
IENG 344	Project management							x																				
IENG 391	Practical Training																								x			
IENG 406	Object oriented Modeling of Industrial Systems		x																		x	x						
IENG 408	Information and decision support	x	x																									
IENG 421	Fundamentals of Service Engineering and Management						x			x																		
IENG 493	Graduation Project I					x														x		x					x	
IENG 495	Graduation Project II					x														x		x					x	
MENG 202	Solid Modeling and Workshop					x																						
NSCI 102	Selected Topics in Environmental Science						x			x												x						
	Electives																											
IENG 345	Engineering cost analysis					x		x									x										x	
IENG 346	Introduction to Entrepreneurship & small business management							x									x											
IENG 402	Operations Research II									x											x		x					
IENG 407	Systems Engineering												x									x						
IENG 409	Selected Topics in Industrial Engineering													x								x						
IENG 416	Product realization and Reverse Engineering																	x	x							x		
IENG 423	Operations Management in Service Industries				x								x															
IENG 425	Industrial Distribution Systems				x									x							x				x		x	
IENG 434	Reliability Engineering				x	x																		x			x	
IENG 435	Maintenance Planning					x														x	x							
IENG 447	Design of Experiments								x					x													x	
MENG 204	Mechanical Measurements																x				x							
MENG 305	Fluid Mechanics I								x					x														
MENG 323	Fundamentals of Mechatronics Engineering					x																						
MENG 325	Computer Control of Manufacturing Processes		x				x							x	x													
COUNT		13	5	6	11	11	8	6	5	8	5	2	8	5	3	7	2	4	14	7	8	10	5	2	3	4	6	

IENG Course - ILOs matrix - Part 2

IENG program		b1	b1	b1	b1	b1	b1	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	d1	d2	d3	d4	d5	d6	d7	d8	d9
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	University Requirements																														
ENGL 001	Intensive English																														
ENGL 101	English 101																	x								x					
ENGL 102	English 102																	x								x					
ENGL 201	Writing Skills																	x								x					
ENGL 202	Communication & Presentation Skills																x		x						x	x					
HUMA 101	Introduction to Scientific Critical Thinking																											x		x	
HUMA 102	Introduction to Ethics																														x
HUMA 103	Selected Topics in Humanities & Arts																									x		x			x
SSCI 101	Selected Topics in Egyptian & Arab Heritage																											x		x	x
SSCI 102	Selected Topics in Social Sciences																	x										x	x	x	x
	School Requirements																														
CHEM 101	Chemical Principles							x					x																		
CSCE 101	Computer & Information Skills							x					x	x													x				
CSCE 201	Introduction to Programming							x					x	x													x				
ECEN 101	Electric Circuits							x	x	x				x																	
ENGR 101	Introduction to Engineering Disciplines							x			x	x																			
ENGR 102	Engineering Design							x	x	x																					
MATH 111	Analytical Geometry & Calculus I							x																							
MATH 112	Calculus II							x																							
MATH 202	Probability & Statistics for Engineers		x					x					x																		
MATH 203	Differential Equations							x																							
MATH 301	Linear Algebra							x								x															
MATH 303	Nnummerical Methods							x					x																		
MENG 101	Engineering Mechanics I - Statics								x																						
MENG 102	Engineering Mechanics II - Dynamics								x																						
PHYS 101	Physics I							x					x																		
PHYS 102	Physics II							x					x																		
	Program Requirements																														
ENTR 301	Selected Topics in Entrepreneurship	x																											x		x
IENG 101	Introduction to Industrial and Service Engineering								x																	x	x	x			
IENG 111	Introduction to Material Science	x	x																x							x					
IENG 202	Operations research I								x																x	x					
IENG 212	Manufacturing processes 1				x	x																									
IENG 213	Manufacturing processes 2								x																x						
IENG 231	Safety Engineering	x							x								x											x			
IENG 232	Work System Analysis & Design									x	x																x				
IENG 233	Human Factors Engineering		x	x																									x		
IENG 241	Engineering Economics	x																												x	
IENG 242	operations management					x		x											x												
IENG 243	Statistical Quality Control						x												x								x				
IENG 303	Facilities Planning									x																x					
IENG 304	Modeling and Simulation								x	x																		x			

IENG program		b10	b11	b12	b13	b14	b15	c16	c17	c18	c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	c36	c37	c38	c39	c40	c41	c42	c43	c44	c45	c46	c47	c48	c49	c50	c51	c52	c53	c54	c55	c56	c57	c58	c59	c60	c61	c62	c63	c64	c65	c66	c67	c68	c69	c70	c71	c72	c73	c74	c75	c76	c77	c78	c79	c80	c81	c82	c83	c84	c85	c86	c87	c88	c89	c90	c91	c92	c93	c94	c95	c96	c97	c98	c99	c100	c101	c102	c103	c104	c105	c106	c107	c108	c109	c110	c111	c112	c113	c114	c115	c116	c117	c118	c119	c120	c121	c122	c123	c124	c125	c126	c127	c128	c129	c130	c131	c132	c133	c134	c135	c136	c137	c138	c139	c140	c141	c142	c143	c144	c145	c146	c147	c148	c149	c150	c151	c152	c153	c154	c155	c156	c157	c158	c159	c160	c161	c162	c163	c164	c165	c166	c167	c168	c169	c170	c171	c172	c173	c174	c175	c176	c177	c178	c179	c180	c181	c182	c183	c184	c185	c186	c187	c188	c189	c190	c191	c192	c193	c194	c195	c196	c197	c198	c199	c200	c201	c202	c203	c204	c205	c206	c207	c208	c209	c210	c211	c212	c213	c214	c215	c216	c217	c218	c219	c220	c221	c222	c223	c224	c225	c226	c227	c228	c229	c230	c231	c232	c233	c234	c235	c236	c237	c238	c239	c240	c241	c242	c243	c244	c245	c246	c247	c248	c249	c250	c251	c252	c253	c254	c255	c256	c257	c258	c259	c260	c261	c262	c263	c264	c265	c266	c267	c268	c269	c270	c271	c272	c273	c274	c275	c276	c277	c278	c279	c280	c281	c282	c283	c284	c285	c286	c287	c288	c289	c290	c291	c292	c293	c294	c295	c296	c297	c298	c299	c300	c301	c302	c303	c304	c305	c306	c307	c308	c309	c310	c311	c312	c313	c314	c315	c316	c317	c318	c319	c320	c321	c322	c323	c324	c325	c326	c327	c328	c329	c330	c331	c332	c333	c334	c335	c336	c337	c338	c339	c340	c341	c342	c343	c344	c345	c346	c347	c348	c349	c350	c351	c352	c353	c354	c355	c356	c357	c358	c359	c360	c361	c362	c363	c364	c365	c366	c367	c368	c369	c370	c371	c372	c373	c374	c375	c376	c377	c378	c379	c380	c381	c382	c383	c384	c385	c386	c387	c388	c389	c390	c391	c392	c393	c394	c395	c396	c397	c398	c399	c400	c401	c402	c403	c404	c405	c406	c407	c408	c409	c410	c411	c412	c413	c414	c415	c416	c417	c418	c419	c420	c421	c422	c423	c424	c425	c426	c427	c428	c429	c430	c431	c432	c433	c434	c435	c436	c437	c438	c439	c440	c441	c442	c443	c444	c445	c446	c447	c448	c449	c450	c451	c452	c453	c454	c455	c456	c457	c458	c459	c460	c461	c462	c463	c464	c465	c466	c467	c468	c469	c470	c471	c472	c473	c474	c475	c476	c477	c478	c479	c480	c481	c482	c483	c484	c485	c486	c487	c488	c489	c490	c491	c492	c493	c494	c495	c496	c497	c498	c499	c500	c501	c502	c503	c504	c505	c506	c507	c508	c509	c510	c511	c512	c513	c514	c515	c516	c517	c518	c519	c520	c521	c522	c523	c524	c525	c526	c527	c528	c529	c530	c531	c532	c533	c534	c535	c536	c537	c538	c539	c540	c541	c542	c543	c544	c545	c546	c547	c548	c549	c550	c551	c552	c553	c554	c555	c556	c557	c558	c559	c560	c561	c562	c563	c564	c565	c566	c567	c568	c569	c570	c571	c572	c573	c574	c575	c576	c577	c578	c579	c580	c581	c582	c583	c584	c585	c586	c587	c588	c589	c590	c591	c592	c593	c594	c595	c596	c597	c598	c599	c600	c601	c602	c603	c604	c605	c606	c607	c608	c609	c610	c611	c612	c613	c614	c615	c616	c617	c618	c619	c620	c621	c622	c623	c624	c625	c626	c627	c628	c629	c630	c631	c632	c633	c634	c635	c636	c637	c638	c639	c640	c641	c642	c643	c644	c645	c646	c647	c648	c649	c650	c651	c652	c653	c654	c655	c656	c657	c658	c659	c660	c661	c662	c663	c664	c665	c666	c667	c668	c669	c670	c671	c672	c673	c674	c675	c676	c677	c678	c679	c680	c681	c682	c683	c684	c685	c686	c687	c688	c689	c690	c691	c692	c693	c694	c695	c696	c697	c698	c699	c700	c701	c702	c703	c704	c705	c706	c707	c708	c709	c710	c711	c712	c713	c714	c715	c716	c717	c718	c719	c720	c721	c722	c723	c724	c725	c726	c727	c728	c729	c730	c731	c732	c733	c734	c735	c736	c737	c738	c739	c740	c741	c742	c743	c744	c745	c746	c747	c748	c749	c750	c751	c752	c753	c754	c755	c756	c757	c758	c759	c760	c761	c762	c763	c764	c765	c766	c767	c768	c769	c770	c771	c772	c773	c774	c775	c776	c777	c778	c779	c780	c781	c782	c783	c784	c785	c786	c787	c788	c789	c790	c791	c792	c793	c794	c795	c796	c797	c798	c799	c800	c801	c802	c803	c804	c805	c806	c807	c808	c809	c810	c811	c812	c813	c814	c815	c816	c817	c818	c819	c820	c821	c822	c823	c824	c825	c826	c827	c828	c829	c830	c831	c832	c833	c834	c835	c836	c837	c838	c839	c840	c841	c842	c843	c844	c845	c846	c847	c848	c849	c850	c851	c852	c853	c854	c855	c856	c857	c858	c859	c860	c861	c862	c863	c864	c865	c866	c867	c868	c869	c870	c871	c872	c873	c874	c875	c876	c877	c878	c879	c880	c881	c882	c883	c884	c885	c886	c887	c888	c889	c890	c891	c892	c893	c894	c895	c896	c897	c898	c899	c900	c901	c902	c903	c904	c905	c906	c907	c908	c909	c910	c911	c912	c913	c914	c915	c916	c917	c918	c919	c920	c921	c922	c923	c924	c925	c926	c927	c928	c929	c930	c931	c932	c933	c934	c935	c936	c937	c938	c939	c940	c941	c942	c943	c944	c945	c946	c947	c948	c949	c950	c951	c952	c953	c954	c955	c956	c957	c958	c959	c960	c961	c962	c963	c964	c965	c966	c967	c968	c969	c970	c971	c972	c973	c974	c975	c976	c977	c978	c979	c980	c981	c982	c983	c984	c985	c986	c987	c988	c989	c990	c991	c992	c993	c994	c995	c996	c997	c998	c999	c1000	c1001	c1002	c1003	c1004	c1005	c1006	c1007	c1008	c1009	c1010	c1011	c1012	c1013	c1014	c1015	c1016	c1017	c1018	c1019	c1020	c1021	c1022	c1023	c1024	c1025	c1026	c1027	c1028	c1029	c1030	c1031	c1032	c1033	c1034	c1035	c1036	c1037	c1038	c1039	c1040	c1041	c1042	c1043	c1044	c1045	c1046	c1047	c1048	c1049	c1050	c1051	c1052	c1053	c1054	c1055	c1056	c1057	c1058	c1059	c1060	c1061	c1062	c1063	c1064	c1065	c1066	c1067	c1068	c1069	c1070	c1071	c1072	c1073	c1074	c1075	c1076	c1077	c1078	c1079	c1080	c1081	c1082	c1083	c1084	c1085	c1086	c1087	c1088	c1089	c1090	c1091	c1092	c1093	c1094	c1095	c1096	c1097	c1098	c1099	c1100	c1101	c1102	c1103	c1104	c1105	c1106	c1107	c1108	c1109	c1110	c1111	c1112	c1113	c1114	c1115	c1116	c1117	c1118	c1119	c1120	c1121	c1122	c1123	c1124	c1125	c1126	c1127	c1128	c1129	c1130	c1131	c1132	c1133	c1134	c1135	c1136	c1137	c1138	c1139	c1140	c1141	c1142	c1143	c1144	c1145	c1146	c1147	c1148	c1149	c1150	c1151	c1152	c1153	c1154	c1155	c1156	c1157	c1158	c1159	c1160	c1161	c1162	c1163	c1164	c1165	c1166	c1167	c1168	c1169	c1170	c1171	c1172	c1173	c1174	c1175	c1176	c1177	c1178	c1179	c1180	c1181	c1182	c1183	c1184	c1185	c1186	c1187	c1188	c1189	c1190	c1191	c1192	c1193	c1194	c1195	c1196	c1197	c1198	c1199	c1200	c1201	c1202	c1203	c1204	c1205	c1206	c1207	c1208	c1209	c1210	c1211	c1212	c1213	c1214	c1215	c1216	c1217	c1218	c1219	c1220	c1221	c1222	c1223	c1224	c1225	c1226	c1227	c1228	c1229	c1230	c1231	c1232	c1233	c1234	c1235	c1236	c1237	c1238	c1239	c1240	c1241	c1242	c1243	c1244	c1245	c1246	c1247	c1248	c1249	c1250	c1251	c1252	c1253	c1254	c1255	c1256	c1257	c1258	c1259	c1260	c1261	c1262	c1263	c1264	c1265	c1266	c1267	c1268	c1269	c1270	c1271	c1272	c1273	c1274	c1275	c1276	c1277	c1278	c1279	c1280	c1281	c1282	c1283	c1284	c1285	c1286	c1287	c1288	c1289	c1290	c1291	c1292	c1293	c1294	c1295	c1296	c1297	c1298	c1299	c1300	c1301	c1302	c1303	c1304	c1305	c1306	c1307	c1308	c1309	c1310	c1311	c1312	c1313	c1314	c1315	c1316	c1317	c1318	c1319	c1320	c1321	c1322	c1323	c1324	c1325	c1326	c1327	c1328	c1329	c1330	c1331	c1332	c1333	c1334	c1335	c1336	c1337	c1338	c1339	c1340	c1341	c1342	c1343	c1344	c1345	c1346	c1347	c1348	c1349	c1350	c1351	c1352	c1353	c1354	c1355	c1356	c1357	c1358	c1359	c1360	c1361	c1362	c1363	c1364	c1365	c1366	c1367	c1368	c1369	c1370	c1371	c1372	c1373	c1374	c1375	c1376	c1377	c1378	c1379	c1380	c1381	c1382	c1383	c1384	c1385	c1386	c1387	c1388	c1389	c1390	c1391	c1392	c1393	c1394	c1395	c1396	c1397	c1398	c1399	c1400	c1401	c1402	c1403	c1404	c1405	c1406	c1407	c1408	c1409	c1410	c1411	c1412	c1413	c1414	c1415	c1416	c1417	c1418	c1419	c1420	c1421	c1422	c1423	c1424	c1425	c1426	c1427	c1428	c1429	c1430	c1431	c1432	c1433	c1434	c1435	c1436	c1437	c1438	c1439	c1440	c1441	c1442	c1443	c1444	c1445	c1446	c1447	c1448	c1449	c1450	c1451	c1452	c1453	c1454	c1455	c1456	c1457	c1458	c1459	c1460	c1461	c1462	c1463	c1464	c1465	c1466	c1467	c1468	c1469	c1470	c1471	c1472	c1473	c1474	c1475	c1476	c1477	c1478	c1479	c1480	c1481	c1482	c1483	c1484	c1485	c1486	c1487	c1488	c1489	c1490	c1491	c1492	c1493	c1494	c1495	c1496	c1497	c1498	c1499	c1500	c1501	c1502	c1503	c1

Course Dependency Flow Diagram



IENG Sample Study Plan

IENG Study Plan (Year 1)

Semester 1						
Code	Title	CH	ECTS	SWL	Prerequisite	
CHEM 101	Chemical Principles	3	5	125	None	
CSCE 101	Computer & Information Skills	3	5	125	None	
ENGL 101	English I	0	0	50	A minimum score of 500 on the TOEFL. Students will also be required to pass a written NU test (essay).	
ENGR 101	Introduction to Engineering Disciplines	3	5	125	None	
MATH 111	Analytical Geometry & Calculus I	3	5	125	None	
PHYS 101	Physics I	4	7	175	None	
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3	75	None	
TOTAL		18	30	800		
Semester 2						
CSCE 201	Introduction to Programming	3	5	125	None	
ENGL 102	English II	0	0	50	ENGL 101 - English I	
ENGR 102	Engineering Design	3	5	125	ENGR 101 - Introduction to Engineering Disciplines	
MATH 112	Calculus II	3	5	125	MATH 111 - Analytical Geometry & Calculus I	
MENG 101	Engineering Mechanics I - Statics	2	4	100	MATH 111 - Analytical Geometry & Calculus I	
PHYS 102	Physics II	4	7	175	PHYS 101 - Physics I	
SSCI 103	Selected Topics in Social Sciences	2	3	75	None	
TOTAL		17	29	775		

IENG Study Plan (Year 2)

Semester 3							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 201	Writing Skills	3	5	125	ENGL 102 - English II - or IELTS 6.5 or equivalent		
HUMA 101	Introduction to Scientific & Critical Thinking	2	3	75	None		
IENG 101	Introduction to Industrial and Service Engineering	3	5	125	None		
MATH 202	Probability & Statistics for Engineers	3	5	125	MATH 112 - Calculus II		
MATH 203	Differential Equations	3	5	125	MATH 112 - Calculus II		
MENG 102	Engineering Mechanics II - Dynamics	2	4	100	MENG 101 - Engineering Mechanics I - Statics		
MENG 202	Solid Modeling and Workshop	3	5	125	ENGR 102 - Engineering Design		
TOTAL		19	32	800			
Semester 4							
ECEN 101	Electric Circuits	3	5	125	PHYS 101 - Physics I		
ENGL 202	Communication and Presentation Skills	3	5	125	ENGL 201 - Writing Skills		
IENG 111	Introduction to Material Science	3	5	125	None		
IENG 231	Safety Engineering	3	5	125	None		
IENG 241	Engineering Economics	3	5	125	None		
MATH 301	Linear Algebra	3	5	125	MATH 112 - Calculus II		
TOTAL		18	30	750			

IENG Study Plan (Year 3)

	Semester 5						
Code	Title	CH	ECTS	SWL	Prerequisite		
ENTR 301	Selected Topics in Entrepreneurship	3	5	125	NONE		
IENG 202	Operations research I	3	5	125	MATH 111 - Analytical Geometry & Calculus I		
IENG 212	Manufacturing processes 1	3	5	125	IENG 111 - Introduction to Material Science		
IENG 232	Work System Analysis & Design	3	5	125	IENG 101 - Introduction to Industrial and Service Engineering		
IENG 242	operations management	3	5	125	IENG 101 - Introduction to Industrial and Service Engineering		
MATH 303	Nummerical Methods	3	5	125	MATH 203 - Differential Equations		
TOTAL		18	30	750			
	Semester 6						
IENG 213	Manufacturing processes 2	3	5	125	IENG 212 - Manufacturing processes 1		
IENG 233	Human Factors Engineering	3	5	125	IENG 231 - Safety Engineering	IENG 232 - Work System Analysis & Design	
IENG 243	Statistical Quality Control	3	5	125	MATH 202 - Probability & Statistics for Engineers		
IENG 304	Modeling and Simulation	3	5	125	MATH 202 - Probability & Statistics for Engineers	IENG 202 - Operations research I	
IENG 344	Project management	3	5	125	IENG 202 - Operations research I		
IENG 421	Fundamentals of Service Engineering and Management	3	5	125	IENG 101 - Introduction to Industrial and Service Engineering		
TOTAL		18	30	750			

IENG Study Plan (Year 4)

	Semester 7						
Code	Title	CH	ECTS	SWL	Prerequisite		
IENG 314 / MENG 463	CAD/CAM	3	5	125	MENG 202 - Solid Modeling and Workshop		
IENG 303	Facilities Planning	3	5	125	IENG 202 - Operations research I	IENG 233 - Human Factors Engineering	
IENG 322	Logistics and Supply chain management	3	5	125	IENG 202 - Operations research I	IENG 242 - operations management	
IENG 305	Management Information systems	3	5	125	IENG 101 - Introduction to Industrial and Service Engineering		
IENG 391	Practical Training	3	6	150	NONE		
NSCI 102	Selected Topics in Environmental Science	3	5	125	None		
TOTAL		18	31	775			
	Semester 8						
HUMA 103	Selected Topics in Humanities & Arts	2	3	75	None		
IENG 315	Manufacturing Systems	3	5	125	IENG 314 / MENG 463 - CAD/CAM		
IENG 324	Warehouse Science & Operations	3	5	125	IENG 322 - Logistics and Supply chain management		
IENG 408	Information and decision support	3	5	125	IENG 305 - Management Information systems		
IENG 493	Graduation Project I	3	6	180	Senior Standing		
IENG xxx	Elective 1	3	5	125			
TOTAL		17	29	755			

IENG Study Plan (Year 5)

Semester 9							
Code	Title	CH	ECTS	SWL	Prerequisite		
HUMA 102	Introduction to Ethics	2	3	75	None		
IENG 406	Object oriented Modeling of Industrial Systems	3	5	125	IENG 111 - Introduction to Material Science	IENG 304 - Modeling and Simulation	IENG 322 - Logistics and Supply chain management
IENG 495	Graduation Project II	3	6	180	IENG 493 - Graduation Project I		
IENG xxx	Elective 2	3	5	125			
IENG xxx	Elective 3	3	5	125			
IENG xxx	Elective 4	3	5	125			
TOTAL		17	29	755			

IENG Electives

Electives							
Code	Title	CH	ECTS	SWL	Prerequisite		
IENG 346	Introduction to Entrepreneurship & small business management	3	5	125	IENG 101 - Introduction to Industrial and Service Engineering		
IENG 402	Operations Research II	3	5	125	IENG 202 - Operations research I		
IENG 409	Selected Topics in Industrial Engineering	3	5	125	NONE		
IENG 449	Introduction to MOT	3	5	125	Senior standing		
IENG 416	Product realization and Reverse Engineering	3	5	125	IENG 315 - Manufacturing Systems		
IENG 423	Operations Management in Service Industries	3	5	125	IENG 421 - Fundamentals of Service Engineering and Management		
IENG 345	Engineering cost analysis	3	5	125	IENG 241 - Engineering Economics		
IENG 407	Systems Engineering	3	5	125	IENG 305 - Management Information systems		
IENG 425	Industrial Distribution Systems	3	5	125	IENG 322 - Logistics and Supply chain management		

Electives						
IENG 434	Reliability Engineering	3	5	125	ENGR 101 - Introduction to Engineering Disciplines	ENGR 102 - Engineering Design
IENG 435	Maintenance Planning	3	5	125	IENG 304 - Modeling and Simulation	
IENG 449	Introduction to MOT	3	5	125	Senior standing	
MENG 324	Signal Processing & Logic Design	3	5	125	MENG 321 - Electronic devices and applications	MATH 203 - Differential Equations
MENG 323	Fundamentals of Mechatronics Engineering	3	5	125	MATH 203 - Differential Equations	
MENG 305	Fluid Mechanics I	3	5	125	PHYS 102 - Physics II	MENG 102 - Engineering Mechanics II - Dynamics
MENG 204	Mechanical Measurements	3	5	125	PHYS 102 - Physics II	

توصيف مقررات برنامج الهندسة الصناعية

(IENG) - ENTR 301

Course Title	Selected Topics in Entrepreneurship	
Course Code	ENTR 301	
Prerequisites	NONE	
Classification within the curriculum	Compulsory (All Tracks)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Business	
Topic Level	Program Requirements	
Description In this course, students get an overview about the definition of entrepreneurship, examples of successful innovations, and the prospects of starting a company. The course covers idea generation and identifying opportunities, business model canvas, and an overview of some business fundamentals such as types of businesses and business functions, in addition to communication and presentation skills.		

(IENG) - IENG 101

Course Title	Introduction to Industrial and Service Engineering	
Course Code	IENG 101	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description Introduction to the fundamentals of Industrial Engineering; concepts, analysis, and design. Applications of the principles and problems in operations research, systems analysis, manufacturing processes, human factors, facility design, process selection, production processes, quality and operation management		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature Turner, W.C., et. Al, 1993, “Introduction to Industrial and System Engineering”, Prentice Hall		

(IENG) - IENG 111

Course Title	Introduction to Material Science	
Course Code	IENG 111	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Program Requirements	
Description This course provides an introduction to engineering materials and their properties, classes of materials, and their general properties, developments in materials used for various applications over time, types of Bonding: interatomic forces and energies, and there relation to engineering materials’ properties, crystal structures and geometry, crystalline imperfections and their effect on mechanical properties, phase diagrams		
Lab and Tutorials The course requires practice in the materials lab		
Literature W. Smith, “Principals of Materials Science and Engineering”, 3rd Ed., McGraw Hill Publishing Co., 1996. R. Askeland, “The Science and Engineering of Materials”, 5th Ed., PWS Publishing Co., Boston, 1999.		

(IENG) - IENG 202

Course Title	Operations research I	
Course Code	IENG 202	
Prerequisites	MATH 111 - Analytical Geometry & Calculus I	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Program Requirements	
Description The aim of this course is to introduce the decision making process criteria to students and differentiate between different decision making environments. Students are given the knowledge and experience of problem solving techniques through using different operations research modeling and solution techniques. Through practical applications, assignments and the final projects students learn how to utilize suitable tools at different problem solving situations.		
Lab and Tutorials The course requires practice and problem solving training during tutorials, in addition to training on software to solve general OR problems.		
Literature- - Barry Render, Ralph M. Stair, JR, and Michael E. Hanna, “Quantitative Analysis for Management”, 10th Edition, Pearson Prentice Hall, 2009. - Frederick S. Hillier and Gerald J. Lieberman, Introduction to Operations Research (8th ed.), McGraw Hill, New York (2005). - Hamdy A. Taha, Operations Research: An Introduction (6th ed.),		

(IENG) - IENG 212

Course Title	Manufacturing processes 1	
Course Code	IENG 212	
Prerequisites	IENG 111 - Introduction to Material Science	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring/Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description This course examines safety, metrology, and working drawings, gd&t (geometric dimensioning & tolerancing), metal casting & injection molding ,solidification and cooling, feeding systems and risers, sand casting, expendable mold casting, die casting, injection molding, metal forming, fundamentals of metal forming, hot working processes, cold working processes (sheet metal working)		
Lab and Tutorials The course requires practice in mechanical workshop		
Literature M P Groover, Fundamentals of Modern Manufacturing, ©2007 John Wiley & Sons, Inc.		

(IENG) - IENG 213

Course Title	Manufacturing processes 2	
Course Code	IENG 213	
Prerequisites	IENG 212 - Manufacturing processes 1	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring/Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description The course examines material removal, machining operations: turning, milling and drilling, machine tools and machining setups, jigs and fixtures, broaching, sawing, filing, abrasive machining processes, thread and gear manufacturing, additive manufacturing, non traditional processes, mechanical energy processes, electrochemical machining processes, thermal energy processes, chemical machining powder metallurgy, nems /mems, nanomaterials processes		
Lab and Tutorials The course requires practice in the mechanical workshop		
Literature E. Paul DeGarmo, J.T. Black, Ronald A. Kohser, 2003,Materials and processes in manufacturing, 7th ed. Macmillan Publishing company		

(IENG) - IENG 231

Course Title	Safety Engineering	
Course Code	IENG 231	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Program Requirements	
Description The focus of the course is on a system engineering approach to safety, causes of accidents, accident analysis and control, techniques used in safety analysis, safety management and organization, risk management, training, human behavioral approach in safety.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature - Industrial Safety and Health Management; Asfahl, C. Ray, Pearson Prentice Hall, ISBN-13- 142392-4 - Occupational Safety Management and Engineering; Hammer, W, Prentice Hall, ISBN-13-629379-4		

(IENG) - IENG 232

Course Title	Work System Analysis & Design	
Course Code	IENG 232	
Prerequisites	IENG 101 - Introduction to Industrial and Service Engineering	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description This course includes the methods used in determining the most effective utilization of effort in human activity systems; work methods, analysis and design; micro motion analysis; human and rating factors; predetermined time systems; work samplings; computer-aided time study; learning curves; lean concepts; fundamentals of line balancing; worker compensation.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature Motion and Time Study; Design and Measurement of Work; Ralph M. Barnes, 7th Ed., John Wiley & Sons; 1980.		

(IENG) - IENG 233

Course Title	Human Factors Engineering	
Course Code	IENG 233	
Prerequisites	IENG 231 - Safety Engineering	IENG 232 - Work System Analysis & Design
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description This course focuses on the application of knowledge about human capabilities and limitations to the design of workplaces, work methods and jobs for optimal safety, efficiency, productivity and comfort. Topics include: systems design and task analysis, muscle use and anthropometry, workspace design, activity-related soft tissue disorders, back injuries, shift work, organizational and psychosocial aspects of work, skilled work and mental activity and regulations in ergonomics. Objectives include how to increase awareness of the need for and role of ergonomics in occupational health, to obtain basic knowledge in the application of ergonomic principles to design of industrial workplaces and the prevention of occupational injuries to understand the breadth and scope of occupational ergonomics.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature Introduction to human factors engineering. NY: Longman, Wickens, C. D., Lee, J. D. Liu, Y. & Becker, S. E. G.,		

(IENG) - IENG 241

Course Title	Engineering Economics	
Course Code	IENG 241	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Business	
Topics Level	Program Requirements	
Description The main aim of this course is make the students acquainted with rational meaningful approaches to evaluating economically different (alternatives) investment opportunities while accomplishing given objectives. The course will also provide the students with the required tools and techniques to consider economic and non-economic factors in evaluating a wide range of industrial and business applications.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature - Fraser, N. M., Jewkes, E. M., Bernhardt I. & Tajima, M., Global Engineering Economics: Financial Decision Making for Engineers, 4th Edition, Pearson Education, 2009. - Chan S. Park, Fundamentals of Engineering Economics, 3rd Edition, Pearson Education, ISBN 13:978-0273772910		

(IENG) - IENG 242

Course Title	operations management	
Course Code	IENG 242	
Prerequisites	IENG 101 - Introduction to Industrial and Service Engineering	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Program Requirements	
Description This course focus on operations and productivity concepts – Production control, operation decision making – Systems design, capacity and investment – Functions of inventory and ordering systems-Facility location and layout – Planning for goods and services – Process planning and selection – Forecasting demand – Production-inventory systems, materials requirements planning (MRP), Just-in-time systems Aggregate demand – Aggregate planning and master scheduling.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature Stevenson, William, <i>Operation Management:</i>, 10th ed., Irwin/McGraw-Hill, 2011		

(IENG) - IENG 243

Course Title	Statistical Quality Control	
Course Code	IENG 243	
Prerequisites	MATH 202 - Probability & Statistics for Engineers	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description This course provides a historical view of quality, introduction of the concept of Total Quality Management (TQM), Statistical Fundamentals, principles and concepts of statistical quality control, quality improvement tools, control charts for variables, control charts for attributes, choice between attribute and variable control charts, process capability measures, types of attribute acceptance sampling plans, characteristics of acceptance sampling plans, producer consumers relationships, performance of acceptance sampling plans, economics of acceptance sampling plans, standard attribute acceptance sampling plans applications and limitation, and case studies.		
Lab and Tutorials The course requires practice and problem solving training during tutorials, and software training		
Literature Montgomery, Douglas C., <i>Statistical Quality Control A Modern Introduction</i>, Six Edition, 2009, John Wiley & sons, ISBN: 978-0470-23397-9		

(IENG) - IENG 303

Course Title	Facilities Planning	
Course Code	IENG 303	
Prerequisites	IENG 202 - Operations research I	IENG 233 - Human Factors Engineering
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description This course covers strategic facilities planning through detailed facilities layout design. Course components include product flow, space and activity relationships, personnel requirements, line-balancing, material handling, and layout. Traditional and contemporary issues in manufacturing and their impact on facilities design including receiving, shipping, warehousing and integration with manufacturing and supporting operations are explored. Facilities planning models and the process of evaluating, selecting, preparing, presenting, and implementing the facilities plans are covered.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature James A. Tompkins, John White, Yavuz A. Bozer, J. M. A. Tanchoco, “Facilities Planning- Wiley		

(IENG) - IENG 304

Course Title	Modeling and Simulation	
Course Code	IENG 304	
Prerequisites	MATH 202 - Probability & Statistics for Engineers	IENG 202 - Operations research I
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Program Requirements	
Description This course provides a basic treatment of discrete-event simulation, including the proper collection and analysis of data, the use of analytic techniques, verification and validation of models, and designing simulation experiments. Furthermore, it presents the application of simulation in manufacturing and material handling systems, and service industries.		
Lab and Tutorials The course requires discussion and training on computer tools for simulation		
Literature • Law, E. M.(2007) " Simulation Modeling and Analysis", Fourth Edition, McGraw-Hill, New York. • Pidd, M. “Computer Simulation in Management Science" Second Edition, John Wiley & Sons, New York (1998). • B. W. Taylor, “Introduction to management science”, ninth edition, Chapter 14, Prentice Hall, 2007 • Simulation, Computer simulation: modeling and Analysis, International journal of Modeling and Simulation European Journal of operations Research, simulation and Gaming, ACM transactions on Modeling and Computer Simulation.		

(IENG) - IENG 305

Course Title	Management Information systems	
Course Code	IENG 305	
Prerequisites	IENG 101 - Introduction to Industrial and Service Engineering	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Program Requirements	
Description This course provides an introduction to Management Information Systems; Importance of information systems to management, hardware, software, input/output devices, file and database, communication, decision support systems and expert systems. MIS planning and development.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature Hawryszkiewicz, J. T., Database Analysis and Design, SRA (Science Research Association, Inc.), 1984		

(IENG) - IENG 314

Course Title	CAD/CAM	
Course Code	IENG 314 / MENG 463	
Prerequisites	MENG 202 - Solid Modeling and Workshop	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring (Semester 9)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description Introduction to CAD/CAM software and hardware. Three-dimensional geometric modelling. Study of types of curves and surfaces. Data capturing, surface fitting, and rapid prototyping techniques. Utilization of interactive computer graphics packages. Utilizing CAD/CAM software to generate G-code, 3D LASER digitizer scanner, 3D printer, FARO arm, and other CAD/CAM peripherals. Project required.		
Laboratory Regular weekly conducted laboratory sessions utilizing CAD/CAM software and hardware peripherals.		
Literature • “CAD, 3D Modeling, Engineering Analysis, and Prototype Experimentation”, Jeremy Zheng Li. Springer, 1st edition 2015. • SolidWorks, User’s Guide 2016, Dassault Systèmes. • Class notes prepared by instructor and uploaded on Moodle.		

(IENG) - IENG 315

Course Title	Manufacturing Systems	
Course Code	IENG 315	
Prerequisites	IENG 314 / MENG 463 - CAD/CAM	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring/Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Program Requirements	
Description This course reflects manufacturers’ growing need to integrate computers into their production processes, this course covers the machining fundamentals—as well as Computer Numerical Control programming and operation of Computer Numerical Control (CNC) machine tools with a focus on word address (G and M code) programming for the industry standard Fanuc controllers.		
Lab and Tutorials The course requires practice and problem solving training during tutorials and CNC training		
Literature - Automation, Production Systems, and Computer Integrated Manufacturing, Mikell Groover, Prentice Hall, 2000. - Computer-Integrated Design and Manufacturing, Nanua Singh, John Wiley & Sons, 1996		

(IENG) - IENG 322

Course Title	Logistics and Supply chain management	
Course Code	IENG 322	
Prerequisites	IENG 202 - Operations research I	IENG 242 - operations management
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description This course covers the major issues in supply chain management, including: definition of a supply chain; role of inventory; advanced production-inventory models; supply contracts; bullwhip effect and information sharing; vendor-managed inventories and other distribution strategies; third-party logistics providers; managing product variety; information technology and supply chain management; international issues.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature Sunil Chopra and Peter Meindl “Supply Chain Management Strategy, Planning, And Operation”, Fourth Edition		

(IENG) - IENG 324

Course Title	Warehouse Science & Operations	
Course Code	IENG 324	
Prerequisites	IENG 322 - Logistics and Supply chain management	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description This course covers main issues in warehouse layout, processes, material handling equipment, warehouse information systems, automation, measuring warehouse efficiency, as well as special topics in warehouse management.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature John J. BARTHOLDI, Steven T. HACKMAN, “Warehouse & Distribution Science”, Release 0.95 and 0.1.2		

(IENG) - IENG 344

Course Title	Project management	
Course Code	IENG 344	
Prerequisites	IENG 202 - Operations research I	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Program Requirements	
Description This course addresses the fundamental of project management, as well as the tools and techniques necessary to manage complex projects. These principles, largely developed and tested on engineering projects, are being successfully applied to projects of all sizes and types within the business world. They are also fully aligned with the industry standard Project Management Book of Knowledge (PMBOK), published by the worldwide Project Management Institute (PMI). The course will enable students to master projects planning, scheduling and estimating; developing approval process, including testing for alternatives; understanding project information and control systems; properly selecting resources, allocation and implementation, and post project evaluation. PERT, CPM		
Lab and Tutorials The course requires practice and problem solving training during tutorials, in addition to software training.		
Literature Project Management: A Systems Approach to Planning, Scheduling, and Controlling, Harold Kerzner.		

(IENG) - IENG 345

Course Title	Engineering cost analysis	
Course Code	IENG 345	
Prerequisites	IENG 241 - Engineering Economics	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Program Requirements	
Description The course outlines the fundamentals of pricing and standard cost, factory overhead costs, use of cost analysis for planning and control processes. Introduction to principles of accounting, and the concepts and techniques of cost accounting are covered. Emphasis placed on the application of cost information to the production of manufacturing goods. (Cost Breakdown, structure, feasibility study)		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature Cost Analysis and Estimating for Engineering and Management, Ostwald, P. and McLaren, T., 2004. Pearson Prentice Hall.		

(IENG) - IENG 346

Course Title	Introduction to Entrepreneurship & small business management	
Course Code	IENG 346	
Prerequisites	IENG 101 - Introduction to Industrial and Service Engineering	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall/Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Program Requirements	
Description This course consists of three parts. The first part introduces students to the entrepreneurial activity. The second part concentrates on the survival and growth of small and medium enterprises (SMEs) and focuses on the managerial aspects of SMEs when compared to large firms. The third part addresses the unique challenges faced by family businesses. Topics covered include the benefits and drawbacks of being an entrepreneur, developmental structures and designs, focus development, management during fast growth periods, lack of resources and financing, development of sustainable intangible resources (legitimacy, status, reputation, etc). Other topics related to family business management include ownership, governance and management, succession planning, generational gaps, delegation and control and the role of non-family members.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature • Entrepreneurship: Successfully Launching New Ventures : Global Edition, 4th Edition, by Bruce R. Barringer and R. Duane Ireland		

(IENG) - IENG 391

Course Title	Practical Training	
Course Code	IENG 391	
Prerequisites	NONE	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 7)	
Contact Hours	Lectures	-
	Tutorials	-
	Labs	-
	TOTAL	0
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL)	150	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description A minimum of four weeks of practical training in off-campus sites elected by the program. Students are required to submit a recognition letter from the site where they received their training, in addition, a report and a presentation are submitted as well. Course is a Pass/Fail course.		
Lab and Tutorials Not Applicable		
Literature Not Applicable		

(IENG) - IENG 402

Course Title	Operations Research II	
Course Code	IENG 402	
Prerequisites	IENG 202 - Operations research I	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours	Lectures	2.5
	Tutorials	
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description The course covers different mathematical modeling techniques, including, integer programming models and solution techniques, goal programming, non-linear programming and dynamic programming, Markov analysis.		
Lab and Tutorials The course is project based and requires software tools during labs		
Literature - Barry Render, Ralph M. Stair, JR, and Michael E. Hanna, “Quantitative Analysis for Management”, 10th Edition, Pearson Prentice Hall, 2009. - Frederick S. Hillier and Gerald J. Lieberman, Introduction to Operations Research (8th ed.), McGraw Hill, New York (2005). - Hamdy A. Taha, Operations Research: An Introduction (6th ed.),		

(IENG) - IENG 406

Course Title	Object oriented Modeling of Industrial Systems		
Course Code	IENG 406		
Prerequisites	IENG 111 - Introduction to Material Science	IENG 304 - Modeling and Simulation	IENG 322 - Logistics and Supply chain management
Classification within the curriculum	Compulsory		
Course Position in Study Plan	Fall		
Contact Hours	Lectures	2.5	
	Tutorials		
	Labs	1.25	
	TOTAL	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL)	125		
Topics Category	Engineering Applications		
Topics Level	Program Requirements		
Description This course introduces the system concept and approach in operation. The course will help students to identify and differentiate between various types of systems, model and analyze various industrial and service systems and processes, system mapping and description using the Unified Modeling Language (UML) and Pseudo coding, and the breakdown and structure of an object oriented system. UML is the modern engineering language to describe a system and serves as an input for software design. Through a set of case studies, students will be trained to analyze and describe software programming requirements of automated machining and processing needed for software coding and human interactive programming.			
Lab and Tutorials This course is project based, where projects are done in groups using UML, and requires software training and practice			
Literature Systems Analysis and Design with UML 2.0 4th ed			

(IENG) - IENG 407

Course Title	Systems Engineering	
Course Code	IENG 407	
Prerequisites	IENG 305 - Management Information systems	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description Introductory course to systems engineering for undergraduate students that offers traditional design processes to accommodate specific requirements and capabilities, and to match the constantly changing requirements and the introduction of new technologies in a continuing and evolutionary basis.. The content of the course follows typical system design life cycle. It correlates the different disciplines required to deploy and sustain a system for missions in information technology and processing. Topics include system architecture, requirement allocation, performance budgeting and integration and test. It correlates the different activities required to deploy and sustain a system as well as to extend its life cycle.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature Systems Engineering Handbook, Edited by Cecilia Haskins, V3, 2006		

(IENG) - IENG 408

Course Title	Information and decision support	
Course Code	IENG 408	
Prerequisites	IENG 305 - Management Information systems	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Program Requirements	
Description This course provides applications of decision support systems in a business environment are studied. Issues pertaining to maintenance of data, construction of models and provision of supporting technology are explored. Students will analyze, design and implement a managerial decision support system using current development tools.		
Lab and Tutorials The course requires practice and problem solving training during tutorials, in addition to software training, also the course is project based and requires discussion during tutorials		
Literature Simon French, John Maule and Nadia Papamichail, "Decision Behaviour, Analysis and Support", Cambridge University Press; 1 edition (August 31, 2009)		

(IENG) - IENG 409

Course Title	Selected Topics in Industrial Engineering	
Course Code	IENG 409	
Prerequisites	NONE	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description TThis course aims at introducing students to recent and/or novel topics in industrial engineering that need to be identified in a responsive manner as technology evolve and develop.		
Lab and Tutorials		
Literature		

(IENG) - IENG 416

Course Title	Product realization and Reverse Engineering	
Course Code	IENG 416	
Prerequisites	IENG 315 - Manufacturing Systems	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description This course provides an introduction to product development with reverse engineering concept – Product development tools – scanning (digitizing) – rapid prototyping – definition of customer needs – product architectures – Product metrics – design for manufactures and assembly – design for environment – case studies		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature - Product Design: Techniques in Reverse Engineering and New Product Development by K.Otto and K. Wood Prentice Hall, 2001. - Reverse Engineering: An Industrial Perspective by Raja and Fernandes. Springer-Verlag 2008		

(IENG) - IENG 421

Course Title	Fundamentals of Service Engineering and Management	
Course Code	IENG 421	
Prerequisites	IENG 101 - Introduction to Industrial and Service Engineering	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description		
This course provides an overview of Service Science, Management and Engineering (SSME), introducing a comprehensive set of definitions of services, early definitions and thoughts on services. The impact of services on modern economies, classification of Service Systems, considerations for the management of services, service productivity and innovation, considerations for the use of methods in the services lifecycle from engagement through solutions design and delivery, SSME Challenges and frameworks, Case studies.		
Lab and Tutorials		
The course requires practice and problem solving training during tutorials		
Literature		
Fitzsimmons, James A., and Mona J. Fitzsimmons, Service Management: Operations, Strategy, and Information Technology, 7th Edition, Irwin/McGraw-Hill, 2011		

(IENG) - IENG 423

Course Title	Operations Management in Service Industries	
Course Code	IENG 423	
Prerequisites	IENG 421 - Fundamentals of Service Engineering and Management	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description This course deals with a firm's operations management function, with emphasis on service organizations. It examines critical competitive and strategic issues pertaining to service operations management. A sampling of topics addressed includes service facility design, layout, and location, service quality, managing queues, managing capacity and demand, the service encounter, forecasting and project management. A wide survey of service industries will be studied including healthcare, financial services, consulting, entertainment, hospitality, airlines, higher education, and environmental services.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature Service operations management: improving Service Delivery by Robert Johnston, Graham Clark, Micheal Shulver, 4th edition		

(IENG) - IENG 425

Course Title	Industrial Distribution Systems	
Course Code	IENG 425	
Prerequisites	IENG 322 - Logistics and Supply chain management	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description This course covers the design and analysis of distribution systems of people, processes and technology. The focus is on distribution, warehousing, and material handling. Topics include the various modes of warehousing and distribution, i.e., cross-docking, 3PL and 4PL logistics outsourcing, Vendor Managed Inventories, role of the warehouse in the extended enterprise, warehouse planning, process design, layout, equipment selection, workforce and workplace issues, and financial performance measures.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature SATISH K. KAPOOR, PURVA KANSAL, "BASICS OF DISTRIBUTION MANAGEMENT: A LOGISTICS APPROACH", Prentice Hall of India, 2003		

(IENG) - IENG 434

Course Title	Reliability Engineering		
Course Code	IENG 434		
Prerequisites	ENGR 101 - Introduction to Engineering Disciplines	ENGR 102 - Engineering Design	MATH 202 - Probability & Statistics for Engineers
Classification within the curriculum	Elective		
Course Position in Study Plan	Spring/Fall		
Contact Hours	Lectures	2.5	
	Tutorials	1.25	
	Labs		
	TOTAL	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL)	125		
Topics Category	Engineering Applications		
Topics Level	Program Requirements		
Description This course introduces students to principles of reliability, failure rate and its relation to reliability, probability distribution of the time to failure, exponential and Weibull distributions, reliability of systems, series and parallel systems, stand by redundancy, systems mean time to failure, mean residual life, reliability in design. Failure mode effect analysis, failure tree analysis, reliability testing analysis, and warranty problems.			
Lab and Tutorials The course requires practice and problem solving training during tutorials			
Literature - An Introduction to Reliability and Maintainability Engineering, by C. E. Ebeling, McGraw-Hill (1997). - Planning and Control of Maintenance Systems: Modeling and Analysis, Duffuaa; A. Raouf and J. Campbell, John Wiley & Sons, (1999).			

(IENG) - IENG 435

Course Title	Maintenance Planning	
Course Code	IENG 435	
Prerequisites	IENG 304 - Modeling and Simulation	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description This course introduces students to Maintenance and the industrial organization – acquisition policy and maintenance life – cycle costs – maintenance strategy, a business centered approach – the reliability of plant components and systems – determining the life plan and schedule – controlling plant reliability – reliability centered maintenance – enterprise asset management – methods of handling managing maintenance operations in manufacturing and service enterprises.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature Duffuaa, S.O. and Raouf, A., Planning and control of maintenance Systems:Modeling and Analysis, John Wiley Inc., 1999		

(IENG) - IENG 447

Course Title	Design of Experiments	
Course Code	IENG 447	
Prerequisites	IENG 243 - Statistical Quality Control	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description This course provides a Revision of models of statistical analysis, objectives of design of experiments, single factor designs, several factors designs, 2k factorial design, fractional factorial design, orthogonal array and Taguchi methods, robust design.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature Design and Analysis of Experiments by Douglas Montgomery (7th edition), 2008.		

(IENG) - IENG 449

Course Title	Introduction to MOT	
Course Code	IENG 449	
Prerequisites	Senior standing	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Engineering Applications	
Topics Level	Program Requirements	
Description This course surveys the key issues related to the strategic management of technology at the firm level. Course objective is to improve the students’ knowledge and skills related to managing technologies in a firm. It provides an introduction to the concepts and methods in the following topic Identification of Firm’s Current and Potential Technologies; Auditing Firm’s Technological Capabilities ; Technology Assessment (Technology Forecasting, Evaluation of Technology Impact on the Firm’s Competitiveness) ; Technology Planning (Strategic view) ; Acquisition & Exploitation of Technology (Technological Innovation, Technology Transfer)		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature Management of Technology, Khalil Tarik, 2004		

(IENG) - IENG 493

Course Title	Graduation Project I	
Course Code	IENG 493	
Prerequisites	Senior Standing	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring (Semester 8)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	-
	TOTAL	2.5
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL)	180	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description Application-oriented capstone project to show competence in major academic area, where an independent research project is conducted under the guidance of a faculty member in the IENG program. The research should contribute to the advancement of knowledge in the field. Written report and formal presentation are required.		
Lab and Tutorials Not Applicable		
Literature Not Applicable		

(IENG) - IENG 495

Course Title	Graduation Project II	
Course Code	IENG 495	
Prerequisites	IENG 493 - Graduation Project I	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 9)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	-
	TOTAL	2.5
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL)	180	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description The continuation and completion of the capstone project I.		
Lab and Tutorials Not Applicable		
Literature Not Applicable		

(IENG) - MENG 202

Course Title	Solid Modeling and Workshop	
Course Code	MENG 202	
Prerequisites	ENGR 102 - Engineering Design	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 3)	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Basic Engineering Sciences	
Topic Level	School Requirements	
Description This course is designed to teach the use of 3D solid modeling CAD packages. Instruction includes how to use a 3D CAD package to develop solid models in order to generate assemblies and 2D drawings. This course enables students to develop basic spatial skill through the use of a solid modelling system. Students develop skills in interpreting and visualising 3D objects in 2D format. They create and assemble solid model representation of machine components and create 2D engineering drawings from solid models. Students develop advanced technical sketching skills to aid communication in engineering design.		
Lab and Tutorials Students are exposed to basic workshop practice techniques & application of the basic skills to undertake a project.		
Literature 1. Course Textbook: Dugan Solid Modeling and Applications: Rapid Prototyping, CAD and CAE Theory. Springer, 2017 2. M. P. Groover , “principles of Modern Technologies”, John Wiley		
Additional Resources: - William E. Howard. Introduction to Solid Modeling Using SolidWorks 2017, McGraw-Hill Education; 13 Ed, 2017 - Donald E. Lacourse. Handbook of Solid Modeling, McGraw-Hill, 1995		

(IENG) - MENG 204

Course Title	Mechanical Measurements	
Course Code	MENG 204	
Prerequisites	PHYS 102 - Physics II	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description This course focuses on basics of mechanical measurement systems including static and dynamic characteristics of instruments, static analysis of measurement errors, variable conversion elements and signal conditioning and amplification. Also, it covers metrology and mechanical measuring instruments, and introduces different types of sensors (like strain, force, pressure, flow, power, temperature)		
Lab and Tutorials Regular tutorial sessions are given to cover theory of operation of different physics and labs are conducted as well to show students metrology devices and DAQ process.		
Literature Course Textbook: Richard S. Figliola, Donald E. Beasley, “Theory and Design for Mechanical Measurements” 5th edition, John Wiley, 2006		

(IENG) - MENG 305

Course Title	Fluid Mechanics I	
Course Code	MENG 305	
Prerequisites	PHYS 102 - Physics II	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 5)	
Contact Hours	Lectures:	2.5
	Tutorials:	0.625
	Labs:	0.625
	TOTAL:	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description		
The aim of the course is to introduce the students to the topic of fluid mechanics. Topics include the difference between a fluid and a solid, properties of fluids, fluid statics and hydro-static forces, continuity equation and steady flow, jet forces and momentum equations, Bernoulli equation and its applications, pressure losses and pipes and fittings.		
Lab and Tutorials		
Teach the students the necessary skills to deal with real life problems as related to fluid mechanics. Demonstrate some of the fundamental concepts taught in the course like the Bernoulli equation and jet forces.		
Literature		
Course Textbook:		
Fluid Mechanics: Fundamentals and Applications, 4th edition. Yunus A. Cengel and John M. Cimbala, 2017 McGraw-Hill Education.		
Additional Resources:		
- Fluid Mechanics, 8th edition. Frank White 2015 McGraw-Hill Education - Munson, Young and Okiishi's Fundamentals of Fluid Mechanics, 8th edition, Philip M. Gerhart, Andrew L. Gerhart and John I. Hochstein 2016 Wiley - Lecture Notes		

(IENG) - MENG 323

Course Title	Fundamentals of Mechatronics Engineering	
Course Code	MENG 323	
Prerequisites	MATH 203 - Differential Equations	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Electromechanical system modeling, Control and Applications. Design of Electronic Interfaces and Controllers for Mechanical Devices. Sensor Technology, Signal acquisition, Filtering, and Conditioning. Microcontroller-based Closed-loop Control. Device Communications Sensor and actuator selection, installation, and application strategies.		
Lab and Tutorials		
Literature Course Textbook: Clarence W. de Silva, Farbod Khoshnoud, Maoqing Li, Saman K. Halgamuge, “Mechatronics: Fundamentals and Applications” 2015. Additional Resources: Class notes.		

(IENG) - MENG 325

Course Title	Computer Control of Manufacturing Processes	
Course Code	MENG 325	
Prerequisites	MENG 203 - Introduction to Engineering Materials and Manufacturing Processes	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description		
The student will be introduced to the field of manufacturing as a control's application area with an emphasis on machining systems. The student will be exposed to the issues in manufacturing systems and learn how to model, control, and simulate machining systems. Topics include machine structures, servomechanisms, CNC programming, interpolation, coordinated control, process modeling and control, and manufacturing systems. Upon completion of this course, the student will be able to successfully apply their knowledge to model, control, and simulate manufacturing systems and processes..		
Lab and Tutorials		
Students will be required to complete Tutorial and laboratory assignments and to perform practical experiments like Computer numerical controller (CNC) demonstration and introduction of the architecture, CNC automated programming, CNC-PLC integration and communication.		
Literature		
1. Course Textbook: J. Bollinger and N. Duffie, Computer Control of Machines and Processes, Addison-Wesley, 1988..		
Additional Resources:		
- Ulrich Rembold. Interface Technology for Computer Controlled Manufacturing Processes. CRC Press - Ken Evans. Programming of CNC Machines 4th Edition. Industrial Press, Inc.; 4 edition (2016)		

(IENG) - NSCI 102

Course Title	Selected Topics in Environmental Science	
Course Code	NSCI 102	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Culture	
Topic Level	Program Requirements	
Description		
A course in any of the fields of environmental sciences related to the discipline it is offered to.		

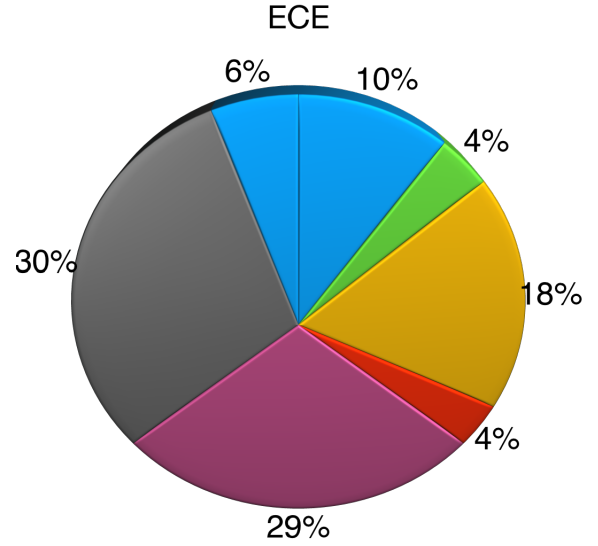
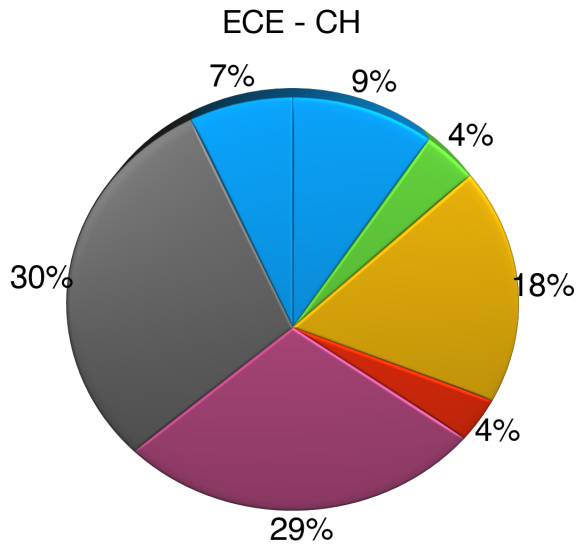
الباب السادس

برنامج الإلكترونيات وهندسة الاتصالات

اسم البرنامج			برنامج الإلكترونيات وهندسة الاتصالات		
اسم التخصصات					
الكلية			الهندسة والعلوم التطبيقية		
الجامعة			جامعة النيل الأهلية		
عدد ساعات الاتصال			محاضرات		معمل
			135		18.75
(CH) الساعات المعتمدة			160		
(ECTS) النقاط المعتمدة			270		
عدد المقررات			58		
توزيع المقررات طبقاً لمتطلبات مستويات التعلم					
			CH		ECTS
متطلبات الجامعة			16		25
متطلبات الكلية			48		82
متطلبات التخصص العام			96		163
متطلبات التخصص الدقيق			لا يوجد		
توزيع المقررات طبقاً لفئات المهارات والمعارف					
			CH		ECTS
العلوم الاجتماعية والانسانية			16		25
إدارة الأعمال			6		10
الرياضيات والعلوم الأساسية			29		49
الثقافة الهندسية			6		10
العلوم الهندسية الأساسية			46		78
التطبيقات الهندسية والتصميم			48		80
المشروعات والتدريب الميداني			9		18

بيانات إحصائية:

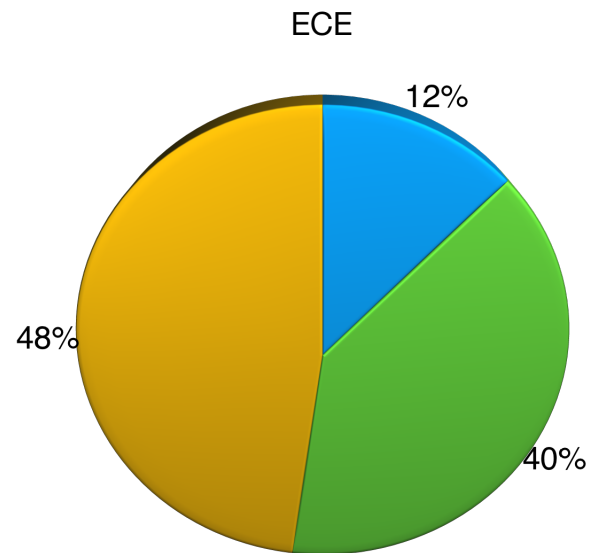
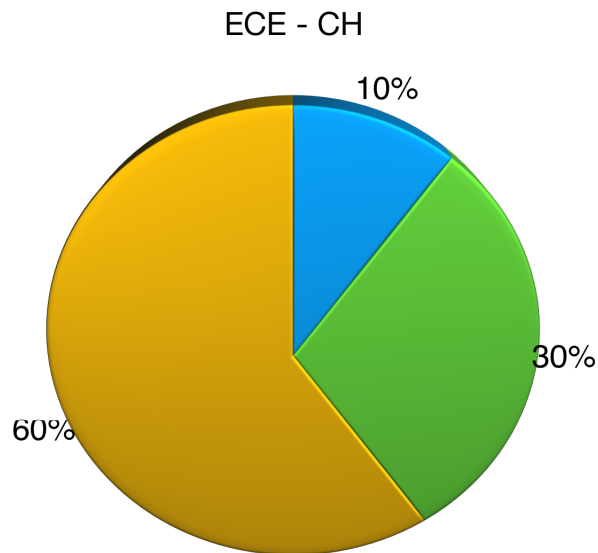
● Hum-SC ● BA ● Math-BS ● Eng-Cult ● Eng-BS ● Eng-App ● Projects-PT



● University

● School

● Program - Gen

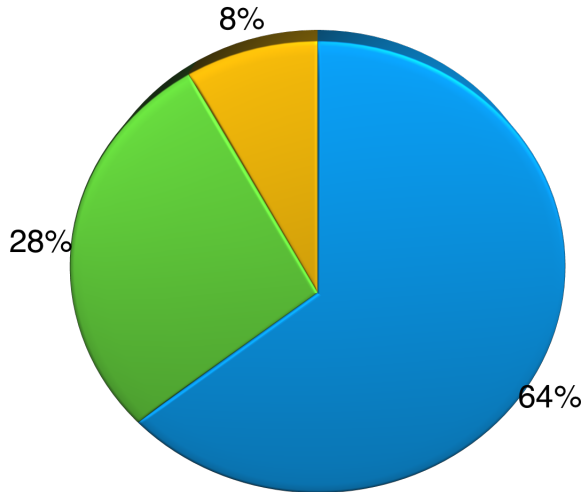


● Lectures

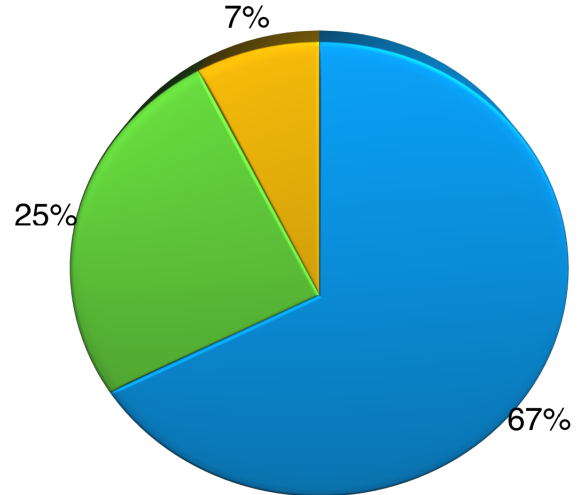
● Tutorials

● Labs

University + School + Program



Program Only



مادة (1): رسالة القسم:

يهدف برنامج هندسة الالكترونية و الاتصالات إلى توفير المستوى التعليمي المتميز للطلاب، وتعزيز شراكة وثيقة مع الصناعة، بهدف توفير الخدمات الهندسية المتخصصة للمجتمع الصناعي في مصر وخارجها. ويلتزم البرنامج في تحقيقه لرسالته بالتحسين المستمر في الجودة الشاملة للتدريس والبحث العلمي والأكاديمي. كما يتحمل البرنامج مسؤولية المشاركة في التقدم العلمي والتكنولوجي في مجال تخصصه عن طريق توفير الأساس النظري والعملية والتقني للطلاب ليسمح لهم بممارسة العمل المهني والبحث سواء كان هذا العمل في المجتمع الصناعي أو في المجال الأكاديمي أو في مراكز البحوث وبحيث يتحول التعليم بالبرنامج إلى نواة صالحة لاستكمال الدراسات العليا على مستوى الماجستير والدكتوراة. كما يتحمل البرنامج المسؤولية المهنية لتقديم وسائل التعليم المستمر والتدريب المتخصص للمهندسين العاملين في الصناعة بهدف تنمية قدراتهم وإكسابهم المهارات اللازمة لتنمashi مع النمو المطرد في التكنولوجيا الذي يشهده العالم حالياً.

مادة (2): توصيف البرنامج الدراسي بالقسم:

وتماشياً مع معدلات التطور في العلوم والتكنولوجيا الهندسية فإن كلية الهندسة والعلوم التطبيقية بجامعة النيل تقدم برنامج هندسة الالكترونية و الاتصالات بالجامعة والذي يؤدي إلى درجة البكالوريوس في الهندسة هندسة الالكترونية و الاتصالات معتمداً نظام الساعات المعتمدة. يتضمن هذا البرنامج تطوير وتطبيق التقنيات الإلكترونية والبصرية لتوليد المعلومات وتوصيلها ومعالجتها. ويتضمن منهج الهندسة الكهربائية في جامعة النيل علي دورات في الدوائر الإلكترونية ، والالكترونيات الصلبة ، والكهرومغناطيسية ، والبصريات ، والليزر ، والضوابط ، ومعالجة الإشارات الرقمية ، والاتصالات ، والشبكات. ويركز البرنامج على تصميم وتحليل الأجهزة الإلكترونية والدوائر والضوئيات

والكهرومغناطيسية والأنظمة الرقمية والرقابية ، بما في ذلك أنظمة التحكم والاتصالات ونظم المعلومات.

ويعتمد برنامج هندسة الالكترونية و الاتصالات على توفير أساس صلب للطلاب ، ويتم التركيز أثناء الدراسة (معتمداً على الأساس العلمى والتكنولوجى المكتسب) على التطبيقات العملية الحديثة من خلال خطط معملية مدروسة تمكن الطالب من ربط الأساس النظرى بالجانب العملى فى تخصصات البرنامج وذلك عن طريق ربط الدراسة الأكاديمية مع احتياجات سوق العمل.

مادة (3): أهداف البرنامج:

يهدف برنامج هندسة الالكترونية و الاتصالات بجامعة النيل إلى تحقيق المستوى الأكاديمى والتقنى اللازم للطلاب ليتواكب مع النمو المطرد فى التكنولوجيا الحديثة فى المجتمعات المتطورة وذلك عن طريق تعليم الطلاب المبادئ الأساسية والتقنيات الحديثة فى مجال تخصصات البرنامج مع تدريب الطلاب على ممارسة المنهجية فى التفكير واستخدام الأساليب الحديثة فى حل المشاكل الهندسية مع دراية شاملة بدور الهندسة الكهربائية فى نمو وتطوير المجتمعات الحديثة، ولتحقيق هذا فإن البرنامج يهدف إلى أن يكون الخريج:

1. مجهزاً علمياً وتقنياً لممارسة مهنة الهندسة الكهربائية كمهندس حديث التخرج أو الالتحاق ببرامج دراسات عليا فى مجالات الإلكترونيات والأجهزة الفيزيائية ، الكهرومغناطيسية ، الدوائر الإلكترونية ، والإشارات والأنظمة
2. قادراً على التعرف على المشاكل الهندسية فى مجالات الهندسة الكهربائية والإلكترونيات والأجهزة الفيزيائية ، الكهرومغناطيسية ، الدوائر الإلكترونية ، والإشارات والأنظمة وتوصيفها بدقة والتعامل معها بمنهجية للوصول إلى الحلول المناسبة وأن يكون قادراً على التواصل مع الآخرين بهذه النتائج وتحليلها وتفسيرها.
3. قادراً على التدرج الوظيفى الناجح فى مجال تخصصه (الإلكترونيات والأجهزة الفيزيائية ، الكهرومغناطيسية ، الدوائر الإلكترونية ، والإشارات والأنظمة) ليتبوأ المناصب القيادية كنتيجة لتمكنه من مهارات العمل المتكامل مع فريق العمل وقدرات التواصل مع الآخرين ومهارات حل المشاكل الهندسية بأسلوب منهجى.
4. مجهزاً للعمل فى مجالات عريضة فى الهندسة الكهربائية من خلال اكتسابه العلوم والمهارات التقنية فى مجال التخصص الدقيق من خلال المقررات الإلزامية والاختيارية وكذلك العلوم والمهارات التقنية فى مجالات التخصص العام من خلال المقررات الإلزامية ومتطلبات البرامج الهندسة بالجامعة.

مادة (4): مواصفات الخريج:

المخرج الرئيسى للبرنامج المقترح هو تخريج جيل من المهندسين الكهربائيين المتخصصين فى مجالات مختلفة وبصفة عامة يكون الخريج:

1. متمكناً من العلوم المتخصصة فى المجال والمتعلقة بمجال العمل فى الهندسة الكهربائية.
2. قادراً على تصميم وإجراء الاختبارات الهندسية فى مجال الهندسة الكهربائية وتحليل بياناتها ونتائجها بصورة منهجية.

3. قادراً على العمل بكفاءة وتكامل في فريق متعدد التخصصات سواء كانوا في نفس تخصصه أو في التخصصات الهندسية أو غير هندسية أخرى.
4. ملماً بالأساس الرياضي والعلمي والتقني لحل المشاكل الهندسية في مجال هندسة الإلكترونيات.
5. قادراً على استخدام العلوم المكتسبة وتطويعها لتطوير وتصميم وإدارة المشروعات والنظم الهندسية في مجالات الهندسة الكهربائية.
6. قادراً على التواصل شفهاً وكتابةً بمهنية مع المشاركين في العمل.
7. مقدراً للتعليم والتطور المستمر واكتساب المهارات الجديدة.
8. قادراً على استخدام التقنيات الهندسية الحديثة وعلوم الحاسب الآلي.
9. قادراً على مواصلة الحصول على درجات علمية أعلى من مرحلة البكالوريوس (للطلبة المتفوقين المتميزين).

وسيكون الخريج من هذا التخصص مؤهلاً للعمل في:

- شركات التصميم و التنفيذ للحلول الالكترونية المتكاملة
- شركات تصميم النظم الالكترونية للشركات و المصانع
- شركات خدمات الإتصالات الأرضية و المحمولة
- شركات البحث و التطوير في مجال الإتصالات
- الشركات العاملة في مجال الأقمار الصناعية و البث الإذاعي و التلفزيوني
- مراكز البحث العلمي و الهيئات المسؤولة عن المشروعات التحكم الالكتروني و ادارة النظم
- شركات الحاسبات الآلية
- مراكز الابحاث و التطوير في المصانع و الشركات التكنولوجية.

مادة (5): المعايير الأكاديمية للبرنامج:

يلتزم البرنامج المقدم بالمعايير الأساسية المقترحة من قبل الهيئة القومية لضمان جودة التعليم والاعتماد كحد أدنى . والمعايير الأكاديمية لبرنامج الإلكترونيات وهندسة الاتصالات يحدد المستوى والإمكانات والقدرات المتوقعة للخريج كالاتي:

الإمكانات المعرفية والفهم:

The graduates of the Electronics and Communications Engineering program should be able to demonstrate the knowledge and understanding of:

10. Basics of mathematical techniques to help model and analyze systems, and use mathematics as a tool for communicating results and concepts;
11. Elementary science underlying electronic engineering systems and information technology;
12. Basics of design and analyzing electronic engineering systems, while considering the constraints of applying inappropriate technology and the needs of commercial risk evaluation;
13. Managing and practicing business, including finance, law, marketing and quality control;
14. The professional and ethical responsibilities of engineer
15. Analyzing and design of electronic circuits and components;
16. Analyzing and design of control systems with performance evaluation;

17. Biomedical instrumentation;
18. A range of programming languages and environments;
19. Broad lines of industrial process engineering;

المهارات الفكرية:

The graduates of Electronics and Communications Engineering program should be able to:

1. Select and apply appropriate scientific principles, mathematical and computer-based methods for analyzing general electronic engineering systems.
2. Initiate creative thinking for resolving and developing innovative solutions for the practical industrial problems.
3. Organize tasks into a structured form.
4. Understand the evolving state of knowledge in a rapidly developing area.
5. Transfer appropriate knowledge and methods from one topic to another.
6. Plan, conduct and write a report on a project or assignment.
7. Prepare an oral presentation.
8. Approach the suitable tools for solving problems to tackle any practical problems in the electronics field.
9. Analyze, interpret, and explain data and design experiments to obtain new data
10. Develop computer programs.
11. Select and apply appropriate IT tools to a variety of engineering problems.

المهارات العملية والفنية:

The graduates of Electronics and Communications Engineering program should be able to:

1. Use appropriate mathematical methods or IT tools.
2. Program a computer to solve problems.
3. Use relevant laboratory equipment and analyze the results correctly.
4. Troubleshoot, maintain and repair almost all types of electronic systems using the standard tools.
5. Synthesis and integrate electronic systems for certain specific function using the right equipment.
6. Design, build and test a system.
7. Use appropriate analysis and design tools.
8. Explain appropriate specifications for required devices.
9. Use appropriate tools to measure system performance.
10. Program a computer to solve problems.

11. Utilize project management methods.
12. Present work both in written and oral form.

المهارات العامة:

The graduates of Electronics and Communications Engineering program should be able to:

1. Collaborate effectively within multidisciplinary team.
2. Work in stressful environment and within constraints.
3. Communicate effectively.
4. Demonstrate efficient IT capabilities.
5. Lead and motivate individuals.
6. Effectively manage tasks, time, and resources.
7. Search for information and engage in life-long self learning discipline.
8. Acquire entrepreneurial skills.
9. Refer to relevant literatures.

مادة (6): تفاعل البرنامج مع احتياجات السوق:

من الأهداف الرئيسية للبرنامج هو التفاعل المستمر مع احتياجات سوق العمل حيث أن ذلك السوق هو ما يمثل المستهلك الحقيقي لنتاج البرنامج المقترح. وتماشياً مع نظام الجودة الشاملة فإن مخرجات البرنامج لابد وأن تتوافق مع متطلبات المستهلك وعليه فإن الجامعة ملتزمة بالتواصل مع الغرف التجارية و الصناعية و الممثلة للمجتمع الصناعي للتعرف على الاحتياجات الحقيقية للخريجين من البرنامج وكذلك لتشكيل قنوات مستمرة لتدريب الطلاب في تلك المصانع.

مادة (7): التشابه والتمايز عن البرامج المشابهة

أوجه التشابه مع البرامج المشابهة:

يقدم برنامج هندسة الالكترونيات و الاتصالات بجامعة النيل نموذجاً للأسلوب المنهجي في التعليم الجامعي في تخصص هندسة الالكترونيات و الاتصالات حيث يستفيد البرنامج من الخبرات المتراكمة في البرامج المشابهة على المستوى المحلى والمستوى الدولى لتقديم منهج دراسى متكامل يعتمد على:

- توفير الأساس النظرى المناسب للتخصص بما يواكب ما يتم تدريسه فى الجامعات العربية محلياً وعالمياً وللبرنامج مكونان أساسيان:
- تقديم الأساس النظرى والذى يخدم فئة المهندسين بصفة عامة لتكوين الأرضية الثابتة للتقدم فى علوم التخصص.
- تقديم المادة العلمية والعملية التى ترتفع بمستوى الطلاب إلى مستوى التخصص معتمداً على دراسة لما يتم تدريسه بالأقسام المماثلة فى مصر وخارجها.

يتميز البرنامج بكونه يقدم للدارسين رؤية شاملة ومتكاملة في مجال هندسة الاتصالات والإلكترونيات و الاتصالات من خلال التركيز على طرق التصميم والتصنيع والاختبارات المختلفة في الهندسة الإلكترونية ودعم ذلك بنظم الاتصالات الحديثة

- استخدام طرق البحث العلمي لتشجيع الطلاب للاطلاع على الجديد في مجال الهندسة الإلكترونية والاتصالات.
- وضع الطلاب في بيئة مشابهة لبيئة العمل أثناء الدراسة من أجل اكتساب المهارات العملية.
- توفير معامل متكاملة للتطبيقات العملية المصاحبة للدراسة النظرية.
- توفير خطة تدريب عملي داخل وخارج الجامعة لتنمashi مع متطلبات المقررات الدراسية والتطور المستمر في احتياجات سوق العمل.

مادة (8): مخرجات البرنامج المستهدفة Program ILOs

لقد تم تصميم برنامج الاتصالات وهندسة الاتصالات بكلية الهندسة والعلوم التطبيقية بجامعة النيل لكي يتميز خريجو البرنامج بخصائص تمكنهم من التكامل بنجاح مع أقرانهم في مجال العمل المهني والأكاديمي. وعليه فإنه كان من الضروري تحديد مخرجات البرنامج المستهدفة والتي تؤدي إلى خريجي بمواصفات وقدرات كما تم توصيفها سابقاً. ويتم تقسيم مخرجات البرنامج المستهدفة إلى أربعة أقسام مختلفة كما يلي:

الإمكانات المعرفية والفهم:

- T. يجب أن يكون خريجي برنامج الاتصالات وهندسة الاتصالات قادرين على إظهار المعرفة والفهم لما يلي:
 - T.1. مفاهيم ونظريات الرياضيات والعلوم المناسبة للتخصص.
 - T.2. أساسيات تكنولوجيا المعلومات والاتصالات (ICT).
 - T.3. خصائص المواد الهندسية المناسبة للتخصص.
 - T.4. مبادئ التصميم بما في ذلك تصميم العناصر وعملية و / أو نظام متعلق بمجالات محددة.
 - T.5. منهجيات حل المشكلات الهندسية وجمع البيانات وتفسيرها.
 - T.6. أنظمة ضمان الجودة ومدونات الممارسات والمعايير ومتطلبات الصحة والسلامة والقضايا البيئية.
 - T.7. مبادئ الأعمال والإدارة ذات الصلة بالهندسة.
 - T.8. التقنيات الهندسية الحالية المتعلقة بالاختصاص.
 - T.9. موضوعات متعلقة بالمصالح الإنسانية والقضايا الأخلاقية.
 - T.10. اللغة الفنية وكتابة التقارير.
 - T.11. الأخلاقيات المهنية وتأثير الحلول الهندسية على المجتمع والبيئة.
 - T.12. موضوعات هندسية معاصرة.
 - T.13. العلوم الأولية التي تقوم عليها الأنظمة الهندسية الإلكترونية وتكنولوجيا المعلومات.
 - T.14. أساسيات تصميم النظم الهندسية الإلكترونية وتحليلها ، مع مراعاة القيود المفروضة على تطبيق التكنولوجيا غير الملائمة واحتياجات تقييم المخاطر التجارية.
 - T.15. مبادئ تحليل وتصميم الدوائر الإلكترونية والمكونات.
 - T.16. مبادئ تحليل وتصميم أنظمة التحكم مع تقييم الأداء.

- T.17. الأجهزة الطبية الحيوية.
- T.18. نظم الاتصالات.
- T.19. تقنيات الترميز وفك التشفير.
- T.20. تطبيقات الميكروويف.
- T.21. الهوائي وانتشار الموجة.
- T.22. تطبيق تقنية النانو.
- T.23. استخدام الألياف البصرية.
- T.24. طرق تصنيع الدوائر المتكاملة.
- T.25. معالجة الإشارات.
- T.26. أنظمة الاتصالات البصرية.

المهارات الفكرية:

- U. متوقع أن يكون خريج برنامج الالكترونيات وهندسة الاتصالات بجامعة النيل قادر على الآتى:
- U.1. تحديد الأساليب الرياضية والحاسوبية المناسبة لنمذجة المشكلات وتحليلها.
- U.2. تحديد الحلول المناسبة للمشاكل الهندسية القائمة على التفكير التحليلي.
- U.3. التفكير بطريقة مبتكرة في حل المشكلات والتصميم.
- U.4. دمج وتبادل وجهات النظر المختلفة والأفكار والمعرفة من مجموعة متنوعة من المصادر.
- U.5. تقييم خصائص وأداء المكونات والنظم والعمليات.
- U.6. التحقق من فشل المكونات والأنظمة والعمليات.
- U.7. حل المشكلات الهندسية ، غالباً على أساس معلومات محدودة وربما متناقضة.
- U.8. اختيار وتقييم أدوات تكنولوجيا المعلومات والاتصالات المناسبة لمجموعة متنوعة من المشاكل الهندسية.
- U.9. اتخاذ قرارات هندسية بشأن التكاليف المتوازنة ، الفوائد ، السلامة ، الجودة ، الموثوقية ، التأثير البيئي.
- U.10. دمج الأبعاد الاقتصادية والاجتماعية والبيئية وإدارة المخاطر في التصميم.
- U.11. تحليل نتائج النماذج العددية وتقييم حدودها.
- U.12. خلق نهج ومنهجية عند التعامل مع التكنولوجيا الجديدة والمتقدمة.
- U.13. تطوير حلول مبتكرة للمشاكل الصناعية العملية.
- U.14. تخطيط وتنفيذ وكتابة تقرير عن مشروع أو مهمة.
- U.15. تحليل أداء الاتصالات الرقمية والتناظرية ، والاتصالات المتنقلة ، والترميز ، وأنظمة فك التشفير.
- U.16. تجميع وتكامل الأنظمة الإلكترونية لوظائف محددة معينة باستخدام المعدات المناسبة.

المهارات العملية والفنية:

- V. متوقع أن يكون خريج برنامج الالكترونيات وهندسة الاتصالات بجامعة النيل قادر على الآتى:
- V.1. تطبيق المعرفة في الرياضيات والعلوم وتكنولوجيا المعلومات والتصميم وسياق الأعمال والممارسة الهندسية بشكل متكامل لحل المشاكل الهندسية.
- V.2. القدرة علي دمج المعرفة الهندسية والفهم والمردود بشكل احترافي لتحسين التصميم والمنتجات والخدمات

- V.3. إنشاء أو إعادة تصميم عملية أو مكون أو نظام ، وتنفيذ التصميم الهندسية المتخصصة.
- V.4. ممارسة الدقة وعلم الجمال في التصميم والنهج.
- V.5. استخدام المرافق والتقنيات الحسابية وأدوات القياس وورش العمل ومعدات المختبرات لتصميم التجارب وجمع وتحليل وتفسير النتائج.
- V.6. استخدام مجموعة واسعة من الأدوات والتقنيات والمعدات وحزم البرامج التحليلية المتعلقة بالانضباط وتطوير برامج الكمبيوتر المطلوبة.
- V.7. تطبيق أساليب النمذجة العددية للمشاكل الهندسية.
- V.8. تطبيق الأنظمة الآمنة في العمل ومراقبة الخطوات المناسبة لإدارة المخاطر.
- V.9. إظهار المهارات الأساسية التنظيمية وإدارة المشاريع.
- V.10. تطبيق إجراءات ضمان الجودة واتباع الرموز والمعايير.
- V.11. تبادل المعرفة والمهارات مع المجتمع والهندسة والصناعة.
- V.12. تحضير وتقديم التقارير الفنية.
- V.13. استخدام الأساليب الرياضية المناسبة أو أدوات تكنولوجيا المعلومات.
- V.14. ممارسة برمجة الكمبيوتر لتصميم وتشخيص الاتصالات الرقمية والتناظرية ، والاتصالات المتنقلة ، والترميز ، وأنظمة فك التشفير.
- V.15. استخدام معدات المختبرات ذات الصلة وتحليل النتائج بشكل صحيح.
- V.16. استكشاف الأخطاء وإصلاحها وصيانة وإصلاح جميع أنواع الأنظمة الإلكترونية تقريباً باستخدام الأدوات القياسية.
- V.17. تحديد المواصفات المناسبة للأجهزة المطلوبة.
- V.18. استخدام الأدوات المناسبة لقياس أداء النظام.

المهارات العامة:

- W. متوقع أن يكون خريج برنامج بجامعة النيل قادر على الآتى:
- W.1. العمل في فريق متكامل.
- W.2. مشاركة الأفكار والآراء والتواصل مع الآخرين بكفاءة.
- W.3. التعامل مع الآخرين في إطار أخلاقيات المهنة الحميدة.
- W.4. إدراك أهمية التعليم المستمر والحاجة إلى التطوير وتحكيم العقل في تفسير الأمور واختيار القرارات الإستراتيجية.

مادة (9): مقارنة مخرجات البرنامج المستهدفة مع المرجعيات المحلية والعالمية

الجدول المرفق يستعرض مقارنة بين مخرجات البرنامج المقترح المستهدفة مع متطلبات الهيئة القومية لضمان جودة التعليم والاعتماد (NARS) ومتطلبات (ABET).

ECE courses/ILOs mapped to NARS and ABET Graduates Attributes

Attributes of program graduates as per ABET Criterion (3) for program outcomes and assessment	Attributes of program graduates as per NARS Requirements for engineering programs, in general	Corresponding ILO's in Current Program	Courses Covering such ILO's
a. Ability to apply knowledge of mathematics, science and engineering.	a. Ability to apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.	A1-A26.	IENG 241, ECEN 202, ECEN 203, ECEN 303, ECEN 309, ECEN 312, ECEN 313, ECEN 311, ECEN 407, ECEN 409, ECEN 341, ECEN 342, ECEN 443, ECEN 303, ECEN 305, ECEN 331, ECEN 462, ECEN 433, ECEN 434, ECEN 351, ECEN 452, ECEN 414, ECEN 435, NSCI 102, ECEN 402, ECEN 445, ECEN 415, ECEN 416, ECEN 421, ECEN 422, ECEN 436, ECEN 424, ECEN 445, ECEN 436, ECEN 437, ECEN 438, ECEN 439
a. Ability to design and conduct experiments, as well as to analyze and interpret data.	c. Ability to Design and conduct experiments as well as analyze and interpret data.	B1, B2, B5, C1, C2, C6, C7	IENG 241, ECEN 202, ECEN 203, ECEN 303, ECEN 309, ECEN 312, ECEN 313, ECEN 311, ECEN 407, ECEN 409, ECEN 341, ECEN 342, ECEN 443, ECEN 305, ECEN 331, ECEN 462, ECEN 433, ECEN 434, ECEN 351, ECEN 452, ECEN 414, ECEN 435, ECEN 402, ECEN 445, ECEN 415, ECEN 416, ECEN 421, ECEN 422, ECEN 436, ECEN 424, ECEN 445, ECEN 436, ECEN 437, ECEN 438, ECEN 439
b. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	b. Ability to Design a system; component and process to meet the required needs within realistic constraints.	B1-B16.	IENG 241, ECEN 202, ECEN 203, ECEN 303, ECEN 309, ECEN 312, ECEN 313, ECEN 311, ECEN 407, ECEN 409, ECEN 341, ECEN 342, ECEN 443, ECEN 305, ECEN 331, ECEN 462, ECEN 433, ECEN 434, ECEN 351, ECEN 452, ECEN 414, ECEN 435, NSCI 102, ECEN 402, ECEN 445, ECEN 415, ECEN 416, ECEN 421, ECEN 422, ECEN 436, ECEN 424, ECEN 445, ECEN 436, ECEN 437, ECEN 438, ECEN 439

c. Ability to function on multi-disciplinary teams	f. Work effectively within multi-disciplinary teams	D1-D4	ECEN 202, ECEN 203, ECEN 303, ECEN 309, ECEN 312, ECEN 313, ECEN 311, ECEN 407, ECEN 409, ECEN 341, ECEN 342, ECEN 443, ECEN 305, ECEN 331, ECEN 462, ECEN 433, ECEN 434, ECEN 351, ECEN 452, ECEN 414, ECEN 435, ECEN 402, ECEN 445, ECEN 415, ECEN 416, ECEN 421, ECEN 422, ECEN 436, ECEN 424, ECEN 445, ECEN 436, ECEN 438, ECEN 439
d. Ability to identify, formulate and solve engineering problems	d. Ability to Identify, formulate and solve fundamental engineering problems	B1-B8	IENG 241, ECEN 202, ECEN 203, ECEN 303, ECEN 309, ECEN 312, ECEN 313, ECEN 311, ECEN 407, ECEN 409, ECEN 341, ECEN 342, ECEN 443, ECEN 305, ECEN 331, ECEN 462, ECEN 433, ECEN 434, ECEN 351, ECEN 452, ECEN 414, ECEN 435, NSCI 102, ECEN 402, ECEN 445, ECEN 415, ECEN 416, ECEN 422, ECEN 436, ECEN 424, ECEN 445, ECEN 436, ECEN 437, ECEN 438, ECEN 439
e. Understanding of professional and ethical responsibility	j. Ability to Display professional and ethical responsibilities; and contextual understanding	D3, A14, A26	ECEN 202, ECEN 203, ECEN 309, ECEN 407, ECEN 409, ECEN 443, ECEN 331, ECEN 433, ECEN 434, ECEN 414, ECEN 435, NSCI 102, ECEN 402, ECEN 416, ECEN 421, ECEN 422, ECEN 436, ECEN 424, ECEN 436, ECEN 437, ECEN 438, ECEN 439
f. Ability to communicate effectively	g. Ability to communicate effectively	D1-D3	ECEN 202, ECEN 309, ECEN 312, ECEN 313, ECEN 407, ECEN 409, ECEN 341, ECEN 342, ECEN 443, ECEN 305, ECEN 331, ECEN 433, ECEN 434, ECEN 351, ECEN 452, ECEN 414, ECEN 435, NSCI 102, ECEN 425, ECEN 415, ECEN 416, ECEN 421, ECEN 422, ECEN 424, ECEN 445, ECEN 436, ECEN 438, ECEN 439
g. Having the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	h. Ability to Consider the impacts of engineering solutions on society & environment	D3, A14, A26	ECEN 202, ECEN 203, ECEN 309, ECEN 407, ECEN 409, ECEN 443, ECEN 331, ECEN 433, ECEN 434, ECEN 414, ECEN 435, NSCI 102, ECEN 402, ECEN 416, ECEN 421, ECEN 422, ECEN 436, ECEN 424, ECEN 436, ECEN 437, ECEN 438, ECEN 439
h. Recognition of the need for, and ability to engage in life-long learning	k. Ability to Engage in self- and life- long learning	d4	ECEN 202, ECEN 203, ECEN 303, ECEN 309, ECEN 312, ECEN 313, ECEN 311, ECEN 305, ECEN 331, ECEN 462, ECEN 433, ECEN 351, ECEN 402, ECEN 415, ECEN 422, ECEN 436, ECEN 424, ECEN 425, ECEN 436

i. Knowledge of contemporary issues	i. Ability to Demonstrate knowledge of contemporary engineering issues	B5, B10	IENG 241, ECEN 202, ECEN 312, ECEN 313, ECEN 311, ECEN 407, ECEN 409, ECEN 342, ECEN 305, ECEN 331, ECEN 462, ECEN 433, ECEN 434, ECEN 452, ECEN 414, ECEN 402, ECEN 424, ECEN 436, ECEN 437, ECEN 439
j. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	e. Ability to Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management	C1 TO C9	IENG 241, ECEN 202, ECEN 203, ECEN 303, ECEN 309, ECEN 312, ECEN 313, ECEN 311, ECEN 407, ECEN 409, ECEN 341, ECEN 342, ECEN 443, ECEN 305, ECEN 351, ECEN 452, ECEN 414, ECEN 435, ECEN 402, ECEN 425, ECEN 415, ECEN 416, ECEN 421, ECEN 422, ECEN 436, ECEN 424, ECEN 445, ECEN 436, ECEN 438, ECEN 439

مادة (10): مطابقة مخرجات البرنامج المستهدفة مع المعايير الأكاديمية طبقاً لمتطلبات (NARS)

مخرجات البرنامج المستهدفة المحققة للمعايير	المعايير الأكاديمية للبرنامج
	الامكانيات المعرفية والفهم
A1-6, A1517	• Basics of mathematical techniques to help model and analyze systems, and use mathematics as a tool for communicating results and concepts;
C1-3, C68	• Elementary science underlying electronic engineering systems and information technology;
A3,6,7,9,10, 11,12,13,16, 19, 20, 21, 22, B2,3,7,8,10, C4,8	• Basics of design and analyzing electronic engineering systems, while considering the constraints of applying inappropriate technology and the needs of commercial risk evaluation;
B3-14	• Managing and practicing business, including finance, law, marketing and quality control;
A9,11, B4, 9, D3	• The professional and ethical responsibilities of engineer
A13-16, B15, 16	• Analyzing and design of electronic circuits and components;
A16, C13-18	• Analyzing and design of control systems with performance evaluation;
A17	• Biomedical instrumentation;
B13, D1-4	• A range of programming languages and environments;
A1-6, A15-17	• Broad lines of industrial process engineering;
	المهارات الفكرية
B1, 2, 8	• Select and apply appropriate scientific principles, mathematical and computer-based methods for analyzing general electronic engineering systems.
B2, 3, 4, 7, 8, 9, 13	• Initiate creative thinking for resolving and developing innovative solutions for the practical industrial problems.
B2, 3, 7, 8	• Organize tasks into a structured form.
B1-3, 6-8	• Understand the evolving state of knowledge in a rapidly developing area.
B1-4, 9	• Transfer appropriate knowledge and methods from one topic to another.
B1,12, 14	• Plan, conduct and write a report on a project or assignment.
B1-3, B6-8, C11, D3	• Prepare an oral presentation.

B1-4, B6-9	Approach the suitable tools for solving problems to tackle any practical problems in the electronics field.
B1-10	Analyze, interpret, and explain data and design experiments to obtain new data
C5, 6, 14	Develop computer programs.
B8, 12, C13, 15	Select and apply appropriate IT tools to a variety of engineering problems.
B9, 10	Assess and analyze risks, and take appropriate steps to manage them
المهارات العملية والفنية	
B1-9, C1-4, C6-8	Use appropriate mathematical methods or IT tools.
B1-9, C1-4, C6-8	Program a computer to solve problems.
B1-9, C1-4, C6-8	Use relevant laboratory equipment and analyze the results correctly.
C1-9, 14	Troubleshoot, maintain and repair almost all types of electronic systems using the standard tools.
C2, 3, 7, 8, 15, 16	Synthesis and integrate electronic systems for certain specific function using the right equipment.
C1-3, C6-8	Design, build and test a system.
A4,	Use appropriate analysis and design tools.
A4, 17, C1, 2, 6, 7	Explain appropriate specifications for required devices.
A14, 26	Use appropriate tools to measure system performance.
C17, 18	Program a computer to solve problems.
C8-12	Utilize project management methods.
C6-11	Present work both in written and oral form.
المهارات العامة	
D1	Collaborate effectively within multidisciplinary team.
D2	Work in stressful environment and within constraints.
D3	Communicate effectively.
D4	Demonstrate efficient IT capabilities.
D5	Lead and motivate individuals.
D6	Effectively manage tasks, time, and resources.
D7	Search for information and engage in life-long self learning discipline.
D8	Acquire entrepreneurial skills.
D9	Refer to relevant literatures.

مادة (11): المقررات الدراسية ومدى ملاءمتها لمخرجات البرنامج المستهدفة:

ECE University Core Requirements (10 courses = 16 CH)

Code No.	Course Title	No. of hours / week			CH	ECTS	SW L	ILOs
		Lec	Tut	Lab				
ENGL 001	Intensive English	0	0	0	0	0	0	A10
ENGL 101	English I	0	0	0	0	0	50	A10, C12, D3
ENGL 102	English II	0	0	0	0	0	50	A10, C12, D3
ENGL 201	Writing Skills	3.75	0	0	3	5	125	A10, C12, D3
ENGL 202	Communication and Presentation Skills	3.75	0	0	3	5	125	A10, B4, C9,12, D1,3
HUMA 101	Introduction to Scientific & Critical Thinking	2.5	0	0	2	3	75	A9, B2,4,C5, D1,3
HUMA 102	Introduction to Ethics	2.5	0	0	2	3	75	A6,9,11, B4, C10
HUMA 103	Selected Topics in Humanities & Arts	2.5	0	0	2	3	75	A7,9, B4, C9
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2.5	0	0	2	3	75	A9, B4, D3
SSCI 103	Selected Topics in Social Sciences	2.5	2.5	0	2	3	75	A9, B4
Total Number of Credits	10	20	3	0	16	25	725	

ECE Engineering Core Requirements (16 courses = 48 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	SW L	ILOs
		Lec	Tut	Lab				
CHEM 101	Chemical Principles	2.5	0	1.25	3	5	125	A1,3, B5, C1,5
CSCE 101	Computer & Information Skills	1.25	0	3.75	3	5	125	A12, B1, C1,5,6, D4
CSCE 201	Introduction to Programming	1.25	0	3.75	3	5	125	A2, B1,8, C1,5, D4
ECEN 101	Electric Circuits	2.5	0	1.25	3	5	125	A4,8, B1,5, C3
ENGR 101	Introduction to Engineering Disciplines	2.5	0	1.25	3	5	125	A12, B2 C1,10, D1,4
ENGR 102	Engineering Design	2.5	0	1.25	3	5	125	A3,4, B3,8, C3, D4
MATH 111	Analytical Geometry & Calculus I	2.5	1.25	0	3	5	125	A1, B1, C1
MATH 112	Calculus II	2.5	1.25	0	3	5	125	A1, B1, C1
MATH 202	Probability & Statistics for Engineers	2.5	1.25	0	3	5	125	A1, B1, C1
MATH 203	Differential Equations	2.5	1.25	0	3	5	125	A1, B1, C1
MATH 301	Linear Algebra	2.5	1.25	0	3	5	125	A1, B1, C1,7
MATH 303	Numerical Methods	2.5	1.25	0	3	5	125	C1,5
MENG 101	Engineering Mechanics I - Statics	2.5	0	0	2	4	100	A5,12, B2, C1,2
MENG 102	Engineering Mechanics II - Dynamics	2.5	0	0	2	4	100	A5,12, B2, C1,2
PHYS 101	Physics I	2.5	1.25	1.25	4	7	175	A1, C1,5
PHYS 102	Physics II	2.5	1.25	1.25	4	7	175	A1, C1,5
Total Number	16	37.5	10	15	48	82	2050	

ECE Program Requirements (32 courses - 96 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	Tut	Lab				
ECEN 202	Fundamentals of Electrical Engineering	2.50	1.3	1.25	3	5	125	A1, a13, b2, b5, c1, d3
ECEN 203	Fundamentals of Computer Engineering	2.50	1.3	0.00	3	5	125	A1, a13, b1, b5, c6
ECEN 303	Introduction to Computer Systems	2.50	1.25	0.00	3	5	125	A2, b2, b8, c1, c6, d7
ECEN 304 / MENG 322	Electric Machines	2.5	0.00	1	3	5	125	A2, b2, b8, c1, c6, d7
ECEN 305	Signals and Systems	2.5	1.25	0	3	5	125	A1, a13, a25, b1, b8, c1
ECEN 309	Programming for Electrical Engineers	2.5	0	1.25	3	5	125	a5, b1, b3, c13
ECEN 311	Fundamentals of Semiconductor Devices	2.5	1.25	0	3	5	125	A3, b5, b11, d9
ECEN 312	Analysis and Design of Analog Circuits	2.5	1.25	0	3	5	125	A5, a14, a15, b1, b5, c3
ECEN 313	Analysis and Design of Digital Circuits	2.5	1.25	0	3	5	125	a14, a15, b1, b5, c3, c5
ECEN 331	Fundamentals of Communications	2.5	1.25	0	3	5	125	A2, a13, b1, b5, c1, c2
ECEN 341	Fundamentals of Electromagnetics	2.5	1.25	0	3	5	125	a3, a13, b1, c13
ECEN 342	Applied Electromagnetics	2.5	1.25	0	3	5	125	a20, b1, b5, c13
ECEN 351	Fundamentals of Control	2.5	1.25	0	3	5	125	A1, a16, b1, b6, c5, d1
ECEN 391	Practical Training	-	-	-	3	6	150	a8, b14, c11, d2, d3, d7
ECEN 407	Physical Sensors, Transducers and Instrumentation	2.5	1.25	0	3	5	125	A3, a17, b5, c5, d9
ECEN 409	Microprocessor System Design	2.5	1.25	0	3	5	125	A4, b2, b8, c5, c6, d4
ECEN 414	Analog and Digital Electronics Lab	2.5	1.25	0	3	5	125	a10, 15, b6, c15, c16, d3
ECEN 432	Digital Communications	2.5	1.25	0	3	5	125	a12, a18, a19, b15, c14
ECEN 433	Wireless Communication	2.5	1.25	0	3	5	125	a12, a18, a19, b15, c14
ECEN 434	Communications Networks	2.5	1.25	0	3	5	125	a8, a18, b15, c14, c18
ECEN 435	Communications Design Lab	2.5	1.25	0	3	5	125	a10, a18, b14, b15, c14, d3
ECEN 443	Antenna and Propagation	2.5	1.25	—	3	5	150	a21, b7, b9, c6, c17
ECEN 452	Embedded and Discrete Control Systems	2.5	1.25	0	3	5	125	a14, a16, b8, b13, c3, c6

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	Tut	Lab				
ECEN 493	Graduation Project I	2.5	-	-	3	6	180	A12, b3, b9, c9, c12, d2, d5, d6
ECEN 495	Graduation Project II	2.5	-	-	3	6	180	A12, b3, b9, c9, c12, d2, d5, d6
ECEN xxx	Elective-1	2.5	—	—	3	5	150	(from list below)
ECEN xxx	Elective-2	2.5	—	—	3	5	150	(from list below)
ECEN xxx	Elective-3	2.5	—	—	3	5	150	(from list below)
ECEN xxx	Elective-4	2.5	—	—	3	5	150	(from list below)
ENTR 301	Selected Topics in Entrepreneurship	2.5	1.25	0	3	5	125	A7,11, B10, D3, 8
IENG 241	Engineering Economics	2.5	1.25	0.00	3	5	125	a7, b4, b10, d8
NSCI 102	Selected Topics in Environmental Science	2.5	1.25	0	3	5	125	A11, B9,10
Total Number	32	77.5	28.75	3.75	96	163	4260	

ECE list of Electives

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	Tut	Lab				
ECEN 402	Introduction To Computer Architecture	2.5	1.25	0.00	3	5	125	A2, a4, b12, c3
ECEN 415	Analog Integrated Circuit Design	2.5	1.25		3	5	150	A14, a15, b16, c14, c10
ECEN 416	Digital Integrated Circuit Design	2.5	1.25	0.00	3	5	125	A14, a15, b16, c4, c10
ECEN 421	Micro and Nano Systems Fabrication	2.5	1.25	0.00	3	5	125	A22, a24
ECEN 422	FPGA and ASIC Design	2.5	1.25	0.00	3	5	125	A14, a15, c4
ECEN 423	Introduction to Electronic Design Automation (EDA and CAD)	2.5	1.25	0.00	3	5	125	A4,24, B1,11, C1,2, D4,7
ECEN 424	Analog and Digital Filters and Communications Circuits	2.5	1.25	0.00	3	5	125	a14, a18, b16, c17
ECEN 425	Radio Frequency Integrated Circuit Design and Implementation	2.5	1.25	0.00	3	5	125	a20, a24, b16, c10

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	Tut	Lab				
ECEN 436	Digital Signal Processing	2.5	1.25	0.00	3	5	125	A5, a18, a25, b2, b5, c6
ECEN 437	Introduction to Optical Communications Systems	2.50	1.25	0.00	3	5	125	A3, a23, a26, b2, c7
ECEN 438	Advanced Communication Systems	2.5	1.25	0.00	3	5	125	A14, a15, b16, c4, c6
ECEN 439	Selected Topics in Communications	2.5	1.25	0.00	3	5	125	A8, a18, b9, b15, c1
ECEN 445	Mechatronic Design	2.5	1.25		3	5	125	A4, b7, b13, c7, c8, d1

مادة (12): توزيع مقررات البرنامج على الفئات المقترحة في (NARS):

ECE Course Mapping to Subject Categories (NARS)

Course Code	Course Title	Hum. & Social Sci.		Business Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.		Eng. App. & Design		Project & PT	
		C	EC	C	EC	C	EC	C	EC	C	EC	C	EC	C	EC
		H	TS	H	TS	H	TS	H	TS	H	TS	H	TS	H	TS
University Requirements															
ENGL 001	Intensive English														
ENGL 101	English I	0	0												
ENGL 102	English II	0	0												
ENGL 201	Writing Skills	3	5												
ENGL 202	Communication and Presentation Skills	3	5												
HUMA 101	Introduction to Scientific & Critical Thinking	2	3												
HUMA 102	Introduction to Ethics	2	3												
HUMA 103	Selected Topics in Humanities & Arts	2	3												
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3												
SSCI 103	Selected Topics in Social Sciences	2	3												
Total University Requirements		16	25	0	0	0	0	0	0	0	0	0	0	0	0
Engineering Requirements															
CHEM 101	Chemical Principles					3	5								
CSCE 101	Computer & Information Skills									3	5				
CSCE 201	Introduction to Programming									3	5				
ECEN 101	Electric Circuits									3	5				
ENGR 101	Introduction to Engineering Disciplines							3	5						
ENGR 102	Engineering Design									3	5				
MATH 111	Analytical Geometry & Calculus I					3	5								
MATH 112	Calculus II					3	5								
MATH 202	Probability & Statistics for Engineers					3	5								
MATH 203	Differential Equations					3	5								
MATH 301	Linear Algebra					3	5								
MATH 303	Numerical Methods					3	5								
MENG 101	Engineering Mechanics I - Statics									2	4				
MENG 102	Engineering Mechanics II - Dynamics									2	4				
PHYS 101	Physics I					4	7								
PHYS 102	Physics II					4	7								
Total Engineering Requirements		0	0	0	0	29	49	3	5	16	28	0	0	0	0
Program Requirements															
ECEN 202	Fundamentals of Electrical Engineering									3	5				
ECEN 203	Fundamentals of Computer Engineering									3	5				
ECEN 303	Introduction to Computer Systems									3	5				
ECEN 304 / MENG 322	Electric Machines											3	5		
ECEN 305	Signals and Systems									3	5				
ECEN 309	Programming for Electrical Engineers									3	5				
ECEN 311	Fundamentals of Semiconductor Devices									3	5				
ECEN 312	Analysis and Design of Analog Circuits											3	5		
ECEN 313	Analysis and Design of Digital Circuits											3	5		
ECEN 331	Fundamentals of Communications									3	5				
ECEN 341	Fundamentals of Electromagnetics									3	5				
ECEN 342	Applied Electromagnetics											3	5		

Course Code	Course Title	Hum. & Social Sci.		Business Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.		Eng. App. & Design		Project & PT	
		C	EC	C	EC	C	EC	C	EC	C	EC	C	EC	C	EC
ECEN 351	Fundamentals of Control									3	5				
ECEN 391	Practical Training													3	6
ECEN 407	Physical Sensors, Transducers and Instrumentation									3	5				
ECEN 409	Microprocessor System Design											3	5		
ECEN 414	Analog and Digital Electronics Lab											3	5		
ECEN 432	Digital Communications											3	5		
ECEN 433	Wireless Communication											3	5		
ECEN 434	Communications Networks											3	5		
ECEN 435	Communications Design Lab											3	5		
ECEN 443	Antenna and Propagation											3	5		
ECEN 452	Embedded and Discrete Control Systems											3	5		
ECEN 493	Graduation Project I													3	6
ECEN 495	Graduation Project II													3	6
ECEN xxx	Elective - 1											3	5		
ECEN xxx	Elective - 2											3	5		
ECEN xxx	Elective - 3											3	5		
ECEN xxx	Elective - 4											3	5		
ENTR 301	Selected Topics in Entrepreneurship			3	5										
IENG 241	Engineering Economics			3	5										
NSCI 102	Selected Topics in Environmental Science							3	5						
Total Program Requirements		0	0	6	10	0	0	3	5	30	50	48	80	9	18
Total ECE		16	25	6	10	29	49	6	10	46	78	48	80	9	18
Course Category %		10.0%		3.8%		18.1%		3.8%		28.8%		30.0%		5.6%	

مادة (13): مصفوفة مخرجات المقررات الدراسية ومدى ملائمتها للمخرجاتها
المستهدفة للبرنامج:

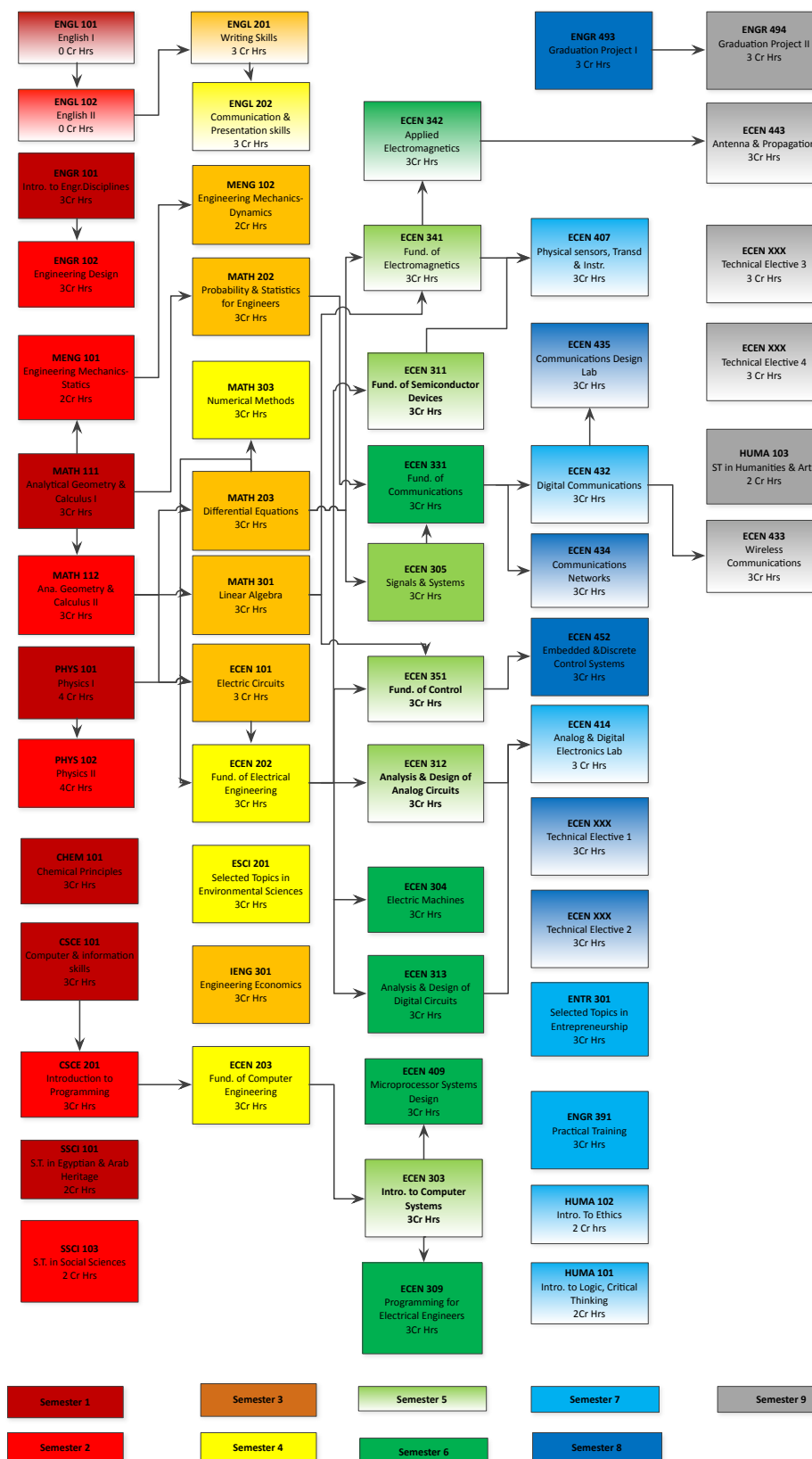
ECE Courses - ILOs matrix - Part 1

ECE program		a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	a18	a19	a20	a21	a22	a23	a24	a25	a26	a27	b1	b2	b3	b4	b5	b6			
		University Requirements																																			
ENGL 001	Intensive English									X																											
ENGL 101	English I									X																											
ENGL 102	English II									X																											
ENGL 201	Writing Skills									X																											
ENGL 202	Communication and Presentation Skills									X																						X					
HUMA 101	Introduction to Scientific & Critical Thinking								X		X																		X		X						
HUMA 102	Introduction to Ethics					X			X		X																					X					
HUMA 103	Selected Topics in Humanities & Arts								X																							X					
SSCI 101	Selected Topics in Egyptian & Arab Heritage								X																							X					
SSCI 103	Selected Topics in Social Sciences						X		X																							X					
		School Requirements																																			
CHEM 101	Chemical Principles	X	X						X			X																					X				
CSCE 101	Computer & Information Skills		X					X				X																X									
CSCE 201	Introduction to Programming		X			X																						X									
ECEN 101	Electric Circuits				X				X																			X					X				
ENGR 101	Introduction to Engineering Disciplines							X			X	X																X				X					
ENGR 102	Engineering Design			X	X																							X		X		X					
MATH 111	Analytical Geometry & Calculus I	X																									X										
MATH 112	Calculus II	X																									X										
MATH 202	Probability & Statistics for Engineers	X				X																					X										
MATH 203	Differential Equations	X																									X										
MATH 301	Linear Algebra	X																									X										
MATH 303	Numerical Methods	X																									X						X				
MENG 101	Engineering Mechanics I - Statics					X						X																X				X					
MENG 102	Engineering Mechanics II - Dynamics				X	X																						X	X			X					
PHYS 101	Physics I	X																																			
PHYS 102	Physics II	X																																			
		Program Requirements																																			
ECEN 202	Fundamentals of Electrical Engineering	X										X																	X			X					
ECEN 203	Fundamentals of Computer Engineering	X										X																X				X					
ECEN 303	Introduction to Computer Systems		X																										X								
ECEN 304	Electric Machines					X	X																										X				
ECEN 305	Signals & Systems	X										X														X		X									
ECEN 309	Programming for Electrical Engineers					X																						X		X							
ECEN 311	Fundamentals of Semiconductor Devices			X																													X				
ECEN 312	Analysis & Design of Analog Circuits					X						X	X														X					X					
ECEN 313	Analysis & Design of Digital Circuits											X	X															X				X					
ECEN 331	Fundamentals of Communications		X									X															X					X					
ECEN 341	Fundamentals of Electromagnetics			X								X																X									
ECEN 342	Applied Electromagnetics																					X						X				X					
ECEN 351	Fundamentals of Control	X											X															X					X				

ECE program		a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	a18	a19	a20	a21	a22	a23	a24	a25	a26	a27	b1	b2	b3	b4	b5	b6
ECEN 391	Practical Training								X																									
ECEN 407	Physical Sensors, Transducers & Instrumentation			X																													X	
ECEN 409	Microprocessor System Design				X																									X				
ECEN 414	Analog and Digital Electronics Lab									X						X																		X
ECEN 432	Digital Communications																				X	X												
ECEN 433	Wireless Communications										X									X	X													
ECEN 434	Communications Networks								X											X														
ECEN 435	Communications Design Lab									X										X														
ECEN 443	Antenna and Propagation																						X											
ECEN 452	Embedded & Discrete Control Systems														X		X																	
ECEN 493	Graduation Project I											X																			X			
ECEN 495	Graduation Project II											X																			X			
IENG 241	Engineering Economics								X																							X		
NSCI 102	Selected Topics in Environmental Sciences									X		X																						
	Electives																																	
ECEN 402	Introduction To Computer Architecture		X		X																													
ECEN 415	Analog Integrated Circuit Design													X	X																			
ECEN 416	Digital Integrated Circuit Design													X	X																			
ECEN 421	Micro and Nano Systems Fabrication																						X		X									
ECEN 422	FPGA and ASIC Design																					X			X									
ECEN 423	Introduction to Electronic Design Automation (EDA and CAD)					X													X							X			X		X			
ECEN 424	Analog and Digital Filters and Communications Circuits			X																				X			X		X					
ECEN 425	Radio Frequency Integrated Circuit Design and Implementation				X														X												X			
ECEN 436	Digital Signal Processing													X	X																			
ECEN 437	Introduction to Optical Communications Systems													X	X																			
ECEN 438	Advanced Communication Systems													X						X														
ECEN 439	Selected Topics in Communications								X											X														
ECEN 445	Mechatronic Design				X																													
COUNT		13	5	6	7	8	2	2	6	6	7	4	6	5	8	7	2	1	8	2	2	1	1	1	2	2	1	19	9	5	8	16	3	

ECE program		b7	b8	b9	b10	b11	b12	b13	b14	b15	b16	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	d1	d2	d3	d4	d5	d6	d7	d8	d9		
ECEN 409	Microprocessor System Design															X																						X		
ECEN 414	Analog and Digital Electronics Lab		X													X	X																	X						
ECEN 433	Wireless Communications																									X	X						X							
ECEN 434	Communications Networks									X															X					X										
ECEN 435	Communications Design Lab									X															X															
ECEN 443	Antenna and Propagation									X															X					X										
ECEN 452	Embedded & Discrete Control Systems									X	X														X									X						
ECEN 462	Digital Communications	X		X													X													X										
ENGR 391	Practical Training		X						X						X		X																							
ENGR 493	Graduation Project I			X																	X				X						X			X	X					
ENGR 494	Graduation Project II			X																	X			X							X			X	X					
IENG 241	Engineering Economics				X																																X			
NSCI 102	Selected Topics in Environmental Sciences				X																																			
		Electives																																						
ECEN 402	Introduction To Computer Architecture					X								X																										
ECEN 415	Analog Integrated Circuit Design									X					X						X																			
ECEN 416	Digital Integrated Circuit Design									X					X						X																			
ECEN 421	Micro and Nano Systems Fabrication																																							
ECEN 422	FPGA and ASIC Design									X											X																			
ECEN 423	Introduction to Electronic Design Automation (EDA and CAD)																X																							
ECEN 424	Analog and Digital Filters and Communications Circuits																	X																						
ECEN 425	Radio Frequency Integrated Circuit Design and Implementation									X																	X													
ECEN 436	Digital Signal Processing															X																								
ECEN 437	Introduction to Optical Communications Systems									X					X	X																								
ECEN 438	Advanced Communication Systems									X																					X									
ECEN 439	Selected Topics in Communications			X						X	X																													
ECEN 445	Mechatronic Design	X						X										X	X												X									
COUNT		3	8	4	3	3	1	2	2	6	5	21	7	6	6	15	12	5	2	4	5	1	6	3	5	1	1	2	2	6	3	10	5	2	2	2	1	2		

Course Dependency Flow Diagram



ECE Sample Study Plan

ECE Study Plan (Year 1)

Semester 1							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 101	English I	0	0	50	A minimum score of 500 on the TOEFL. Students will also be required to pass a written NU test (essay).		
MATH 111	Analytical Geometry & Calculus I	3	5	125	None		
CSCE 101	Computer & Information Skills	3	5	125	None		
ENGR 101	Introduction to Engineering Disciplines	3	5	125	None		
CHEM 101	Chemical Principles	3	5	125	None		
PHYS 101	Physics I	4	7	175	None		
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3	75	None		
TOTAL		18	30	800			
Semester 2							
ENGL 102	English II	0	0	50	ENGL 101 - English I		
MATH 112	Calculus II	3	5	125	MATH 111 - Analytical Geometry & Calculus I		
CSCE 201	Introduction to Programming	3	5	125	None		
ENGR 102	Engineering Design	3	5	125	ENGR 101 - Introduction to Engineering Disciplines		
MENG 101	Engineering Mechanics I - Statics	2	4	100	MATH 111 - Analytical Geometry & Calculus I		
PHYS 102	Physics II	4	7	175	PHYS 101 - Physics I		
SSCI 103	Selected Topics in Social Sciences	2	3	75	None		
TOTAL		17	29	775			

ECE Study Plan (Year 2)

	Semester 3							
Code	Title	CH	ECTS	SWL	Prerequisite			
ENGL 201	Writing Skills	3	5	125	ENGL 102 - English II - or IELTS 6.5 or equivalent			
MATH 203	Differential Equations	3	5	125	MATH 112 - Calculus II			
MATH 202	Probability & Statistics for Engineers	3	5	125	MATH 112 - Calculus II			
MENG 102	Engineering Mechanics II - Dynamics	2	4	100	MENG 101 - Engineering Mechanics I - Statics			
MATH 301	Linear Algebra	3	5	125	MATH 112 - Calculus II			
ECEN 101	Electric Circuits	3	5	125	PHYS 101 - Physics I			
TOTAL		17	29	725				
	Semester 4							
ENGL 202	Communication and Presentation Skills	3	5	125	ENGL 201 - Writing Skills			
MATH 303	Numerical Methods	3	5	125	MATH 203 - Differential Equations			
ECEN 202	Fundamentals of Electrical Engineering	3	5	125	MATH 203 - Differential Equations	ECEN 101 - Electric Circuits		
IENG 241	Engineering Economics	3	5	125	None			
ECEN 203	Fundamentals of Computer Engineering	3	5	125	CSCE 201 - Introduction to Programming			
NSCI 102	Selected Topics in Environmental Science	3	5	125	None			
TOTAL		18	30	750				

ECE Study Plan (Year 3)

	Semester 5						
Code	Title	CH	ECTS	SWL	Prerequisite		
ECEN 303	Introduction to Computer Systems	3	5	125	ECEN 203 - Fundamentals of Computer Engineering		
ECEN 351	Fundamentals of Control	3	5	125	ECEN 202 - Fundamentals of Electrical Engineering	MATH 301 - Linear Algebra	
ECEN 312	Analysis and Design of Analog Circuits	3	5	125	ECEN 202 - Fundamentals of Electrical Engineering		
ECEN 305	Signals and Systems	3	5	125	MATH 203 - Differential Equations		
ECEN 311	Fundamentals of Semiconductor Devices	3	5	125	ECEN 202 - Fundamentals of Electrical Engineering		
ECEN 341	Fundamentals of Electromagnetics	3	5	125	MATH 203 - Differential Equations	MATH 301 - Linear Algebra	
TOTAL		18	30	750			
	Semester 6						
ECEN 309	Programming for Electrical Engineers	3	5	125	ECEN 303 - Introduction to Computer Systems		
ECEN 313	Analysis and Design of Digital Circuits	3	5	125	ECEN 202 - Fundamentals of Electrical Engineering		
ECEN 409	Microprocessor System Design	3	5	125	ECEN 303 - Introduction to Computer Systems		
ECEN 331	Fundamentals of Communications	3	5	125	ECEN 305 - Signals and Systems		
ECEN 342	Applied Electromagnetics	3	5	125	ECEN 341 - Fundamentals of Electromagnetics		
ECEN 304 / MENG 322	Electric Machines	3	5	125	ECEN 101 - Electric Circuits		
TOTAL		18	30	750			

ECE Study Plan (Year 4)

	Semester 7						
Code	Title	CH	ECTS	SWL	Prerequisite		
ECEN 407	Physical Sensors, Transducers and Instrumentation	3	5	125	ECEN 311 - Fundamentals of Semiconductor Devices	ECEN 341 - Fundamentals of Semiconductor Devices	
ECEN 432	Digital Communications	3	5	125	ECEN 331 - Fundamentals of Communications		
ECEN 414	Analog and Digital Electronics Lab	3	5	125	ECEN 312 - Analysis and Design of Analog Circuits	ECEN 313 - Analysis and Design of Digital Circuits	
ECEN 391	Practical Training	3	6	150	After 6th semester		
HUMA 101	Introduction to Scientific & Critical Thinking	2	3	75	None		
HUMA 102	Introduction to Ethics	2	3	75	None		
ENTR 301	Selected Topics in Entrepreneurship	3	5	125	NONE		
TOTAL		19	32	800			
	Semester 8						
ECEN 434	Communications Networks	3	5	125	ECEN 331 - Fundamentals of Communications		
ECEN 452	Embedded and Discrete Control Systems	3	5	125	ECEN 351 - Fundamentals of Control		
ECEN 435	Communications Design Lab	3	5	125	ECEN 432 - Digital Communications		
ECEN xxx	Technical Elective 1	3	5	125			
ECEN xxx	Technical Elective 2	3	5	125			
ECEN 493	Graduation Project I	3	6	180	Senior Standing		
TOTAL		18	31	805			

ECE Study Plan (Year 5)

Semester 9						
Code	Title	CH	ECTS	SWL	Prerequisite	
ECEN xxx	Technical Elective 3	3	5	125		
ECEN xxx	Technical Elective4	3	5	125		
ECEN 443	Antenna and Propagation	3	5	125	ECEN 342 - Applied Electromagnetics	
ECEN 433	Wireless Communication	3	5	125	ECEN 432 - Digital Communications	
ECEN 495	Graduation Project II	3	6	180	ECEN 493 - Graduation Project I	
HUMA 103	Selected Topics in Humanities & Arts	2	3	75	None	
TOTAL		17	29	755		

ECE Electives

Electives						
Code	Title	CH	ECTS	SWL	Prerequisite	
ECEN 402	Introduction To Computer Architecture	3	5	125	ECEN 303 - Introduction to Computer Systems	
ECEN 445	Mechatronic Design	3	5	125	ECEN 351 - Fundamentals of Control	
ECEN 415	Analog Integrated Circuit Design	3	5	125	ECEN 312 - Analysis and Design of Analog Circuits	
ECEN 416	Digital Integrated Circuit Design	3	5	125	ECEN 313 - Analysis and Design of Digital Circuits	
ECEN 421	Micro and Nano Systems Fabrication	3	5	125	ECEN 416 - Digital Integrated Circuit Design	
ECEN 422	FPGA and ASIC Design	3	5	125	ECEN 416 - Digital Integrated Circuit Design	
ECEN 423	Introduction to Electronic Design Automation (EDA and CAD)	3	5	125	ECEN 416 - Digital Integrated Circuit Design	
ECEN 424	Analog and Digital Filters and Communications Circuits	3	5	125	ECEN 312 - Analysis and Design of Analog Circuits	ECEN 331 - Fundamentals of Communications
ECEN 425	Radio Frequency Integrated Circuit Design and Implementation	3	5	125	ECEN 312 - Analysis and Design of Analog Circuits	ECEN 342 - Applied Electromagnetics
ECEN 436	Digital Signal Processing	3	5	125	ECEN 305 - Signals and Systems	
ECEN 437	Introduction to Optical Communications Systems	3	5	125	ECEN 331 - Fundamentals of Communications	

	Electives				
ECEN 438	Advanced Communication Systems	3	5	125	ECEN 432 - Digital Communications
ECEN 439	Selected Topics in Communications	3	5	125	ECEN 331 - Fundamentals of Communications

توصيف مقررات برنامج الإلكترونيات وهندسة الاتصالات

(ECE) - ECEN 202

Course Title	Fundamentals of Electrical Engineering	
Course Code	ECEN 202	
Prerequisites	MATH 203 - Differential Equations	ECEN 101 - Electric Circuits
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	1.25
	TOTAL	5
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description This course covers topics that are fundamental to a wide variety of electrical engineering systems. Topics include circuit analysis techniques, passive and active components modeling, operational amplifiers, energy storage elements, power analysis, time-response of first- and second-order systems, sinusoidal steady-state response, frequency domain analysis, and filters. Other topics may include: diodes and transistors, basic noise analysis, transformers, pole-zero plotting and analysis in the complex plane. Relevant lab experiments are conducted.		

(ECE) - ECEN 203

Course Title	Fundamentals of Computer Engineering	
Course Code	ECEN 203	
Prerequisites	CSCE 201 - Introduction to Programming	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description This course introduces basic issues in design and verification of modern digital systems. Topics include: Boolean algebra, digital number systems and computer arithmetic, combinational and sequential logic design and optimization, register-transfer design, basic processor organization and instruction set issues, assembly language programming and debugging, and a hardware description language. Emphasis is on the levels of abstraction and hardware description language methods that allow designers to cope with hugely complex systems, and on connections to practical hardware implementation problems. Students are introduced to computer-aided digital design software.		

(ECE) - ECEN 303

Course Title	Introduction to Computer Systems	
Course Code	ECEN 303	
Prerequisites	ECEN 203 - Fundamentals of Computer Engineering	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description		
This course provides a programmer's view of how computer systems execute programs, store information, and communicate. It enables students to become more effective programmers, especially in dealing with issues of performance, portability and robustness. It also serves as a foundation for courses on compilers, networks, operating systems, and computer architecture, where a deeper understanding of systems-level issues is required. Topics covered include: machine-level code and its generation by optimizing compilers, performance evaluation and optimization, computer arithmetic, memory organization and management, networking technology and protocols, and supporting concurrent computation.		

(ECE) - ECEN 304

Course Title	Electric Machines	
Course Code	ECEN 304 / MENG 322	
Prerequisites	ECEN 101 - Electric Circuits	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	0.00
	Labs	1
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description		
The course covers the basics electromagnetic fields in electromechanical devices: Production of magnetic field, Faraday’s law (transformer action), production of induced force on a wire (motor action), Production of induced voltage on conductor moving in magnetic field (generator action).		
DC Machines: construction, Theory of operation.		
DC Generators: Separately-excited generator, Self-excited generators (shunt, series and compound types) Characteristics of different types of DC generators, Efficiency of DC generators.		
DC Motors: Separately-excited Motor, Self-excited Motor (shunt, series and compound types) Characteristics of different types of DC motors, Efficiency of DC motors.		
Transformers: Single phase transformers, principle of operation, equivalent circuit, efficiency, three phase transformers, connections of transformers.		
AC Machine Fundamentals; Synchronous Machines; Induction Motors: Construction, theory of operation, equivalent circuit. Special Machines.		

(ECE) - ECEN 305

Course Title	Signals and Systems	
Course Code	ECEN 305	
Prerequisites	MATH 203 - Differential Equations	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The objective of this course is to provide students with an understanding of the relationships between mathematical tools and properties of real signals and systems. Continuous and discrete time signals and systems are treated in a unified manner through the concept of sampling. The course covers the basic concepts and tools needed to perform time and frequency domain transform analyses of signals and linear time-invariant systems, including: impulse and step response and convolution; Fourier transforms and filtering; Laplace transforms, feedback and stability; and a brief introduction to z-transforms in the context of digital filtering.		

(ECE) - ECEN 309

Course Title	Programming for Electrical Engineers	
Course Code	ECEN 309	
Prerequisites	ECEN 303 - Introduction to Computer Systems	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description Introduction to computer programming using the C/C++ programming language with emphasis on problems of interest to electrical engineers. Major topics include data types, operations, program control structures, functions, data files, numerical techniques, pointers, structures, bit operations, algorithm development, and hardware integration.		

(ECE) - ECEN 311

Course Title	Fundamentals of Semiconductor Devices	
Course Code	ECEN 311	
Prerequisites	ECEN 202 - Fundamentals of Electrical Engineering	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description		
An introduction to the operation and fabrication of the most important semiconductor devices used in integrated circuit technology together with device design and layout. At the end of the course students will have a basic understanding of pn diodes, bipolar transistors, and MOSFETs, light emitting and light detecting devices such as photodiodes, LEDs and solar cells. Students will also receive an introduction to the fundamental concepts of semiconductor physics such as doping, electron and hole transport, and band diagrams. In the laboratory they learn how to lay out both bipolar and MOS devices and design small (2-3 transistor) circuits. Students experimentally evaluate the operation of amplifier and gate circuits fabricated with discrete devices. This course gives the student the understanding of the operation and fabrication of the devices necessary for high-performance analog and digital circuit design.		

(ECE) - ECEN 312

Course Title	Analysis and Design of Analog Circuits	
Course Code	ECEN 312	
Prerequisites	ECEN 202 - Fundamentals of Electrical Engineering	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description		
The course introduces the student to the fundamentals of the analysis and design of basic analog circuits. Topics include: operational amplifier design, basic amplifier feedback theory, frequency stability and compensation, dc bias calculations and circuits, MOSFET and BJT large- and small-signal device models, small-signal gain and frequency response characteristics of amplifiers, large-signal characteristics and non-idealities. In the hardware laboratory the student will gain experience designing, building, and characterizing analog circuits. The students will also learn how to use the SPICE circuit simulation program to compare actual and simulated performance.		

(ECE) - ECEN 313

Course Title	Analysis and Design of Digital Circuits	
Course Code	ECEN 313	
Prerequisites	ECEN 202 - Fundamentals of Electrical Engineering	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Overview of digital logic design. Implementation technologies, timing in combinational and sequential circuits, basic arithmetic units, EDA tools, introduction to simulation and synthesis using VHDL.		

(ECE) - ECEN 331

Course Title	Fundamentals of Communications	
Course Code	ECEN 331	
Prerequisites	ECEN 305 - Signals and Systems	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description Fundamental analog and digital communications concepts are presented together with supporting theoretical foundations and practical applications. Signals and bandwidth concepts, spectra, basics of electronics, information and coding, modulation, multiplexing, transmission systems, transmission media, analog versus digital communications, computer networks, and switching techniques.		

(ECE) - ECEN 341

Course Title	Fundamentals of Electromagnetics	
Course Code	ECEN 341	
Prerequisites	MATH 203 - Differential Equations	MATH 301 - Linear Algebra
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description This course introduces electromagnetic principles and describes how they are applied in engineering devices and systems. Topics include: vector calculus, Maxwell’s equations in integral and differential forms with associated boundary conditions, quasi static electric fields in free space and in materials, superposition for known charge sources, conduction and polarization, resistance and capacitance, charge relaxation, analytic and numerical methods for electric field boundary value problems, quasi static magnetic fields in free space and in materials, superposition for known current sources, magnetization, inductance, magnetic diffusion, and analytic and numerical methods for magnetic field boundary value problems.		

(ECE) - ECEN 342

Course Title	Applied Electromagnetics	
Course Code	ECEN 342	
Prerequisites	ECEN 341 - Fundamentals of Electromagnetics	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description This course builds upon the electric and magnetic field foundations established in the fundamentals of electromagnetics course to describe devices and phenomena in which electromagnetic waves are a central issue. Topics include: review of Maxwell’s equations, propagation of uniform plane waves in lossless and lossy media, energy conservation as described by the Poynting Theorem, reflection and transmission with normal and oblique incidence, sinusoidal steady state and transients on two-conductor transmission lines, modal descriptions of waveguides, radiation and antennas.		

(ECE) - ECEN 351

Course Title	Fundamentals of Control	
Course Code	ECEN 351	
Prerequisites	ECEN 202 - Fundamentals of Electrical Engineering	MATH 301 - Linear Algebra
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The course is an introduction to the fundamental principles and methodologies of classical feedback control and its applications. Topics include analytical, graphical and computer-aided (MATLAB) techniques for analyzing and designing automatic control systems; analysis of performance, stability criteria, realizability, and speed of response; compensating methods in the frequency domain, root-locus and frequency response design, and pole-zero synthesis techniques; robust controller design; systems with delay and computer control systems; transfer function and state space modeling of linear systems, nonlinearities in control systems; and control engineering software (MATLAB).		

(ECE) - ECEN 391

Course Title	Practical Training	
Course Code	ECEN 391	
Prerequisites	After 6th semester	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 7)	
Contact Hours	Lectures	-
	Tutorials	-
	Labs	-
	TOTAL	0
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL)	150	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description A minimum of four weeks of practical training in off-campus sites elected by the program. Students are required to submit a recognition letter from the site where they received their training, in addition, a report and a presentation are submitted as well. Course is a Pass/Fail course.		
Lab and Tutorials Not Applicable		
Literature Not Applicable		

(ECE) - ECEN 402

Course Title	Introduction To Computer Architecture	
Course Code	ECEN 402	
Prerequisites	ECEN 303 - Introduction to Computer Systems	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall/Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description This course introduces the basic hardware structure of a programmable computer and the basic laws underlying performance evaluation. The student learns how to design the control and data path hardware for a processor, how to make machine instructions execute simultaneously through pipelining and simple superscalar execution, and how to design fast memory and storage systems. The principles presented in lecture are reinforced in the laboratory through design and simulation of a register transfer (RT) implementations in verilog.		

(ECE) - ECEN 407

Course Title	Physical Sensors, Transducers and Instrumentation	
Course Code	ECEN 407	
Prerequisites	ECEN 311 - Fundamentals of Semiconductor Devices	ECEN 341 - Fundamentals of Semiconductor Devices
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description		
The course explores many types of responses to physical stimuli, as well as the instrumentation, electronic detection, signal conversion and signal processing techniques used to capture the physical event electronically. This requires knowledge of the diversity of physical phenomena, and the materials and devices that can be used to convert the various forms of physical energy into electronic signals.		

(ECE) - ECEN 409

Course Title	Microprocessor System Design	
Course Code	ECEN 409	
Prerequisites	ECEN 303 - Introduction to Computer Systems	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Structure and timing of typical microprocessors. Sample microprocessor families. Memories, UARTS, timer/counters, serial devices and related devices. MUX and related control structures for building systems. Interrupt programming. Hardware/software design tradeoffs.		

(ECE) - ECEN 414

Course Title	Analog and Digital Electronics Lab	
Course Code	ECEN 414	
Prerequisites	ECEN 312 - Analysis and Design of Analog Circuits	ECEN 313 - Analysis and Design of Digital Circuits
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Lab activities that reinforce and support the theory covered in ECEN 312 and ECEN 313 course. Design, implementation, and measurement of analog and digital electronic circuits. Use of discrete devices, integrated circuits, and operational amplifiers. Design of logic gates, memory elements and registers at the device level; system considerations with reference to various technologies.		

(ECE) - ECEN 415

Course Title	Analog Integrated Circuit Design	
Course Code	ECEN 415	
Prerequisites	ECEN 312 - Analysis and Design of Analog Circuits	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall/Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The Course teaches methods used in the design and analysis of analog integrated circuits, illustrating how to approach design problems in general, and exposing the students to a broad cross-section of analog circuit topologies. The course focuses on learning design through carrying out design projects. Design and implementation details of wide-band amplifiers, operational amplifiers, continuous-time filters, phase lock loops and data converters are covered. The course focuses mainly on analog CMOS, but some aspects of BJT design will be discussed.		

(ECE) - ECEN 416

Course Title	Digital Integrated Circuit Design	
Course Code	ECEN 416	
Prerequisites	ECEN 313 - Analysis and Design of Digital Circuits	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description This course is intended to provide the student with IC design experience. The emphasis is on the IC design process as a whole. The aim is to reach an optimal design through optimization of a number of variables ranging from the choice of architecture to the details of the IC layout. Typical performance criteria of the design are: throughput, power, signal-to-noise ratio, clock frequency, and gain-bandwidth. Typical constraints will be: die size and minimum feature size.		

(ECE) - ECEN 421

Course Title	Micro and Nano Systems Fabrication	
Course Code	ECEN 421	
Prerequisites	ECEN 416 - Digital Integrated Circuit Design	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall/Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description This course introduces students to the process flow and design methodology for integrated systems fabrication. The course highlights the basic unit processes of micro and nano systems fabrication: deposition, patterning, and etching. Students are exposed to examples from: Semiconductor device fabrication; MicroElectroMechanical systems (MEMS) fabrication; Magnetic device fabrication, and optical device fabrication. Labs allow the students to design, fabricate and test an integrated device.		

(ECE) - ECEN 422

Course Title	FPGA and ASIC Design	
Course Code	ECEN 422	
Prerequisites	ECEN 416 - Digital Integrated Circuit Design	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall/Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Overview of Computer Aided Design tool flow for ASIC and FPGA Design. Synthesis from hardware description languages and creation of finite state machines. Differences between FPGA and ASIC design flows. Exploration of concepts in several projects.		

(ECE) - ECEN 423

Course Title	Introduction to Electronic Design Automation (EDA and CAD)	
Course Code	ECEN 423	
Prerequisites	ECEN 416 - Digital Integrated Circuit Design	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall/Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description		
Basic concepts in VLSI CAD with emphasis on physical design, fundamental algorithms for CAD problems, development of CAD tools.		

(ECE) - ECEN 424

Course Title	Analog and Digital Filters and Communications Circuits	
Course Code	ECEN 424	
Prerequisites	ECEN 312 - Analysis and Design of Analog Circuits	ECEN 331 - Fundamentals of Communications
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall/Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Characterization, properties, and analysis of analog filters. Butterworth, Chebyshev, and elliptic approximations. Introduction to the realization of LC one- and two-port circuits; Darlington's method. Active elements such as gyrators and generalized impedance converters, and their representation by singular elements. Design of high-performance, low-sensitivity active filters. The course includes a project in which a complete analog filter is designed. Recursive and nonrecursive digital filters, decimation and interpolation, A/ D and D/A conversion as digital filtering problems. Implementation of nonrecursive filters via FFT, quantization problems, e.g., companding and limit.		

(ECE) - ECEN 425

Course Title	Radio Frequency Integrated Circuit Design and Implementation	
Course Code	ECEN 425	
Prerequisites	ECEN 312 - Analysis and Design of Analog Circuits	ECEN 342 - Applied Electromagnetics
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall/Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The course covers the design and analysis of radio frequency integrated circuits at the transistor level using CMOS and bipolar technologies. It focuses on system-level trade-offs in transceiver design, practical RF circuit techniques, and physical understanding of device parasitics. Models for active devices, passive components and interconnect parasitics are examined. The course also covers concepts in wireless system design and their impact on design trade-offs in different transceiver architectures. RF transistor models, passive matching networks, noise analysis and low-noise amplifier design are studied. The effects of nonlinearity are treated along with mixer design techniques and practical bias circuits. The importance of phase noise and VCO design will be considered.		

(ECE) - ECEN 432

Course Title	Digital Communications	
Course Code	ECEN 432	
Prerequisites	ECEN 331 - Fundamentals of Communications	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The course introduces the fundamentals of digital signaling, information theory and coding, digital transmission and reception. Topics include sampling and time-division multiplexing, baseband digital signals and systems, pulse code modulation, error control, digital modulation systems, information measure and source encoding, and introduction to spread spectrum communications.		

(ECE) - ECEN 433

Course Title	Wireless Communication	
Course Code	ECEN 433	
Prerequisites	ECEN 432 - Digital Communications	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description In this course wireless communication channels are introduced, and their peculiarities such as fading and co-channel interference are emphasized. Solutions to combat the problems are described, covering equalization and detection, coding and diversity ideas. Examples will be chosen from existing wireless standards (e.g., W-CDMA). The course also covers basic communication theory.		

(ECE) - ECEN 434

Course Title	Communications Networks	
Course Code	ECEN 434	
Prerequisites	ECEN 331 - Fundamentals of Communications	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Basic techniques for modeling and analyzing communication networks. Topics include overview telephone and cellular, and computer networks, layered network architectures and models, protocol specification and correctness, queuing models, loss networks, multi-class queues and scheduling, graph-based and flow-based routing, and congestion control.		

(ECE) - ECEN 435

Course Title	Communications Design Lab	
Course Code	ECEN 435	
Prerequisites	ECEN 432 - Digital Communications	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description		
Lab activities that complement the ECEN 331 and ECEN 462 courses. The lab covers the fundamental elements of communications systems hardware; use of measurement instruments typically encountered in communication systems, analog and digital communication systems including; Amplitude Modulation types and demodulation, angle modulation and demodulation, sampling and quantization, and Pulse code modulation encoder and decoder.		

(ECE) - ECEN 436

Course Title	Digital Signal Processing	
Course Code	ECEN 436	
Prerequisites	ECEN 305 - Signals and Systems	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall/Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description		
The course addresses the mathematics, implementation, design and application of the digital signal processing algorithms used in areas such as multimedia telecommunications and speech and image processing. Topics include discrete-time signals and systems, discrete-time Fourier transforms, Z- transforms and fast Fourier transform, digital filter design and implementation, and multi-rate signal processing. The course also includes introductory discussions of 2-dimensional signal processing, linear prediction, adaptive filtering, and selected application areas. Lectures are supplemented with exercises using MATLAB.		

(ECE) - ECEN 437

Course Title	Introduction to Optical Communications Systems	
Course Code	ECEN 437	
Prerequisites	ECEN 331 - Fundamentals of Communications	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall/Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description		
The course objective is to provide a basic understanding of present optical communication systems as well as future engineering challenges. The course covers the basic concepts of data modulation in optical fiber channels, channel multiplexing, wavelength division multiplexing, and fiber optics. The course also addresses the basic function principles of optical fibers, light emitting diodes, lasers, optical amplifiers, and optical receivers.		

(ECE) - ECEN 438

Course Title	Advanced Communication Systems	
Course Code	ECEN 438	
Prerequisites	ECEN 432 - Digital Communications	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall/Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The course focus on advanced communication systems including the evolution of mobile communication systems from 1G to 4G and beyond, radar systems fundamentals, satellite communication systems. The design of radio networks including link budgets, propagation path losses and transmitter and receiver parameters. Advanced communication technologies such as Orthogonal Frequency-Division Multiplexing (OFDM) and Multiple-Input Multiple-Output (MIMO).		

(ECE) - ECEN 439

Course Title	Selected Topics in Communications	
Course Code	ECEN 439	
Prerequisites	ECEN 331 - Fundamentals of Communications	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall/Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description This course is tailored to introduce students to the latest advances in the various fields in communications, and/or to focus on a specific area of particular interest to the discipline.		

(ECE) - ECEN 443

Course Title	Antenna and Propagation	
Course Code	ECEN 443	
Prerequisites	ECEN 342 - Applied Electromagnetics	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Introduction to the fundamentals of wave propagation and antenna theory and design. The course covers the theory of radiation, fundamental antenna parameters and concepts, wire antennas such as dipoles and loop antennas, antenna arrays, aperture antennas, microstrip antennas, numerical analysis, and practical configurations in communication and radar systems.		

(ECE) - ECEN 452

Course Title	Embedded and Discrete Control Systems	
Course Code	ECEN 452	
Prerequisites	ECEN 351 - Fundamentals of Control	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The course introduces principles for design of embedded controllers and emphasizes the tools for modeling and simulating dynamic systems and designing the real-time control software for embedded computers. Relevant theory and background from real-time systems and control engineering are covered, including event-based and clock-based sampling, switching control, pulse-width modulation, PID design, state-variable feedback, state estimation, and methods for setpoint control and trajectory tracking. Basic computing, sensor, and actuator technologies are also considered.		

(ECE) - ECEN 445

Course Title	Mechatronic Design	
Course Code	ECEN 445	
Prerequisites	ECEN 351 - Fundamentals of Control	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall/Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Mechatronics is the synergistic integration of mechanism, electronics, and computer control to achieve a functional system. The course emphasizes system integration in which small teams of students configure, design and implement a succession of mechatronic subsystems, leading to a main project. Lecture will complement the laboratory experience with the operational principles, and integrated design issues associated with mechanism, electronics and control components. Topics include: mechanisms, actuators, motor drives, sensors and electronic interfaces, microcontroller hardware and programming and basic controllers.		

(ECE) - ECEN 493

Course Title	Graduation Project I	
Course Code	ECEN 493	
Prerequisites	Senior Standing	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring (Semester 8)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	-
	TOTAL	2.5
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL)	180	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description		
Application-oriented capstone project to show competence in major academic area, where an independent research project is conducted under the guidance of a faculty member in the ECE program. The research should contribute to the advancement of knowledge in the field. Written report and formal presentation are required.		

(ECE) - ECEN 495

Course Title	Graduation Project II	
Course Code	ECEN 495	
Prerequisites	ECEN 493 - Graduation Project I	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 9)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	-
	TOTAL	2.5
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL)	180	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description		
The continuation and completion of the capstone project.		

(ECE) - ENTR 301

Course Title	Selected Topics in Entrepreneurship	
Course Code	ENTR 301	
Prerequisites	NONE	
Classification within the curriculum	Compulsory (All Tracks)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Business	
Topic Level	Program Requirements	
Description In this course, students get an overview about the definition of entrepreneurship, examples of successful innovations, and the prospects of starting a company. The course covers idea generation and identifying opportunities, business model canvas, and an overview of some business fundamentals such as types of businesses and business functions, in addition to communication and presentation skills.		

(ECE) - IENG 241

Course Title	Engineering Economics	
Course Code	IENG 241	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Business	
Topics Level	Program Requirements	
Description		
The main aim of this course is make the students acquainted with rational meaningful approaches to evaluating economically different (alternatives) investment opportunities while accomplishing given objectives. The course will also provide the students with the required tools and techniques to consider economic and non-economic factors in evaluating a wide range of industrial and business applications.		
Lab and Tutorials		
The course requires practice and problem solving training during tutorials		
Literature		
- Fraser, N. M., Jewkes, E. M., Bernhardt I. & Tajima, M., Global Engineering Economics: Financial Decision Making for Engineers, 4th Edition, Pearson Education, 2009. - Chan S. Park, Fundamentals of Engineering Economics, 3rd Edition, Pearson Education, ISBN 13:978-0273772910		

(ECE) - NSCI 102

Course Title	Selected Topics in Environmental Science	
Course Code	NSCI 102	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Culture	
Topic Level	Program Requirements	
Description		
A course in any of the fields of environmental sciences related to the discipline it is offered to.		

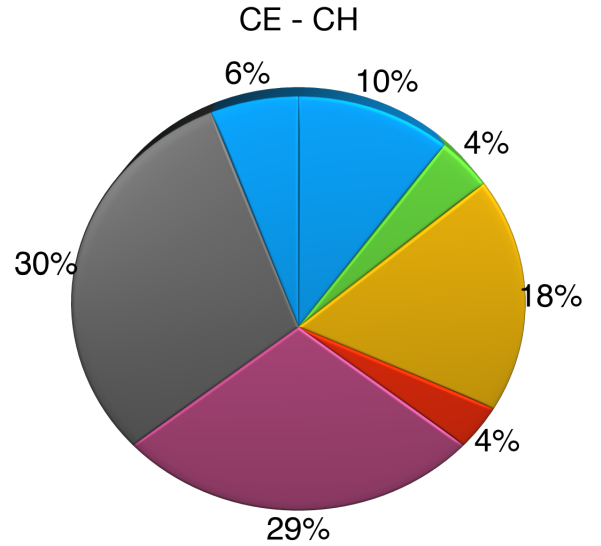
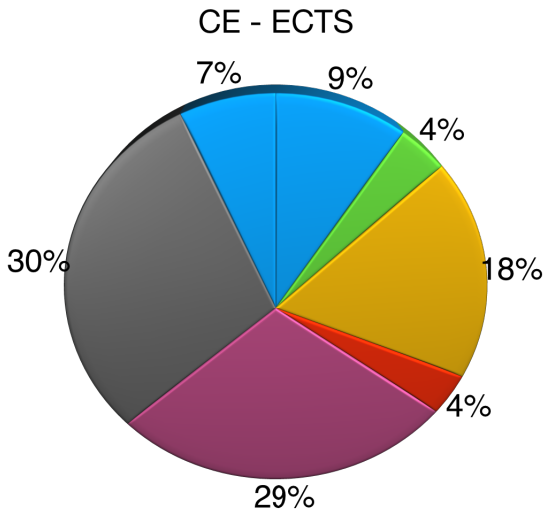
الباب السابع

برنامج هندسة الحاسبات

اسم البرنامج			برنامج هندسة الحاسبات		
اسم التخصصات			لا يوجد		
الكلية			الهندسة والعلوم التطبيقية		
الجامعة			جامعة النيل الأهلية		
عدد ساعات الاتصال			محاضرات		
			تمارين		
			معمل		
			135		
			49		
			16		
(CH) الساعات المعتمدة			160		
(ECTS) النقاط المعتمدة			270		
عدد المقررات			58		
توزيع المقررات طبقاً لمتطلبات مستويات التعلم					
			CH		ECTS
متطلبات الجامعة			16		25
متطلبات الكلية			48		82
متطلبات التخصص العام			96		163
متطلبات التخصص الدقيق			لا يوجد		
توزيع المقررات طبقاً لفئات المهارات والمعارف					
			CH		ECTS
العلوم الاجتماعية والانسانية			16		25
إدارة الأعمال			6		10
الرياضيات والعلوم الأساسية			29		49
الثقافة الهندسية			6		10
العلوم الهندسية الأساسية			43		73
التطبيقات الهندسية والتصميم			51		85
المشروعات والتدريب الميداني			9		18

بيانات إحصائية:

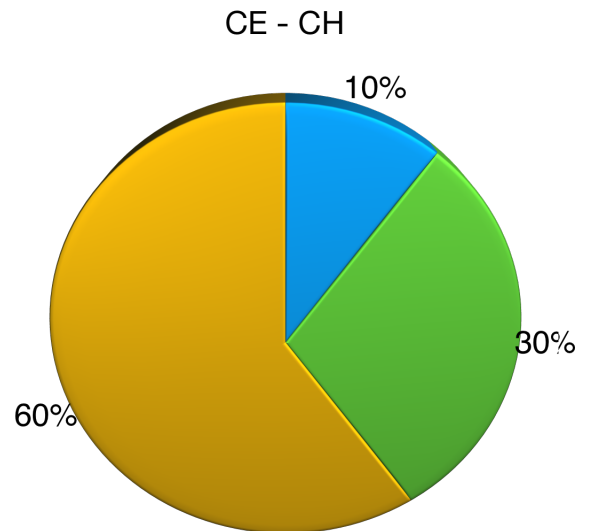
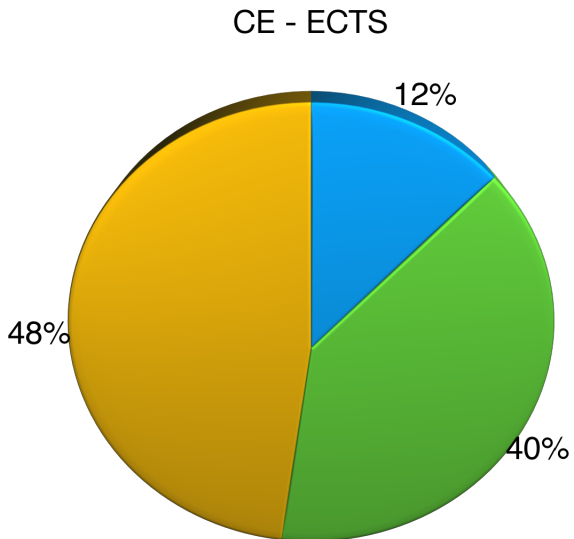
Hum-SC BA Math-BS Eng-Cult Eng-BS Eng-App Projects-PT



University

School

Program - Gen

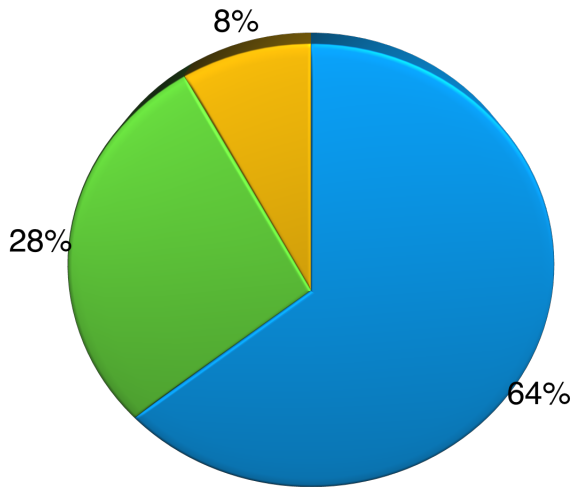


● Lectures

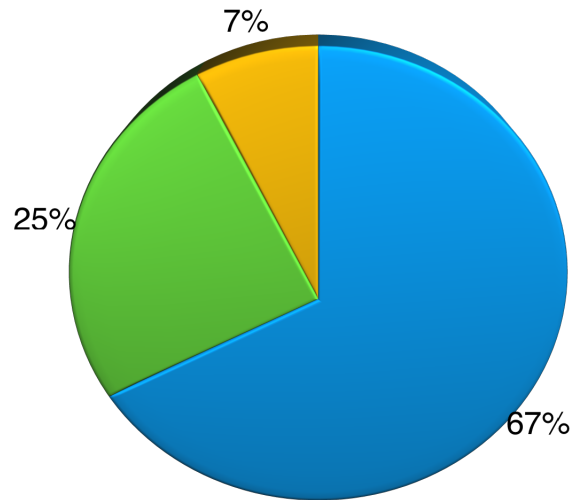
● Tutorials

● Labs

University + School + Program



Program Only



مادة (1): رسالة القسم:

يسعى قسم هندسة الحاسبات بجامعة النيل إلى تزويد الخريجين بالأسس النظرية والتطبيقات اللازمة لحل المشكلات بطريقة علمية والوعي بالدور الهام الذي تقوم به الهندسة في المجتمع التكنولوجي الحديث بهدف توفير الخدمات الهندسية المتخصصة للمجتمع الصناعي في مصر وخارجها. ويلتزم القسم في تحقيقه لرسالته بالتحسين المستمر في الجودة الشاملة للتدريس والبحث العلمي والأكاديمي بمشاركة الطالب بفاعلية بحيث يكون هو محور العملية التعليمية. كما يتحمل القسم المسؤولية المهنية لتقديم وسائل التعليم المستمر والتدريب المتخصص للمهندسين العاملين في الصناعة بهدف تنمية قدراتهم وإكسابهم المهارات اللازمة لتنمashi مع النمو المطرد في التكنولوجيا الذي يشهده العالم حالياً.

مادة (2): توصيف البرنامج الدراسي بالقسم:

يتميز البرنامج الدراسي في هندسة الحاسبات بجامعة النيل بالمرونة والشمولية من خلال طرح قاعدة عريضة من المقررات الدراسية للطلاب تشمل هندسة الحاسبات ، أسس الدوائر الرقمية والتناظرية، الكيمياء، الإحصاء، الإقتصاد ، تصميم الدوائر المتكاملة ، تنظيم الحاسبات ، بنية الحاسبات ، برمجة الحاسبات ، نظم وإشارات ، أسس التحكم ، شبكات الحاسبات ، نظم التشغيل ، قواعد البيانات ، هندسة البرمجيات ، النظم الدفينة .

مادة (3): أهداف البرنامج:

يهدف البرنامج الدراسي في قسم هندسة الحاسبات بجامعة النيل إلى تحقيق المستوى الأكاديمي والتقني اللازم للطلاب ليتواكب مع النمو المطرد في التكنولوجيا الحديثة في المجتمعات المتطورة وذلك عن طريق تعليم الطلاب المبادئ الأساسية والتقنيات الحديثة في مجال تخصصات القسم مع تدريب الطلاب على ممارسة المنهجية في التفكير واستخدام الأساليب الحديثة في حل المشاكل الهندسية مع دراية شاملة بدور هندسة الحاسبات في نمو المجتمعات الصناعية الحديثة من خلال:

1. تخريج كوادر قادرة على بناء أنظمة الحاسبات وتحليلها وتطويرها وتوصيفها بدقة والتعامل معها بمنهجية للوصول إلى حل لهذه المشاكل الهندسية وأن يكون قادراً على التواصل مع الآخرين بهذه النتائج.
 2. تقديم الاستشارات في مجالات علوم الحاسب ونظم المعلومات.
 3. تنظيم الندوات وعقد المؤتمرات العلمية بهدف تعميق مفاهيم المعلومات والمعرفة.
 4. تبادل الخبرات في مجالات هندسة الحاسب ونظم المعلومات مع الهيئات والمؤسسات المناظرة، لإكساب الطالب/الخريج مهارات العمل المتكامل مع فريق العمل وقدرات التواصل مع الآخرين ومهارات حل المشاكل الهندسية بأسلوب منهجي.
- إنشاء وحدات الأبحاث المتخصصة في أفرع نظم المعلومات وعلوم وهندسة الحاسبات
- تجهيز الطالب علمياً وتقنياً لممارسة مهنة هندسة الحاسبات كمهندس حديث التخرج أو الالتحاق ببرامج دراسات عليا في مجال التخصص، قادراً على العمل بكفاءة وتكامل في فريق متعدد التخصصات سواء كانوا في نفس تخصصه أو في تخصصات هندسية أو غير هندسية أخرى.

مادة (4): مواصفات الخريج:

1. ملماً بالأساس الرياضي والعلمي والتقني لحل المشاكل الهندسية في مجال هندسة الحاسبات.
2. قادراً على استخدام العلوم المكتسبة وتطويرها لتطوير وتصميم المنتجات والنظم الهندسية في مجال هندسة الحاسبات بما يتلاءم مع احتياجات السوق والمجتمع.
3. قادراً على التواصل شفهيًا وكتابةً بمهنية مع المشاركين في العمل.
4. مقدراً للتعليم والتطور المستمر واكتساب المهارات الجديدة.
5. مقدراً للجوانب الاجتماعية المحيطة والتي تحكمه أحياناً في تصميم وتطوير المنتجات والخدمات الملائمة للمحيط والمجتمع الذي يعمل فيه.
6. قادراً على استخدام التقنيات الهندسية الحديثة وعلوم الحاسب الآلي.
7. قادراً على مواصلة الحصول على درجات علمية أعلى من مرحلة البكالوريوس (للطلبة المتفوقين المتميزين).

وسيكون الخريج من هذا التخصص مؤهلاً للعمل في:

- مجالات أنظمة التحكم الإلكتروني والحاسب والذي تعتمد عليها معظم وسائل الانتاج الحديثة.
- عمليات الانتاج والتصنيع فى مجال الصناعات الدقيقة مثال صناعة الطيران والفضاء والصناعات العسكرية المتطورة.
- جميع المجالات الصناعية التى تضم تفاعل وتكامل بين أنظمة الذكاء الصناعي والأنظمة الالكترونية الحياتية وأنظمة الحاسب ومن المتوقع أن يتزايد الطلب على المهندسين المتخصصين فى هندسة الحاسبات مع بلورة الثورة الصناعية الرابعة.

مادة (5): المعايير الأكاديمية للبرنامج:

يلتزم البرنامج المقدم بالمعايير الأساسية المقترحة من قبل الهيئة القومية لضمان جودة التعليم والاعتماد كحد أدنى، والمعايير الأكاديمية لبرنامج هندسة الحاسبات يحدد المستوى والإمكانات والقدرات المتوقعة للخريج كالاتى:

الإمكانات المعرفية والفهم:

The graduates of the Computer Engineering program should be able to demonstrate the knowledge and understanding of:

1. Essential facts, concepts, principles and theories relevant to computer engineering;
2. Relevant mathematical methods, physical laws and the principles of electronic engineering science as applied to computer engineering systems;
3. Engineering principles in the fields of logic design, circuit analysis, machine and assembly languages, computer organization and architectures, memory hierarchy, advanced computer architectures, embedded systems, signal processing, operating systems, real-time systems and reliability analysis.
4. Quality assessment of computer systems;
5. Principles of design specific to computer engineering;
6. Broad general education necessary to understand the impact of computer engineering solutions in a global and societal context;
7. Related research methods and approaches to create more advanced products.

المهارات الفكرية:

The graduates of Computer Engineering program should be able to:

1. Demonstrate a high level of competence in identifying, defining and solving computer engineering problems;
2. Select and apply appropriate mathematical tools, computing methods, design techniques and tools in computer engineering disciplines, for modeling and analyzing computer systems;
3. Evaluate different techniques and strategies for solving computer engineering problems;
4. Maintain a sound theoretical approach in dealing with new and advancing technology;
5. Select and apply appropriate IT tools to a variety of computer engineering problems.

المهارات العملية والفنية:

The graduates of Computer Engineering program should be able to:

1. Use laboratory and field equipment competently and safely;
2. Observe, record and analyze data in laboratory as well as in the field;
3. Use appropriate specialized computer software, computational tools and packages;
4. Write computer programs.
5. Integrate technical professionalism and societal and
6. ethical responsibility

المهارات العامة:

The graduates of Computer Engineering program should be able to:

1. Collaborate effectively within multidisciplinary team.
2. Work in stressful environment and within constraints.
3. Communicate effectively.
4. Demonstrate efficient IT capabilities.
5. Lead and motivate individuals.
6. Effectively manage tasks, time, and resources.
7. Search for information and engage in life-long self learning discipline.
8. Acquire entrepreneurial skills.
9. Refer to relevant literatures.

مادة (6): تفاعل البرنامج مع احتياجات السوق:

من الأهداف الرئيسية لبرنامج هندسة الحاسبات هو التفاعل المستمر مع احتياجات سوق العمل حيث أن ذلك السوق هو ما يمثل المستهلك الحقيقي لنتائج قسم الهندسة الميكانيكية المقترح. وتماشياً مع نظام الجودة الشاملة فإن مخرجات القسم لابد وأن تتوافق مع متطلبات المستهلك وعليه فإن الجامعة ملتزمة بالتواصل مع الغرف التجارية والصناعية والممثلة للمجتمع الصناعي للتعرف على الاحتياجات الحقيقية للخريجين من القسم الجديد وكذلك لتشكيل قنوات مستمرة لتدريب الطلاب في تلك المصانع.

مادة (7): التشابه والتمايز عن البرامج المشابهة:

يقدم البرنامج نموذجاً للأسلوب المنهجي في التعليم الجامعي في تخصص هندسة الحاسبات حيث يستفيد البرنامج من الخبرات المتراكمة في البرامج المشابهة على المستوى المحلي والمستوى الدولي لتقديم برنامج دراسي يعتمد على:

1. توفير الأساس النظري المناسب للتخصص بما يواكب ما يتم تدريسه في الجامعات العريقة محلياً وعالمياً وينقسم هذا إلى شقين أساسيين:
 - تقديم الأساس النظري والذي يخدم فئة مهندسي الحاسبات بصفة عامة لتكوين الأرضية الثابتة للتقدم في علوم التخصص.
 - تقديم الأساس النظري والذي يرتفع بمستوى الطلاب إلى مستوى التخصص معتمداً على دراسة لما يتم تدريسه بالأقسام المماثلة في مصر وخارجها.
2. توفير نظام الساعات المعتمدة والذي يتيح للطلبة الاختيار من مجموعة من المقررات للتعمق في تخصص أكثر دقة من التخصص العام.
3. توفير معامل متكاملة للتطبيقات العملية المصاحبة للدراسة النظرية.
4. توفير خطة تدريب عملي داخل وخارج الجامعة لتتماشى مع متطلبات المقررات الدراسية والتطور المستمر في احتياجات الصناعة.

مادة (8): مخرجات البرنامج المستهدفة Program ILOs

لقد تم تصميم برنامج هندسة الحاسبات بكلية الهندسة والعلوم التطبيقية بجامعة النيل لكي يتميز خريجو البرنامج بخصائص تمكنهم من التكامل بنجاح مع أقرانهم في مجال العمل المهني والأكاديمي. وعليه فإنه كان من الضروري تحديد مخرجات البرنامج المستهدفة والتي تؤدي إلى خريجي بمواصفات وقدرات كما تم توصيفها سابقاً. ويتم تقسيم مخرجات البرنامج المستهدفة إلى أربعة أقسام مختلفة كما يلي:

الإمكانيات المعرفية والفهم:

- E. يجب أن يكون خريجي برنامج هندسة الحاسبات قادرين على إظهار المعرفة والفهم لما يلي:
 - E.1. المفاهيم ونظريات الرياضيات والعلوم والخاصة بالتخصص.
 - E.2. أساسيات تكنولوجيا المعلومات والاتصالات (ICT).

- E.3. خصائص المواد الهندسية المتعلقة بالتخصص.
- E.4. مبادئ التصميم بما في ذلك تصميم العناصر والمنظومات المتكاملة.
- E.5. منهجية حل المشكلات الهندسية وجمع البيانات وتفسيرها.
- E.6. أنظمة ضمان الجودة والمعايير ومتطلبات الصحة والسلامة والقضايا البيئية.
- E.7. مبادئ إدارة الأعمال ذات الصلة بالتخصص.
- E.8. التقنيات الهندسية الحالية المتعلقة بالتخصص.
- E.9. موضوعات متعلقة بالمصالح الإنسانية والقضايا الأخلاقية.
- E.10. اللغة الفنية وكتابة التقارير.
- E.11. الأخلاقيات المهنية وتأثير الحلول الهندسية على المجتمع والبيئة.
- E.12. موضوعات هندسية معاصرة.
- E.13. المبادئ الهندسية في مجالات تصميم الدوائر المنطقية وتحليل الدوائر الكهربائية والإلكترونية ولغات الحاسب الآلي و هيكل أنظمة الكمبيوتر والأنظمة المدمجة ومعالجة الإشارات وأنظمة التشغيل.
- E.14. تقييم جودة نظم الكمبيوتر.
- E.15. البحوث ذات الصلة والتطورات الحالية في مجال برامج الكمبيوتر والأجهزة.
- E.16. تقنيات تمثيل البيانات والصور والرسوم وتنظيمها على وسائط تخزين الكمبيوتر.
- E.17. الاتجاهات الحديثة في تكنولوجيا المعلومات ودورها الأساسي في مؤسسات الأعمال.

المهارات الفكرية:

- F. متوقع أن يكون خريج برنامج هندسة الحاسبات بجامعة النيل قادر على الآتي:
- F.1. تحديد الأساليب الرياضية والحاسوبية المناسبة لنمذجة المشكلات وتحليلها.
- F.2. تحديد الحلول المناسبة للمشاكل الهندسية القائمة على التفكير التحليلي.
- F.3. التفكير بطريقة مبتكرة في حل المشكلات والتصميم.
- F.4. دمج وتبادل وجهات النظر المختلفة والأفكار والمعرفة من مجموعة متنوعة من المصادر.
- F.5. تقييم خصائص وأداء المكونات والنظم والعمليات.
- F.6. تحليل آليات انهيار المكونات والأنظمة والعمليات.
- F.7. حل المشكلات الهندسية ، غالبًا على أساس معلومات محدودة وربما متناقضة.
- F.8. اختيار وتقييم أدوات تكنولوجيا المعلومات والاتصالات المناسبة لمجموعة متنوعة من المشاكل الهندسية.
- F.9. اتخاذ قرارات هندسية بشأن التكاليف المتوازنة ، الفوائد ، السلامة ، الجودة ، الموثوقية ، التأثير البيئي.
- F.10. دمج الأبعاد الاقتصادية والاجتماعية والبيئية وإدارة المخاطر في التصميم.
- F.11. تحليل نتائج النماذج العددية وتقييم حدودها.
- F.12. تطوير منهجية متناسقة عند التعامل مع التكنولوجيا الجديدة والمتقدمة.
- F.13. تحديد الأدوات الرياضية المناسبة ، وأساليب الحوسبة ، وتقنيات التصميم لنمذجة وتحليل أنظمة الكمبيوتر.
- F.14. تحديد وتوليف وتطبيق أدوات تكنولوجيا المعلومات المناسبة لمشكلات هندسة الكمبيوتر.
- F.15. اقتراح حلول حاسوبية مختلفة لمشاكل نظام الأعمال. وإجراء تحليل للتكلفة والعائد خاصة في المجالات الحساسة التي تنطوي على تكاليف مباشرة وغير مباشرة.

- F.16. تحديد الأعراض في الحالات الإشكالية.
F.17. ابتكار حلول مبنية على التفكير غير التقليدي واستخدام أحدث التقنيات.
F.18. القدرة على دمج مكونات الكمبيوتر التي تعمل بأنظمة مختلفة.

المهارات العملية والفنية:

- G. متوقع أن يكون خريج برنامج هندسة الحاسبات بجامعة النيل قادراً على الآتي:
- G.1. تطبيق المعرفة في الرياضيات والعلوم وتكنولوجيا المعلومات والتصميم بشكل متكامل لحل المشاكل الهندسية.
- G.2. دمج المعرفة والفهم والملاحظات الهندسية بشكل مهني لتحسين التصميم والمنتجات والخدمات.
- G.3. إنشاء وإعادة تصميم عملية أو مكون أو نظام، وتنفيذ تصاميم هندسية متخصصة.
- G.4. الدقة وعلم الجمال في التصميم والنهج.
- G.5. استخدام المرافق والتقنيات الحسابية وأدوات القياس وورش العمل ومعدات المختبرات لتصميم التجارب وجمع وتحليل وتفسير النتائج.
- G.6. استخدام مجموعة واسعة من الأدوات والتقنيات والمعدات وحزم البرامج التحليلية المتعلقة بالتخصص وتطوير برامج الكمبيوتر المطلوبة.
- G.7. تطبيق أساليب النمذجة العددية للمشاكل الهندسية.
- G.8. تطبيق الأنظمة الآمنة في العمل ومراقبة الخطوات المناسبة لإدارة المخاطر.
- G.9. إظهار المهارات الأساسية التنظيمية وإدارة المشاريع.
- G.10. تطبيق إجراءات ضمان الجودة واتباع المعايير.
- G.11. تبادل المعرفة والمهارات مع المجتمع والصناعة.
- G.12. كتابة وعرض التقارير الفنية.
- G.13. تصميم وتشغيل أنظمة حاسوبية مصممة خصيصاً لتطبيقات الأعمال.
- G.14. استخدام برامج الكمبيوتر المتخصصة المناسبة ، والأدوات الحسابية وحزم التصميم على مدار مراحل دورة حياة تطوير النظام.
- G.15. كتابة برامج الكمبيوتر على المستويات المهنية لتحقيق مقاييس الجودة المقبولة في تطوير البرمجيات.
- G.16. إجراء أنشطة دعم المستخدم بكفاءة.

المهارات العامة:

- H. متوقع أن يكون خريج برنامج هندسة الحاسبات بجامعة النيل قادر على الآتي:
- H.1. العمل في فريق متكامل.
- H.2. مشاركة الأفكار والآراء والتواصل مع الآخرين بكفاءة.
- H.3. التعامل مع الآخرين في إطار أخلاقيات المهنة الحميدة.
- H.4. إدراك أهمية التعليم المستمر والحاجة إلى التطوير وتحكيم العقل في تفسير الأمور واختيار القرارات الإستراتيجية.

مادة (9): مقارنة مخرجات البرنامج المستهدفة مع المرجعيات المحلية والعالمية

الجدول المرفق يستعرض مقارنة بين مخرجات البرنامج المقترح المستهدفة مع متطلبات الهيئة القومية لضمان جودة التعليم والاعتماد (NARS) ومتطلبات (ABET).

Attributes of program graduates as per ABET Criterion (3) for program outcomes and assessment	Attributes of program graduates as per NARS Requirements for engineering programs, in general	Corresponding ILO's in Current Program	Courses Covering such ILO's
a. Ability to apply knowledge of mathematics, science and engineering.	a. Ability to apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.	a1 to a5, a8, a12 to a17.	HUMA 101, HUMA 102, HUMA 103, SSCI 101, SSCI 103, MATH 111, MATH 112, MATH 203, MATH 301, MATH 202, PHYS 101, PHYS 102, CHEM 101, CSCE 101, ENGR 102, ECEN 101, CSCE 201, MENG 101, MENG 202, ECEN 202, ECEN 203, ECEN 312, ECEN 313, ECEN 305, ECEN 307, ECEN 351, ECEN 304, ECEN 404, IENG 241, ENGR 101, ENGR 391, ENGR 493, ENGR 494, ECEN 303, ECEN 331, ECEN 401, ECEN 402, ECEN 409, ECEN 408, ECEN 304, ECEN 417, ECEN 411, ECEN 462, ECEN 441, ECEN 442, ECEN 436, ECEN 444, ECEN 445, ECEN 426, ECEN 427, ECEN 428, ECEN 429, ECEN 430, ECEN 450
a. Ability to design and conduct experiments, as well as to analyze and interpret data.	c. Ability to Design and conduct experiments as well as analyze and interpret data.	B1 TO B5, B13 TO B18, C1, C2, C3, C5, C6, C7, C13, C14, C15.	HUMA 101, HUMA 102, HUMA 103, SSCI 101, SSCI 103, MATH 111, MATH 112, MATH 203, MATH 301, MATH 202, PHYS 101, PHYS 102, CHEM 101, CSCE 101, ENGR 102, ECEN 101, CSCE 201, MENG 101, MENG 202, ECEN 202, ECEN 203, ECEN 312, ECEN 313, ECEN 305, ECEN 307, ECEN 351, ECEN 304, ECEN 404, IENG 241, NSCI 102, ENGR 101, ENGR 391, ENGR 493, ENGR 494, ECEN 303, ECEN 331, ECEN 401, ECEN 402, ECEN 409, ECEN 408, ECEN 304, ECEN 417, ECEN 411, ECEN 462, ECEN 441, ECEN 442, ECEN 436, ECEN 444, ECEN 445, ECEN 426, ECEN 427, ECEN 428, ECEN 429, ECEN 430, ECEN 450

b. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	b. Ability to Design a system; component and process to meet the required needs within realistic constraints.	B1 TO B18.	HUMA 101, HUMA 102, HUMA 103, SSCI 101, SSCI 103, MATH 111, MATH 112, MATH 203, MATH 301, MATH 202, CHEM 101, CSCE 101, ENGR 102, ECEN 101, CSCE 201, MENG 101, MENG 202, ECEN 202, ECEN 203, ECEN 312, ECEN 313, ECEN 305, ECEN 307, ECEN 351, ECEN 304, ECEN 404, IENG 241, NSCI 102, ENGR 101, ENGR 493, ENGR 494, ECEN 303, ECEN 331, ECEN 401, ECEN 402, ECEN 409, ECEN 408, ECEN 304, ECEN 417, ECEN 411, ECEN 462, ECEN 441, ECEN 442, ECEN 436, ECEN 444, ECEN 445, ECEN 426, ECEN 427, ECEN 428, ECEN 429, ECEN 430, ECEN 450
c. Ability to function on multi-disciplinary teams	f. Work effectively within multi-disciplinary teams	D1 TO D9	HUMA 101, HUMA 102, HUMA 103, SSCI 101, SSCI 103, CSCE 101, ENGR 102, CSCE 201, MENG 202, ECEN 202, ECEN 203, ECEN 312, ECEN 313, ECEN 305, ECEN 307, ECEN 351, ECEN 304, ECEN 404, IENG 241, NSCI 102, ENGR 101, ENGR 391, ENGR 493, ENGR 494, ECEN 303, ECEN 331, ECEN 401, ECEN 402, ECEN 409, ECEN 408, ECEN 304, ECEN 417, ECEN 411, ECEN 462, ECEN 441, ECEN 442, ECEN 444, ECEN 445, ECEN 426, ECEN 427, ECEN 429, ECEN 430, ECEN 450
d. Ability to identify, formulate and solve engineering problems	d. Ability to Identify, formulate and solve fundamental engineering problems	B1 TO B16	HUMA 101, HUMA 102, HUMA 103, SSCI 101, SSCI 103, MATH 111, MATH 112, MATH 203, MATH 301, MATH 202, CHEM 101, CSCE 101, ENGR 102, ECEN 101, CSCE 201, MENG 101, MENG 202, ECEN 202, ECEN 203, ECEN 312, ECEN 313, ECEN 305, ECEN 307, ECEN 351, ECEN 304, ECEN 404, IENG 241, NSCI 102, ENGR 101, ENGR 493, ENGR 494, ECEN 303, ECEN 331, ECEN 401, ECEN 402, ECEN 409, ECEN 408, ECEN 304, ECEN 417, ECEN 411, ECEN 462, ECEN 441, ECEN 442, ECEN 436, ECEN 444, ECEN 445, ECEN 426, ECEN 427, ECEN 428, ECEN 429, ECEN 430, ECEN 450
e. Understanding of professional and ethical responsibility	j. Ability to Display professional and ethical responsibilities; and contextual understanding	d3, a11, a8, b10, b12	HUMA 101, HUMA 102, HUMA 103, CSCE 101, ENGR 102, ECEN 101, MENG 202, ECEN 202, ECEN 307, ECEN 304, ECEN 404, IENG 241, NSCI 102, ENGR 101, ENGR 391, ENGR 493, ENGR 494, ECEN 331, ECEN 401, ECEN 402, ECEN 409, ECEN 408, ECEN 304, ECEN 417, ECEN 411, ECEN 462, ECEN 441, ECEN 442, ECEN 436, ECEN 444, ECEN 445, ECEN 426, ECEN 427, ECEN 428, ECEN 430, ECEN 450

f. Ability to communicate effectively	g. Ability to communicate effectively	D1 TO D3	HUMA 101, HUMA 103, ECEN 202, ECEN 312, ECEN 313, ECEN 305, ECEN 351, ECEN 304, ENGR 101, ENGR 391, ENGR 493, ENGR 494, ECEN 331, ECEN 462, ECEN 441, ECEN 442, ECEN 445, ECEN 426,
g. Having the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	h. Ability to Consider the impacts of engineering solutions on society & environment	D3, A14, A16	HUMA 101, HUMA 103, ECEN 202, ECEN 203, ECEN 307, ECEN 304, ECEN 404, NSCI 102, ENGR 101, ENGR 391, ECEN 331, ECEN 402, ECEN 408, ECEN 462, ECEN 444, ECEN 426, ECEN 450
h. Recognition of the need for, and ability to engage in life-long learning	k. Ability to Engage in self- and life-long learning	d4, d6, d7	HUMA 101, HUMA 102, SSCI 101, SSCI 103, CSCE 101, ENGR 102, CSCE 201, MENG 202, ECEN 202, ECEN 203, ECEN 312, ECEN 313, ECEN 305, ECEN 307, ECEN 351, ECEN 304, ECEN 404, IENG 241, ENGR 101, ENGR 493, ENGR 494, ECEN 303, ECEN 331, ECEN 401, ECEN 402, ECEN 409, ECEN 408, ECEN 304, ECEN 417, ECEN 411, ECEN 462, ECEN 441, ECEN 442, ECEN 444, ECEN 445, ECEN 426, ECEN 427, ECEN 429, ECEN 430, ECEN 450
i. Knowledge of contemporary issues	i. Ability to Demonstrate knowledge of contemporary engineering issues	B3, B5, B9,	CHEM 101, ENGR 102, ECEN 101, MENG 101, MENG 202, ECEN 202, ECEN 312, ECEN 313, ECEN 305, ECEN 307, ECEN 304, ECEN 404, IENG 241, ENGR 101, ENGR 493, ENGR 494, ECEN 331, ECEN 402, ECEN 409, ECEN 408, ECEN 417, ECEN 411, ECEN 462, ECEN 441, ECEN 444, ECEN 445, ECEN 426, ECEN 427, ECEN 428, ECEN 450

j. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	e. Ability to Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management	C1 TO C16	HUMA 101, HUMA 102, SSCI 103, MATH 111, MATH 112, MATH 203, MATH 301, MATH 202, PHYS 101, PHYS 102, CHEM 101, CSCE 101, ENGR 102, ECEN 101, CSCE 201, MENG 101, MENG 202, ECEN 202, ECEN 203, ECEN 312, ECEN 313, ECEN 305, ECEN 307, ECEN 351, ECEN 404, IENG 241, ENGR 101, ENGR 391, ENGR 493, ENGR 494, ECEN 303, ECEN 401, ECEN 402, ECEN 409, ECEN 408, ECEN 304, ECEN 417, ECEN 411, ECEN 462, ECEN 441, ECEN 442, ECEN 444, ECEN 445, ECEN 426, ECEN 427, ECEN 428, ECEN 429, ECEN 430, ECEN 450

مادة (10): مطابقة مخرجات البرنامج المستهدفة مع المعايير الأكاديمية طبقاً لمتطلبات (NARS)

الجدول المرفق يستعرض مدى تحقيق مخرجات البرنامج المستهدفة (Program ILOs) للمعايير الأكاديمية له طبقاً لمتطلبات (NARS):

مخرجات البرنامج المستهدفة المحققة للمعايير	المعايير الأكاديمية للبرنامج
	الامكانيات المعرفية والفهم
A1-5, A7-8, A13-17	• Essential facts, concepts, principles and theories relevant to computer engineering;
A1, A3-5, A8, A13	• Relevant mathematical methods, physical laws and the principles of electronic engineering science as applied to computer engineering systems;
A2-5, A8, A13, A15-17	• Engineering principles in the fields of logic design, circuit analysis, machine and assembly languages, computer organization and architectures, memory hierarchy, advanced computer architectures, embedded systems, signal processing, operating systems, real-time systems and reliability analysis.
A3-4, A6, A11, A14	• Quality assessment of computer systems;
A2, A4-5, A8, A12-13, A15-17	• Principles of design specific to computer engineering;
A1, A5-7, A9-12, A16	• Broad general education necessary to understand the impact of computer engineering solutions in a global and societal context;
A3, A15-17	• Related research methods and approaches to create more advanced products.
	المهارات الفكرية
B1-13, B18	• Demonstrate a high level of competence in identifying, defining and solving computer engineering problems;
B1, B7-8, B13-14, B17	• Select and apply appropriate mathematical tools, computing methods, design techniques and tools in computer engineering disciplines, for modeling and analyzing computer systems;
B2-11, B14-15, B17	• Evaluate different techniques and strategies for solving computer engineering problems;
B3, B8, B11, B17	• Maintain a sound theoretical approach in dealing with new and advancing technology;
B1, b5, B8, B13-14,	• Select and apply appropriate IT tools to a variety of computer engineering problems.
	المهارات العملية والفنية
C1, C4-6, C16	• Use laboratory and field equipment competently and safely;
C4-7	• Observe, record and analyze data in laboratory as well as in the field;
C6-7, C14	• Use appropriate specialized computer software, computational tools and packages;
C15	• Write computer programs.
C13-16	• Integrate technical professionalism and societal and

ALL	• ethical responsibility
المهارات العامة	
D1	• Collaborate effectively within multidisciplinary team.
D2	• Work in stressful environment and within constraints.
D3	• Communicate effectively.
D4	• Demonstrate efficient IT capabilities.
D5	• Lead and motivate individuals.
D6	• Effectively manage tasks, time, and resources.
D7	• Search for information and engage in life-long self learning discipline.
D8	• Acquire entrepreneurial skills.
D9	• Refer to relevant literatures.

مادة (11): المقررات الدراسية ومدى ملاءمتها لمخرجات البرنامج المستهدفة:

CE University Core Requirements (10 courses = 16 CH)

Code No.	Course Title	No. of hours / week			CH	ECTS	SW L	ILOs
		Lec	Tut	Lab				
ENGL 001	Intensive English	0	0	0	0	0	0	A1, b1, c2
ENGL 101	English I	0	0	0	0	0	50	A1, b1, c2
ENGL 102	English II	0	0	0	0	0	50	A1, b1, c2
ENGL 201	Writing Skills	3.75	0	0	3	5	125	A10, c12, d3
ENGL 202	Communication and Presentation Skills	3.75	0	0	3	5	125	A10, b4, c9, c12, d1, d3
HUMA 101	Introduction to Scientific & Critical Thinking	2.5	0	0	2	3	75	a11, b2, b4, c5, d7
HUMA 102	Introduction to Ethics	2.5	0	0	2	3	75	A6, a9, a11, c10, d7
HUMA 103	Selected Topics in Humanities & Arts	2.5	0	0	2	3	75	A9, b4, d3, d5, d9
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2.5	0	0	2	3	75	A9, b4, d5, d7, d9
SSCI 103	Selected Topics in Social Sciences	2.5	2.5	0	2	3	75	A7, a9, b4, c9, d5, d8
Total Number of	10	20	3	0	16	25	725	

CE Engineering Core Requirements (16 courses = 48 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	SW L	ILOs
		Lec	Tut	Lab				
CHEM 101	Chemical Principles	2.5	0	1.25	3	5	125	A1, a3, b5, c1, c 5
CSCE 101	Computer & Information Skills	1.25	0	3.75	3	5	125	A2, a8, c6, d4
CSCE 201	Introduction to Programming	1.25	0	3.75	3	5	125	A2, a5, b8, c6, d4
ECEN 101	Electric Circuits	2.5	0	1.25	3	5	125	A4, a8, b5, c3, c5
ENGR 101	Introduction to Engineering Disciplines	2.5	0	1.25	3	5	125	A8, a11, a12, b4, b15
ENGR 102	Engineering Design	2.5	0	1.25	3	5	125	A3, b1, b3, c4 to c6
MATH 111	Analytical Geometry & Calculus I	2.5	1.25	0	3	5	125	A1, b1, c1
MATH 112	Calculus II	2.5	1.25	0	3	5	125	A1, b1, c1
MATH 202	Probability & Statistics for Engineers	2.5	1.25	0	3	5	125	A1, a5, b1, b11, c1, c7
MATH 203	Differential Equations	2.5	1.25	0	3	5	125	A1, b1, c1
MATH 301	Linear Algebra	2.5	1.25	0	3	5	125	A1, b1, c1, c7
MATH 303	Numerical Methods	2.5	1.25	0	3	5	125	A1, b1, c1, c7
MENG 101	Engineering Mechanics I - Statics	2.5	0	0	2	4	100	A5, a12, b5, b7, c2,
MENG 102	Engineering Mechanics II - Dynamics	2.5	0	0	2	4	100	A5, a12, b5, b7, c2
PHYS 101	Physics I	2.5	1.25	1.25	4	7	175	A1, c1, c5
PHYS 102	Physics II	2.5	1.25	1.25	4	7	175	A1, c1, c5
Total Number of Credits	16	37.5	10	15	48	82	2050	

CE Program Requirements (19 courses = 57 CH)

Code No.	Course Title	No. of hours / week			CH	ECTS	SW L	ILOs
		Le c	Tut	Lab				
ECEN 202	Fundamentals of Electrical Engineering	2.50	1.25	1.25	3	5	125	a5, a13, b2, b8
ECEN 203	Fundamentals of Computer Engineering	2.5	1.25	0	3	5	125	a4, a13, a14, a16, b8, c6
ECEN 207	Fundamentals of Data Structures & Algorithms	2.50	1.25	0	3	5	125	a16, b3, b15, c14
ECEN 303	Introduction to Computer Systems	2.50	1.25	0	3	5	125	A2, b2, b8, c1, c6, d6
ECEN 304 / MENG 322	Electric Machines	2.50	1.25	0	3	5	125	A5, a6, b14, c12, c15
ECEN 305	Signals & Systems	2.50	1.25	0	3	5	125	A1, a13, b3, b5, c4
ECEN 312	Analysis and Design of Analog Circuits	2.50	1.25	0	3	5	125	A4, a5, b2, b5, c3
ECEN 313	Analysis and Design of Digital Circuits	2.50	1.25	0	3	5	125	A4, a5, a13, b2, b5, c5
ECEN 331	Fundamentals of Communications	2.50	1.25	0	3	5	125	A2, a13, b1, b5, d4
ECEN 351	Fundamentals of Control	2.50	1.25	0	3	5	125	a4, b6, b7, c5
ECEN 364	Computer Systems Software	2.50	1.25	0	3	5	125	a13, b2, b13, c3, d4
ECEN 391	Practical Training	-	-	-	3	6	150	A5, a8, c1, c11, c12, d3
ECEN 401	Introduction to Computer Networks	2.50	1.25	0	3	5	125	A1, a4, b13, c2, d4
ECEN 402	Introduction to Computer Architecture	2.50	1.25	0	3	5	125	A4, a15, b17, b18, d9
ECEN 404	Introduction to Databases Systems	2.50	1.25	0	3	5	125	a16, b3, b15, c14
ECEN 408	Advanced Computer Architecture	2.50	1.25	0	3	5	125	a4, a15, b18, c3, c5, d9
ECEN 409	Microprocessor Systems Design	2.50	1.25	0	3	5	125	a13, b5, b16, c5, c6, d4
ECEN 411	Machine Intelligence	2.50	1.25	0	3	5	125	a5, a12, b9, b17, c5
ECEN 417	Operating Systems	2.50	1.25	0	3	5	125	a4, a8, b6, b8, b14, c14

Code No.	Course Title	No. of hours / week			CH	ECTS	SW L	ILOs
		Le c	Tut	Lab				
ECEN 430	Introduction to Parallel Computing	2.50	1.25	0	3	5	125	A2, b17, c13, d6
ECEN 441	Embedded Systems Engineering	2.50	1.25	0	3	5	125	a13, b7, b13-b14, c14, d6
ECEN 442	Embedded Real-Time Systems	2.50	1.25	0	3	5	125	a13, a14, b 7, c13, c14, d6
ECEN 462	Introduction to Computer Security	2.50	1.25	0	3	5	125	a4, a12, b9, b12, c5, c6
ECEN 493	Graduation Project I	2.5	-	-	3	6	180	c6, c9, c11, c12, d1, d2, d6, d8, d9
ECEN 495	Graduation Project II	2.5	-	-	3	6	180	c6, c9, c11, c12, d1, d2, d6, d8, d9
ECEN XXX	Technical Electives	2.5	1.25	0	3	5	150	From list below
ECEN XXX	Technical Electives	2.5	1.25	0	3	5	150	From list below
ECEN XXX	Technical Electives	2.5	1.25	0	3	5	150	From list below
ECEN XXX	Technical Electives	2.5	1.25	0	3	5	150	From list below
ENTR 301	Selected Topics in Entrepreneurship	2.5	1.25	0	3	5	125	a5, a8, c11, c12, c16, d3
IENG 241	Engineering Economics	2.5	1.25	0	3	5	125	a7, b13, c1, d8
NSCI 102	Selected Topics in Environmental Science	2.50	1.25	0	3	5	125	A6, a9, b4, b10, d9
Total Number	32	77.5	36.25	1.25	96	163	4235	

CE list of Electives

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	La b	Tut				
ECEN 427	Software Engineering	2.5	1.25	0.00	3	5	125	a13, a15, b13, c7, d6
ECEN 428	Numerical Methods and Mathematical Precision of Floating Numbers	2.5	1.25	0.00	3	5	125	A1, b1, c1, c7
ECEN 429	Compiler Construction	2.5	1.25	0.00	3	5	125	A4, b12, c6, d4
ECEN 433	Wireless Communication	2.5	1.25	0.00	3	5	125	A12, 18, 19, B15, C14
ECEN 436	Digital Signal Processing	2.5	1.25	0.00	3	5	125	A5, a16, b2, c6, d4, d9
ECEN 444	Image Processing and Bio-image Informatics	2.5	1.25	0.00	3	5	125	A5, b3, c5, c1
ECEN 445	Mechatronic Design	2.50	1.25	0.00	3	5	125	A4, b7, b13, c7
ECEN 450	Selected Topics in Computer Engineering	2.5	1.25	0.00	3	5	125	A3, a8, b1, b8, c15, d9

مادة (12): توزيع مقررات البرنامج على الفئات المقترحة في (NARS):

CE Course Mapping to Subject Categories (NARS)

Course Code	Course Title	Hum. & Social Sci.		Business Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.		Eng. App. & Design		Project & PT	
		C	EC	C	EC	C	EC	C	EC	C	EC	C	EC	C	EC
		H	TS	H	TS	H	TS	H	TS	H	TS	H	TS	H	TS
University Requirements															
ENGL 001	Intensive English														
ENGL 101	English I	0	0												
ENGL 102	English II	0	0												
ENGL 201	Writing Skills	3	5												
ENGL 202	Communication and Presentation Skills	3	5												
HUMA 101	Introduction to Scientific & Critical Thinking	2	3												
HUMA 102	Introduction to Ethics	2	3												
HUMA 103	Selected Topics in Humanities & Arts	2	3												
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3												
SSCI 103	Selected Topics in Social Sciences	2	3												
Total University Requirements		16	25	0	0	0	0	0	0	0	0	0	0	0	0
Engineering Requirements															
CHEM 101	Chemical Principles					3	5								
CSCE 101	Computer & Information Skills									3	5				
CSCE 201	Introduction to Programming									3	5				
ECEN 101	Electric Circuits									3	5				
ENGR 101	Introduction to Engineering Disciplines							3	5						
ENGR 102	Engineering Design									3	5				
MATH 111	Analytical Geometry & Calculus I					3	5								
MATH 112	Calculus II					3	5								
MATH 202	Probability & Statistics for Engineers					3	5								
MATH 203	Differential Equations					3	5								
MATH 301	Linear Algebra					3	5								
MATH 303	Numerical Methods					3	5								
MENG 101	Engineering Mechanics I - Statics									2	4				
MENG 102	Engineering Mechanics II - Dynamics									2	4				
PHYS 101	Physics I					4	7								
PHYS 102	Physics II					4	7								
Total Engineering Requirements		0	0	0	0	29	49	3	5	16	28	0	0	0	0
Program Requirements															
ECEN 202	Fundamentals of Electrical Engineering									3	5				
ECEN 203	Fundamentals of Computer Engineering									3	5				
ECEN 207	Fundamentals of Data Structures & Algorithms									3	5				
ECEN 303	Introduction to Computer Systems									3	5				
ECEN 304 / MENG 322	Electric Machines									3	5				
ECEN 305	Signals & Systems									3	5				
ECEN 312	Analysis and Design of Analog Circuits											3	5		
ECEN 313	Analysis and Design of Digital Circuits											3	5		
ECEN 331	Fundamentals of Communications											3	5		
ECEN 364	Computer Systems Software									3	5				
ECEN 351	Fundamentals of Control									3	5				

Course Code	Course Title	Hum. & Social Sci.		Business Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.		Eng. App. & Design		Project & PT	
		C	EC	C	EC	C	EC	C	EC	C	EC	C	EC	C	EC
ECEN 391	Practical Training													3	6
ECEN 401	Introduction to Computer Networks											3	5		
ECEN 402	Introduction to Computer Architecture											3	5		
ECEN 404	Introduction to Databases Systems									3	5				
ECEN 408	Advanced Computer Architecture											3	5		
ECEN 409	Microprocessor Systems Design											3	5		
ECEN 411	Machine Intelligence											3	5		
ECEN 417	Operating Systems											3	5		
ECEN 441	Embedded Systems Engineering											3	5		
ECEN 430	Introduction to Parallel Computing											3	5		
ECEN 442	Embedded Real-Time Systems											3	5		
ECEN 462	Introduction to Computer Security											3	5		
ECEN 493	Graduation Project I													3	6
ECEN 495	Graduation Project II													3	6
ECEN XXX	Technical Electives											3	5		
ECEN XXX	Technical Electives											3	5		
ECEN XXX	Technical Electives											3	5		
ECEN XXX	Technical Electives											3	5		
ENTR 301	Selected Topics in Entrepreneurship			3	5										
IENG 241	Engineering Economics			3	5										
NSCI 102	Selected Topics in Environmental Science							3	5						
Total Program Requirements		0	0	6	10	0	0	3	5	27	45	51	85	9	18
Total CE		16	25	6	10	29	49	6	10	43	73	51	85	9	18
Course Category %		10.0%		3.8%		18.1%		3.8%		26.9%		31.9%		5.6%	

مادة (13): مصفوفة مخرجات المقررات الدراسية ومدى ملائمتها للمخرجاتها
المستهدفة للبرنامج:

CE Program Requirements Courses - ILOs matrix - Part 1

CE Program		a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11
University Requirements																													
ENGL 001	Intensive English																												
ENGL 101	English I																												
ENGL 102	English II																												
ENGL 201	Writing Skills										X																		
ENGL 202	Communication and Presentation Skills										X											X							
HUMA 101	Introduction to Scientific & Critical Thinking										X								X		X								
HUMA 102	Introduction to Ethics						X			X	X																		
HUMA 103	Selected Topics in Humanities & Arts									X											X								
SSCI 101	Selected Topics in Egyptian & Arab Heritage									X											X								
SSCI 103	Selected Topics in Social Sciences							X		X											X								
Engineering Requirements																													
CHEM 101	Chemical Principles	X		X																		X							
CSCE 101	Computer & Information Skills		X						X																				
CSCE 201	Introduction to Programming		X			X																					X		
ECEN 101	Electric Circuits				X				X														X						
ENGR 101	Introduction to Engineering Disciplines								X			X	X									X							
ENGR 102	Engineering Design			X															X		X								
MATH 111	Analytical Geometry & Calculus I	X																			X								
MATH 112	Calculus II	X																			X								
MATH 202	Probability & Statistics for Engineers	X				X																						X	
MATH 203	Differential Equations	X																			X								
MATH 301	Linear Algebra	X																			X								
MATH 303	Numerical Methods																												
MENG 101	Engineering Mechanics I - Statics					X						X											X		X				
MENG 102	Engineering Mechanics II - Dynamics					X						X											X		X				
PHYS 101	Physics I	X																											
PHYS 102	Physics II	X																											
Program Requirements																													
ECEN 202	Fundamentals of Electrical Engineering					X						X									X						X		
ECEN 203	Fundamentals of Computer Engineering				X							X	X		X												X		
ECEN 207	Fundamentals of Data Structures & Algorithms															X					X								
ECEN 303	Introduction to Computer Systems		X																		X						X		
ECEN 304 / MENG 322	Electric Machines					X	X																						
ECEN 305	Signals & Systems	X											X								X		X						
ECEN 312	Analysis and Design of Analog Circuits				X	X															X		X						

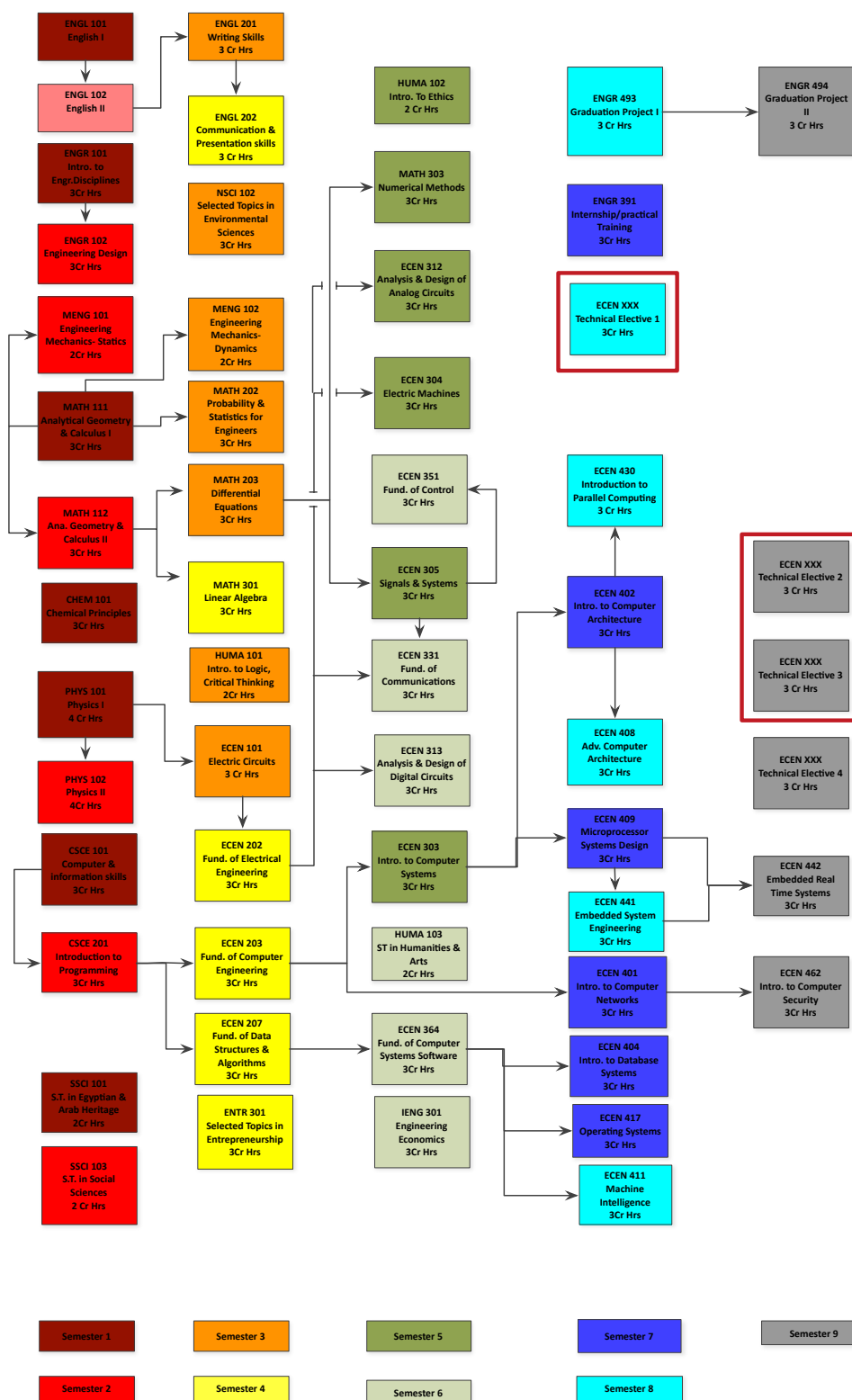
CE Program		a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11
ECEN 313	Analysis and Design of Digital Circuits				x	x							x						x			x							
ECEN 331	Fundamentals of Communications		x										x						x			x							
ECEN 364	Computer Systems Software												x						x										
ECEN 351	Fundamentals of Control				x																			x	x				
ECEN 391	Practical Training					x			x																				
ECEN 401	Introduction to Computer Networks	x			x																								
ECEN 402	Introduction to Computer Architecture				x										x														
ECEN 404	Introduction to Databases Systems															x					x								
ECEN 408	Advanced Computer Architecture				x										x														
ECEN 409	Microprocessor Systems Design												x										x						
ECEN 411	Machine Intelligence					x						x															x		
ECEN 417	Operating Systems				x				x															x		x			
ECEN 441	Embedded Systems Engineering												x												x				
ECEN 430	Introduction to Parallel Computing		x																										
ECEN 442	Embedded Real-Time Systems												x	x											x				
ECEN 462	Introduction to Computer Security				x								x														x		
ECEN 493	Graduation Project I																												
ECEN 495	Graduation Project II																												
ENTR 301	Selected Topics in Entrepreneurship					x			x																				
IENG 241	Engineering Economics								x																				
NSCI 102	Selected Topics in Environmental Science						x			x													x						x
Electives																													
ECEN 427	Software Engineering												x	x															
ECEN 428	Numerical Methods and Mathematical Precision of Floating Numbers		x																x										
ECEN 429	Compiler Construction				x																								
ECEN 436	Digital Signal Processing					x										x				x									
ECEN 444	Image Processing and Bio-image Informatics					x															x								
ECEN 445	Mechatronic Design				x																					x			
ECEN 450	Selected Topics in Computer Engineering		x															x									x		
ECEN 433	Wireless Communication			x					x										x								x		
COUNT		11	6	3	12	13	3	2	7	5	2	3	5	10	2	3	4	1	8	7	5	7	9	2	6	6	3	1	1

CE Program Requirements Courses - ILOs matrix - Part 2

CE Program		b1 2	b1 3	b1 4	b1 5	b1 6	b1 7	b1 8	c1 2	c2 3	c3 4	c4 5	c5 6	c6 7	c7 8	c8 9	c9 0	c10 1	c11 2	c12 3	c13 4	c14 5	c15 6	d1 1	d2 2	d3 3	d4 4	d5 5	d6 6	d7 7	d8 8	d9 9				
	University Requirements																																			
ENGL 001	Intensive English																																			
ENGL 101	English I																																			
ENGL 102	English II																																			
ENGL 201	Writing Skills																		X								X									
ENGL 202	Communication and Presentation Skills														X				X						X	X										
HUMA 101	Introduction to Scientific & Critical Thinking												X														X				X					
HUMA 102	Introduction to Ethics																X														X					
HUMA 103	Selected Topics in Humanities & Arts																									X		X				X				
SSCI 101	Selected Topics in Egyptian & Arab Heritage																											X		X		X				
SSCI 103	Selected Topics in Social Sciences															X												X			X					
	Engineering Requirements																																			
CHEM 101	Chemical Principles							X					X																							
CSCE 101	Computer & Information Skills													X														X								
CSCE 201	Introduction to Programming													X														X								
ECEN 101	Electric Circuits								X		X																									
ENGR 101	Introduction to Engineering Disciplines			X																																
ENGR 102	Engineering Design									X	X	X																								
MATH 111	Analytical Geometry & Calculus I							X																												
MATH 112	Calculus II							X																												
MATH 202	Probability & Statistics for Engineers							X						X																						
MATH 203	Differential Equations							X																												
MATH 301	Linear Algebra							X						X																						
MATH 303	Numerical Methods																																			
MENG 101	Engineering Mechanics I - Statics								X																											
MENG 102	Engineering Mechanics II - Dynamics								X																											
PHYS 101	Physics I							X					X																							
PHYS 102	Physics II							X					X																							
	Program Requirements																																			
ECEN 202	Fundamentals of Electrical Engineering																																			
ECEN 203	Fundamentals of Computer Engineering													X																						
ECEN 207	Fundamentals of Data Structures & Algorithms			X																			X													
ECEN 303	Introduction to Computer Systems							X					X																X							
ECEN 304 / MENG 322	Electric Machines		X																X			X														
ECEN 305	Signals & Systems									X																										
ECEN 312	Analysis and Design of Analog Circuits								X																											
ECEN 313	Analysis and Design of Digital Circuits											X																								
ECEN 331	Fundamentals of Communications																										X									

CE Program		b1	b1	b1	b1	b1	b1	b1	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	d1	d2	d3	d4	d5	d6	d7	d8	d9
ECEN 364	Computer Systems Software		x								x																	x					
ECEN 351	Fundamentals of Control												x						x	x							x						
ECEN 391	Practical Training							x										x	x								x						
ECEN 401	Introduction to Computer Networks		x						x																			x					
ECEN 402	Introduction to Computer Architecture					x	x			x																						x	
ECEN 404	Introduction to Databases Systems			x																		x											
ECEN 408	Advanced Computer Architecture						x			x		x																				x	
ECEN 409	Microprocessor Systems Design				x							x	x															x					
ECEN 411	Machine Intelligence					x						x																					
ECEN 417	Operating Systems			x																		x											
ECEN 441	Embedded Systems Engineering		x	x																		x								x			
ECEN 430	Introduction to Parallel Computing					x																x								x			
ECEN 442	Embedded Real-Time Systems																					x	x							x			
ECEN 462	Introduction to Computer Security	x											x	x																			
ECEN 493	Graduation Project I													x			x		x	x						x	x			x	x	x	
ECEN 495	Graduation Project II													x			x		x	x						x	x			x	x	x	
ENTR 301	Selected Topics in Entrepreneurship																	x	x						x			x					
IENG 241	Engineering Economics		x					x																								x	
NSCI 102	Selected Topics in Environmental Science																															x	
	Electives																																
ECEN 427	Software Engineering		x												x															x			
ECEN 428	Numerical Methods and Mathematical Precision of Floating Numbers							x							x																		
ECEN 429	Compiler Construction	x													x													x					
ECEN 436	Digital Signal Processing														x													x				x	
ECEN 444	Image Processing and Bio-image Informatics							x				x																					
ECEN 445	Mechatronic Design		x												x																		
ECEN 450	Selected Topics in Computer Engineering							x				x																					
ECEN 433	Wireless Communication																															x	
COUNT		2	6	3	3	1	3	2	13	4	5	2	14	11	5	0	4	1	4	7	2	5	2	1	3	2	6	8	3	7	3	4	9

Course Dependency Flow Diagram



CE Sample Study Plan

CE Study Plan (Year 1)

Semester 1							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 101	English I	0	0	50	A minimum score of 500 on the TOEFL. Students will also be required to pass a written NU test (essay).		
MATH 111	Analytical Geometry & Calculus I	3	5	125	None		
CSCE 101	Computer & Information Skills	3	5	125	None		
ENGR 101	Introduction to Engineering Disciplines	3	5	125	None		
CHEM 101	Chemical Principles	3	5	125	None		
PHYS 101	Physics I	4	7	175	None		
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3	75	None		
TOTAL		18	30	800			
Semester 2							
ENGL 102	English II	0	0	50	ENGL 101 - English I		
MATH 112	Calculus II	3	5	125	MATH 111 - Analytical Geometry & Calculus I		
CSCE 201	Introduction to Programming	3	5	125	None		
ENGR 102	Engineering Design	3	5	125	ENGR 101 - Introduction to Engineering Disciplines		
MENG 101	Engineering Mechanics I - Statics	2	4	100	MATH 111 - Analytical Geometry & Calculus I		
PHYS 102	Physics II	4	7	175	PHYS 101 - Physics I		
SSCI 103	Selected Topics in Social Sciences	2	3	75	None		
TOTAL		17	29	775			

CE Study Plan (Year 2)

	Semester 3						
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 201	Writing Skills	3	5	125	ENGL 102 - English II - or IELTS 6.5 or equivalent		
MENG 102	Engineering Mechanics II - Dynamics	2	4	100	MENG 101 - Engineering Mechanics I - Statics		
MATH 203	Differential Equations	3	5	125	MATH 112 - Calculus II		
MATH 202	Probability & Statistics for Engineers	3	5	125	MATH 112 - Calculus II		
HUMA 101	Introduction to Scientific & Critical Thinking	2	3	75	None		
NSCI 102	Selected Topics in Environmental Science	3	5	125	None		
ECEN 101	Electric Circuits	3	5	125	PHYS 101 - Physics I		
TOTAL		19	32	800			
	Semester 4						
ENGL 202	Communication and Presentation Skills	3	5	125	ENGL 201 - Writing Skills		
MATH 301	Linear Algebra	3	5	125	MATH 112 - Calculus II		
ENTR 301	Selected Topics in Entrepreneurship	3	5	125	NONE		
ECEN 207	Fundamentals of Data Structures & Algorithms	3	5	125	CSCE 201 - Introduction to Programming		
ECEN 202	Fundamentals of Electrical Engineering	3	5	125	MATH 203 - Differential Equations	ECEN 101 - Electric Circuits	
ECEN 203	Fundamentals of Computer Engineering	3	5	125	CSCE 101 - Computer & Information Skills		
TOTAL		18	30	750			

CE Study Plan (Year 3)

	Semester 5						
Code	Title	CH	ECTS	SWL	Prerequisite		
MATH 303	Numerical Methods	3	5	125	MATH 203 - Differential Equations		
ECEN 312	Analysis and Design of Analog Circuits	3	5	125	ECEN 202 - Fundamentals of Electrical Engineering		
ECEN 303	Introduction to Computer Systems	3	5	125	ECEN 203 - Fundamentals of Computer Engineering		
ECEN 304 / MENG 322	Electric Machines	3	5	125	ECEN 202 - Fundamentals of Electrical Engineering		
ECEN 305	Signals & Systems	3	5	125	MATH 203 - Differential Equations		
HUMA 102	Introduction to Ethics	2	3	75	None		
TOTAL		17	28	700			
	Semester 6						
ECEN 313	Analysis and Design of Digital Circuits	3	5	125	ECEN 202 - Fundamentals of Electrical Engineering		
ECEN 364	Computer Systems Software	3	5	125	ECEN 207 - Fundamentals of Data Structures & Algorithms		
ECEN 351	Fundamentals of Control	3	5	125	ECEN 305 - Signals & Systems		
ECEN 331	Fundamentals of Communications	3	5	125	ECEN 202 - Fundamentals of Electrical Engineering	ECEN 305 - Signals & Systems	
HUMA 103	Selected Topics in Humanities & Arts	2	3	75	None		
IENG 241	Engineering Economics	3	5	125	None		
TOTAL		17	28	700			

CE Study Plan (Year 4)

Semester 7							
Code	Title	CH	ECTS	SWL	Prerequisite		
ECEN 401	Introduction to Computer Networks	3	5	125	ECEN 203 - Fundamentals of Computer Engineering		
ECEN 402	Introduction to Computer Architecture	3	5	125	ECEN 303 - Introduction to Computer Systems		
ECEN 404	Introduction to Databases Systems	3	5	125	ECEN 364 - Computer Systems Software		
ECEN 409	Microprocessor Systems Design	3	5	125	ECEN 303 - Introduction to Computer Systems		
ECEN 417	Operating Systems	3	5	125	ECEN 364 - Computer Systems Software		
ECEN 391	Practical Training	3	6	150	After 6th semester		
TOTAL		18	31	775			
Semester 8							
ECEN 430	Introduction to Parallel Computing	3	5	125	ECEN 402 - Introduction to Computer Architecture		
ECEN 408	Advanced Computer Architecture	3	5	125	ECEN 402 - Introduction to Computer Architecture		
ECEN 411	Machine Intelligence	3	5	125	ECEN 364 - Computer Systems Software		
ECEN 441	Embedded Systems Engineering	3	5	125	ECEN 409 - Microprocessor Systems Design		
ECEN XXX	Technical Electives	3	5	125			
ECEN 493	Graduation Project I	3	6	180	Senior Standing		
TOTAL		18	31	805			

CE Study Plan (Year 5)

Semester 9						
Code	Title	CH	ECTS	SWL	Prerequisite	
ECEN 462	Introduction to Computer Security	3	5	125	ECEN 401 - Introduction to Computer Networks	
ECEN 442	Embedded Real-Time Systems	3	5	125	ECEN 409 - Microprocessor Systems Design	
ECEN XXX	Technical Electives	3	5	125		
ECEN XXX	Technical Electives	3	5	125		
ECEN XXX	Technical Electives	3	5	125		
ECEN 495	Graduation Project II	3	6	180	ECEN 493 - Graduation Project I	
TOTAL		18	31	805		

CE Electives

Electives						
Code	Title	CH	ECTS	SWL	Prerequisite	
ECEN 427	Software Engineering	3	5	125	ECEN 364 - Computer Systems Software	
ECEN 428	Numerical Methods and Mathematical Precision of Floating Numbers	3	5	125	ECEN 364 - Computer Systems Software	
ECEN 429	Compiler Construction	3	5	125	ECEN 364 - Computer Systems Software	
ECEN 433	Wireless Communication	3	5	125	ECEN 462 - Introduction to Computer Security	
ECEN 436	Digital Signal Processing	3	5	125	ECEN 305 - Signals & Systems	
ECEN 444	Image Processing and Bio-image Informatics	3	5	125	ECEN 305 - Signals & Systems	
ECEN 445	Mechatronic Design	3	5	125	ECEN 441 - Embedded Systems Engineering	
ECEN 450	Selected Topics in Computer Engineering	3	5	125	None	

توصيف مقررات برنامج هندسة الحاسبات

(CE) - ECEN 202

Course Title	Fundamentals of Electrical Engineering	
Course Code	ECEN 202	
Prerequisites	MATH 203 - Differential Equations	ECEN 101 - Electric Circuits
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	1.25
	TOTAL	5.00
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)/ semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description This course covers topics that are fundamental to a wide variety of electrical engineering systems. Topics include circuit analysis techniques, passive and active components modeling, operational amplifiers, energy storage elements, power analysis, time-response of first- and second-order systems, sinusoidal steady-state response, frequency domain analysis, and filters. Other topics may include: diodes and transistors, basic noise analysis, transformers, pole-zero plotting and analysis in the complex plane. Relevant lab experiments are conducted.		

(CE) - ECEN 203

Course Title	Fundamentals of Computer Engineering	
Course Code	ECEN 203	
Prerequisites	CSCE 101 - Computer & Information Skills	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)/ Semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description This course introduces basic issues in design and verification of modern digital systems. Topics include: Boolean algebra, digital number systems and computer arithmetic, combinational and sequential logic design and optimization, register-transfer design, basic processor organization and instruction set issues, assembly language programming and debugging, and a hardware description language. Emphasis is on the levels of abstraction and hardware description language methods that allow designers to cope with hugely complex systems, and on connections to practical hardware implementation problems. Students are introduced to computer-aided digital design software.		

(CE) - ECEN 207

Course Title	Fundamentals of Data Structures & Algorithms	
Course Code	ECEN 207	
Prerequisites	CSCE 201 - Introduction to Programming	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)/ Semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description		
Fundamental concepts of data structures and algorithms for representing and processing information; including the use of linked lists, stacks, queues, directed graphs and trees. Analysis of algorithms, sorting, searching and hashing techniques.		

(CE) - ECEN 312

Course Title	Analysis and Design of Analog Circuits	
Course Code	ECEN 312	
Prerequisites	ECEN 202 - Fundamentals of Electrical Engineering	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)/ Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The course introduces the student to the fundamentals of the analysis and design of basic analog circuits. Topics include: operational amplifier design, basic amplifier feedback theory, frequency stability and compensation, dc bias calculations and circuits, MOSFET and BJT large- and small-signal device models, small-signal gain and frequency response characteristics of amplifiers, large-signal characteristics and non-idealities. In the hardware laboratory the student will gain experience designing, building, and characterizing analog circuits. The students will also learn how to use the SPICE circuit simulation program to compare actual and simulated performance.		

(CE) - ECEN 313

Course Title	Analysis and Design of Digital Circuits	
Course Code	ECEN 313	
Prerequisites	ECEN 202 - Fundamentals of Electrical Engineering	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)/ Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description		
Overview of digital logic design. Implementation technologies, timing in combinational and sequential circuits, basic arithmetic units, EDA tools, introduction to simulation and synthesis using VHDL.		

(CE) - ECEN 303

Course Title	Introduction to Computer Systems	
Course Code	ECEN 303	
Prerequisites	ECEN 203 - Fundamentals of Computer Engineering	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)/ Semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description This course provides a programmer's view of how computer systems execute programs, store information, and communicate. It enables students to become more effective programmers, especially in dealing with issues of performance, portability and robustness. It also serves as a foundation for courses on compilers, networks, operating systems, and computer architecture, where a deeper understanding of systems-level issues is required. Topics covered include: machine-level code and its generation by optimizing compilers, performance evaluation and optimization, computer arithmetic, memory organization and management, networking technology and protocols, and supporting concurrent computation.		

(CE) - ECEN 304

Course Title	Electric Machines	
Course Code	ECEN 304 / MENG 322	
Prerequisites	ECEN 202 - Fundamentals of Electrical Engineering	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description This course covers polyphase systems, magnetic circuit concepts, principles of electromechanical energy conversion, introduction to transformers, dc machines, induction machines, synchronous machines, stepper motors, electric drives, rectifiers and inverters.		

(CE) - ECEN 305

Course Title	Signals & Systems	
Course Code	ECEN 305	
Prerequisites	MATH 203 - Differential Equations	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The objective of this course is to provide students with an understanding of the relationships between mathematical tools and properties of real signals and systems. Continuous and discrete-time signals and systems are treated in a unified manner through the concept of sampling. The course covers the basic concepts and tools needed to perform time and frequency domain transform analyses of signals and linear time-invariant systems, including: impulse and step response and convolution; Fourier transforms and filtering; Laplace transforms, feedback and stability; and a brief introduction to z-transforms in the context of digital filtering.		

(CE) - ECEN 331

Course Title	Fundamentals of Communications	
Course Code	ECEN 331	
Prerequisites	ECEN 202 - Fundamentals of Electrical Engineering	ECEN 305 - Signals & Systems
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Fundamental analog and digital communications concepts are presented together with supporting theoretical foundations and practical applications. Signals and bandwidth concepts, spectra, basics of electronics, information and coding, modulation, multiplexing, transmission systems, transmission media, analog versus digital communications, computer networks, and switching techniques.		

(CE) - ECEN 351

Course Title	Fundamentals of Control	
Course Code	ECEN 351	
Prerequisites	ECEN 305 - Signals & Systems	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)/ Semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The course is an introduction to the fundamental principles and methodologies of classical feedback control and its applications. Topics include analytical, graphical and computer-aided (MATLAB) techniques for analyzing and designing automatic control systems; analysis of performance, stability criteria, realizability, and speed of response; compensating methods in the frequency domain, root-locus and frequency response design, and pole-zero synthesis techniques; robust controller design; systems with delay and computer control systems; transfer function and state space modeling of linear systems, nonlinearities in control systems; and control engineering software (MATLAB).		

(CE) - ECEN 364

Course Title	Computer Systems Software	
Course Code	ECEN 364	
Prerequisites	ECEN 207 - Fundamentals of Data Structures & Algorithms	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)/ Semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description Basics of assembly language programming. Macros. System stack and procedure calls. Techniques for writing assembly language programs. The features of IA-32 based PC will be used. Interfaces between high-level languages and assembly codes will be discussed.		

(CE) - ECEN 391

Course Title	Practical Training	
Course Code	ECEN 391	
Prerequisites	After 6th semester	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 7)	
Contact Hours	Lectures	-
	Tutorials	-
	Labs	-
	TOTAL	0
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL)	150	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description A minimum of four weeks of practical training in off-campus sites elected by the program. Students are required to submit a recognition letter from the site where they received their training, in addition, a report and a presentation are submitted as well. Course is a Pass/Fail course.		
Lab and Tutorials Not Applicable		
Literature Not Applicable		

(CE) - ECEN 401

Course Title	Introduction to Computer Networks	
Course Code	ECEN 401	
Prerequisites	ECEN 203 - Fundamentals of Computer Engineering	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description This course introduces the fundamental concepts of data networks. Underlying engineering principles of computer networks and integrated digital networks are discussed. Topics include: data networks overview; OSI layers; data link protocol; flow control, congestion control, routing; local area networks (Ethernet, Token Ring and FDDI); transport layer; Introduction to high-speed networks and performance evaluation techniques.		

(CE) - ECEN 402

Course Title	Introduction to Computer Architecture	
Course Code	ECEN 402	
Prerequisites	ECEN 303 - Introduction to Computer Systems	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) /Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description This course introduces the basic hardware structure of a programmable computer and the basic laws underlying performance evaluation. The student learns how to design the control and data path hardware for a processor, how to make machine instructions execute simultaneously through pipelining and simple superscalar execution, and how to design fast memory and storage systems. The principles presented in lecture are reinforced in the laboratory through design and simulation of a register transfer (RT) implementations in verilog.		

(CE) - ECEN 404

Course Title	Introduction to Databases Systems	
Course Code	ECEN 404	
Prerequisites	ECEN 364 - Computer Systems Software	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description Data models and database design. Modeling the real world: structures, constraints, and operations. The entity relationship to data modeling (including network hierarchical and object-oriented), emphasis on the relational model. Use of existing database systems for the implementation of information systems.		

(CE) - ECEN 408

Course Title	Advanced Computer Architecture	
Course Code	ECEN 408	
Prerequisites	ECEN 402 - Introduction to Computer Architecture	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description This course examines computer design trade-offs. The topics covered include: advanced processor designs, such as superscalar and out-of-order execution, advanced memory systems, such as non-blocking caches, and multiporting/banking and alternative virtual memory implementations, I/O systems, interconnects, introduction to multiprocessor architectures, performance and cost metrics, and benchmarking.		

(CE) - ECEN 409

Course Title	Microprocessor Systems Design	
Course Code	ECEN 409	
Prerequisites	ECEN 303 - Introduction to Computer Systems	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Structure and timing of typical microprocessors. Sample microprocessor families. Memories, UARTS, timer/counters, serial devices and related devices. MUX and related control structures for building systems. Interrupt programming. Hardware/software design tradeoffs.		

(CE) - ECEN 411

Course Title	Machine Intelligence	
Course Code	ECEN 411	
Prerequisites	ECEN 364 - Computer Systems Software	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description		
The course covers techniques and applications of artificial intelligence and machine learning; representation retrieving and application of knowledge for problem solving. Topics typically include hypothesis exploration, theorem proving, vision, Bayesian learning, decision trees, genetic algorithms, neural networks.		

(CE) - ECEN 417

Course Title	Operating Systems	
Course Code	ECEN 417	
Prerequisites	ECEN 364 - Computer Systems Software	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description This course provides an overview of fundamental operating system principles, complemented with discussions of concrete modern systems to help you understand how these principles are applied in real OSs . Topics covered include an overview of the components of an operating system, mutual exclusion and synchronization, implementation of processes, scheduling algorithms, memory management and file systems. The course has a strong project component intended to provide essential experience in designing and implementing complex systems and working as part of a team.		

(CE) - ECEN 441

Course Title	Embedded Systems Engineering	
Course Code	ECEN 441	
Prerequisites	ECEN 409 - Microprocessor Systems Design	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Topics covered include embedded computing platforms (hardware, microcontroller instruction sets, software), interacting with the external world (analog I/O, serial ports, control), system-level engineering (design cycle, architectural patterns), real time operation (timers, interrupts, concurrency), constraints and optimization (economics, power, performance) and a survey of techniques important for building systems that work in the real world (debug, test, robust design, dependability). Hands-on experience with a 16-bit microcontroller module reinforces core skills.		

(CE) - ECEN 427

Course Title	Software Engineering	
Course Code	ECEN 427	
Prerequisites	ECEN 364 - Computer Systems Software	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The course covers concepts of software processes, implantation techniques, and project management. It focuses on several aspects of the software lifecycle that have significant influence on the overall quality of the software system including techniques and approaches to requirement engineering, software architecture, software design, quantitative measurement and assessment of the system during implementation, testing, and maintenance, and the role of verification and validation in assuring software quality.		

(CE) - ECEN 428

Course Title	Numerical Methods and Mathematical Precision of Floating Numbers	
Course Code	ECEN 428	
Prerequisites	ECEN 364 - Computer Systems Software	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description		
Introduction to numerical methods; numerical differentiation, numerical integration, solution of ordinary and partial differential equations. Consequences of limited precision computing. Students write programs in C++, C, or Matlab using methods presented in class.		

(CE) - ECEN 429

Course Title	Compiler Construction	
Course Code	ECEN 429	
Prerequisites	ECEN 364 - Computer Systems Software	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Overview of compilers and context-free languages, top-down parsing, LL(1) parser construction, translation grammars, implementation of lexical analyzer, parser and translator, compiler optimization, error handling, and recovery.		

(CE) - ECEN 430

Course Title	Introduction to Parallel Computing	
Course Code	ECEN 430	
Prerequisites	ECEN 402 - Introduction to Computer Architecture	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring/Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description		
Introduction to parallel computing for scientists and engineers. Shared memory parallel architectures and programming, distributed memory, message-passing data-parallel architectures, and programming.		

(CE) - ECEN 433

Course Title	Wireless Communication	
Course Code	ECEN 433	
Prerequisites	ECEN 462 - Introduction to Computer Security	
Classification within the curriculum	Elective	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description In this course wireless communication channels are introduced, and their peculiarities such as fading and co-channel interference are emphasized. Solutions to combat the problems are described, covering equalization and detection, coding and diversity ideas. Examples will be chosen from existing wireless standards (e.g., W-CDMA). The course also covers basic communication theory.		

(CE) - ECEN 436

Course Title	Digital Signal Processing	
Course Code	ECEN 436	
Prerequisites	ECEN 305 - Signals & Systems	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The course addresses the mathematics, implementation, design and application of the digital signal processing algorithms used in areas such as multimedia telecommunications and speech and image processing. Topics include discrete-time signals and systems, discrete-time Fourier transforms, Z- transforms and fast Fourier transform, digital filter design and implementation, and multi-rate signal processing. The course also includes introductory discussions of 2-dimensional signal processing, linear prediction, adaptive filtering, and selected application areas. Lectures are supplemented with exercises using MATLAB.		

(CE) - ECEN 442

Course Title	Embedded Real-Time Systems	
Course Code	ECEN 442	
Prerequisites	ECEN 409 - Microprocessor Systems Design	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description This practical hands-on course introduces the various building blocks and principles behind embedded real-time systems. The course covers the integrated hardware and software aspects of embedded processor architectures, along with topics such as real-time, resource/device and memory management, interaction with devices (buses, memory architectures, memory management, device drivers), concurrency (software and hardware interrupts, timers), real-time principles (multi-tasking, scheduling, synchronization), implementation trade-offs, profiling and code optimization (for performance and memory), embedded software (exception handling, loading, mode-switching, programming embedded systems). Through a series of laboratory exercises with state-of-the art embedded processors and industry-strength development tools, students will acquire skills in the design/implementation/debugging of core embedded real-time functionality.		

(CE) - ECEN 444

Course Title	Image Processing and Bio-image Informatics	
Course Code	ECEN 444	
Prerequisites	ECEN 305 - Signals & Systems	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description This course gives an overview of biological and biomedical imaging modalities, such as fluorescent microscopy, electron microscopy, magnetic resonance imaging, ultrasound and others. The focus is on automating and solving the fundamental tasks required for the interpretation of these images, including deconvolution, registration, segmentation, pattern recognition, and modeling, as well as tools needed to solve those tasks (such as Fourier and wavelet methods). The discussion of these topics will draw on many fields including statistics, signal processing, and machine learning.		

(CE) - ECEN 445

Course Title	Mechatronic Design	
Course Code	ECEN 445	
Prerequisites	ECEN 441 - Embedded Systems Engineering	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Mechatronics is the synergistic integration of mechanism, electronics, and computer control to achieve a functional system. The course emphasizes system integration in which small teams of students configure, design and implement a succession of mechatronic subsystems, leading to a main project. Lecture will complement the laboratory experience with the operational principles, and integrated design issues associated with mechanism, electronics and control components. Topics include: mechanisms, actuators, motor drives, sensors and electronic interfaces, microcontroller hardware and programming and basic controllers.		

(CE) - ECEN 450

Course Title	Selected Topics in Computer Engineering	
Course Code	ECEN 450	
Prerequisites	None	
Classification within the curriculum	Elective	
Course Position in Study Plan	Spring/Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description This course is tailored to introduce students to the latest advances in the various fields in computer engineering, and/or to focus on a specific area of particular interest to the discipline.		

(CE) - ECEN 462

Course Title	Introduction to Computer Security	
Course Code	ECEN 462	
Prerequisites	ECEN 401 - Introduction to Computer Networks	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / Semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description This course is an introduction to techniques for defending against hostile adversaries in modern computer systems and computer networks. Topics covered include operating system security; network security, cryptography and cryptographic protocols, firewalls, network denial-of-service attacks and defenses; user authentication technologies; security for network servers; web security; and security for mobile code technologies, such as Java and Javascript.		

(CE) - ECEN 493

Course Title	Graduation Project I	
Course Code	ECEN 493	
Prerequisites	Senior Standing	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring (Semester 8)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	-
	TOTAL	2.5
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL)	180	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description		
Application-oriented capstone project to show competence in major academic area, where an independent research project is conducted under the guidance of a faculty member in the CE program. The research should contribute to the advancement of knowledge in the field. Written report and formal presentation are required.		
Lab and Tutorials		
Not Applicable		
Literature		
Not Applicable		

(CE) - ECEN 495

Course Title	Graduation Project II	
Course Code	ECEN 495	
Prerequisites	ECEN 493 - Graduation Project I	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 9)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	-
	TOTAL	2.5
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL)	180	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description The continuation and completion of the capstone project.		
Lab and Tutorials Not Applicable		
Literature Not Applicable		

(CE) - ENTR 301

Course Title	Selected Topics in Entrepreneurship	
Course Code	ENTR 301	
Prerequisites	NONE	
Classification within the curriculum	Compulsory (All Tracks)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Business	
Topic Level	Program Requirements	
Description In this course, students get an overview about the definition of entrepreneurship, examples of successful innovations, and the prospects of starting a company. The course covers idea generation and identifying opportunities, business model canvas, and an overview of some business fundamentals such as types of businesses and business functions, in addition to communication and presentation skills.		

(CE) - IENG 241

Course Title	Engineering Economics	
Course Code	IENG 241	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Business	
Topics Level	Program Requirements	
Description		
The main aim of this course is make the students acquainted with rational meaningful approaches to evaluating economically different (alternatives) investment opportunities while accomplishing given objectives. The course will also provide the students with the required tools and techniques to consider economic and non-economic factors in evaluating a wide range of industrial and business applications.		
Lab and Tutorials		
The course requires practice and problem solving training during tutorials		
Literature		
- Fraser, N. M., Jewkes, E. M., Bernhardt I. & Tajima, M., Global Engineering Economics: Financial Decision Making for Engineers, 4th Edition, Pearson Education, 2009. - Chan S. Park, Fundamentals of Engineering Economics, 3rd Edition, Pearson Education, ISBN 13:978-0273772910		

(CE) - NSCI 102

Course Title	Selected Topics in Environmental Science	
Course Code	NSCI 102	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Culture	
Topic Level	Program Requirements	
Description		
A course in any of the fields of environmental sciences related to the discipline it is offered to.		

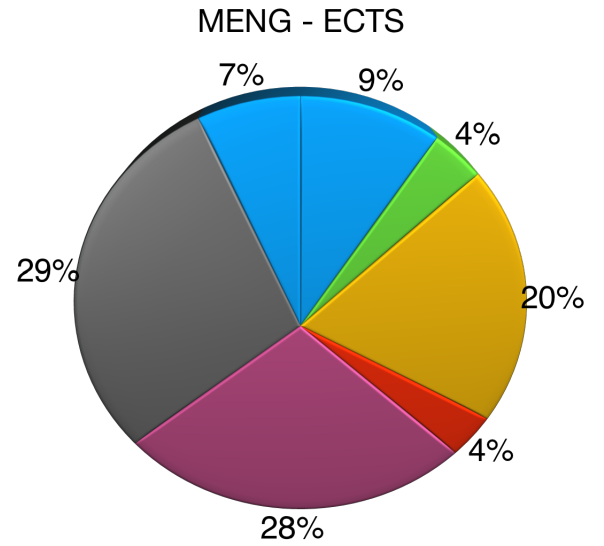
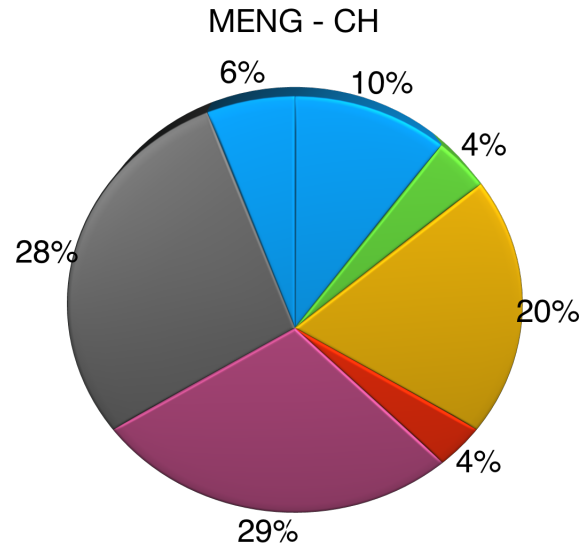
الباب الثامن

برنامج الهندسة الميكانيكية

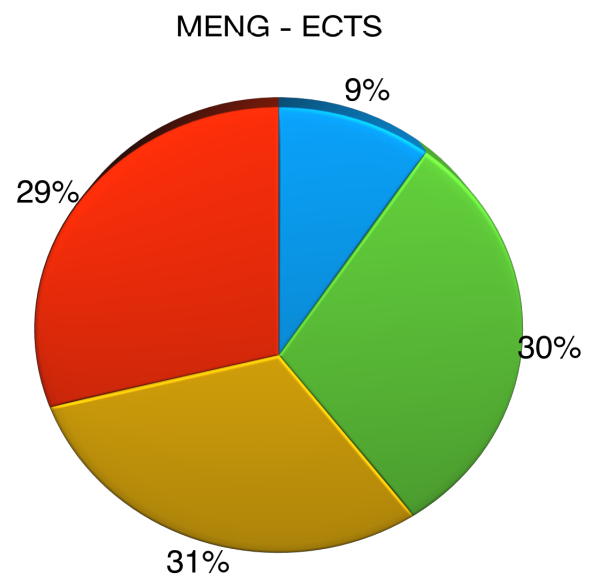
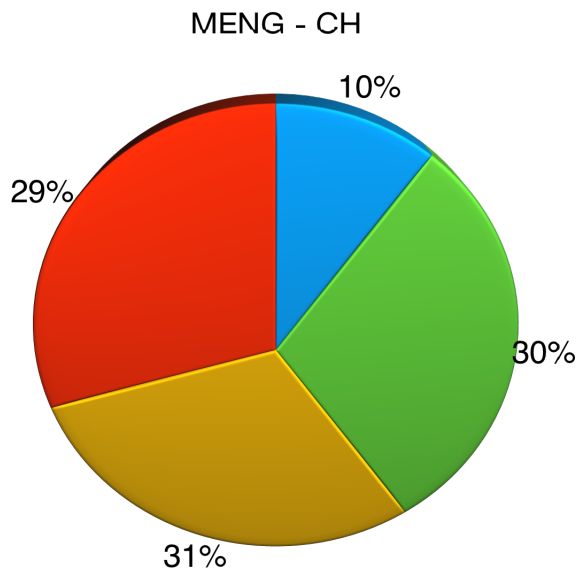
الهندسة الميكانيكية			اسم البرنامج			
هندسة الميكاترونات			اسم التخصصات			
هندسة العلوم الحرارية والطاقة						
هندسة التصميم الميكانيكي			الكلية			
الهندسة والعلوم التطبيقية			الجامعة			
جامعة النيل الأهلية			عدد ساعات الاتصال			
معمل	تمارين	محاضرات				
36	30	137.5				
160			(CH) الساعات المعتمدة			
270			(ECTS) النقاط المعتمدة			
59			عدد المقررات			
توزيع المقررات طبقاً لمتطلبات مستويات التعلم						
ECTS			CH			
25			16			
82			48			
85			49			
78			47			
توزيع المقررات طبقاً لفئات المهارات والمعارف						
ECTS			CH			
Track 3	Track 2	Track 1	Track 3	Track 2	Track 1	
25	25	25	16	16	16	العلوم الاجتماعية والانسانية
10	10	10	6	6	6	إدارة الأعمال
54	54	49	32	32	29	الرياضيات والعلوم الأساسية
10	10	10	6	6	6	الثقافة الهندسية
75	78	78	44	46	46	العلوم الهندسية الأساسية
78	75	80	47	45	48	التطبيقات الهندسية والتصميم
18	18	18	9	9	9	المشروعات والتدريب الميداني

بيانات إحصائية

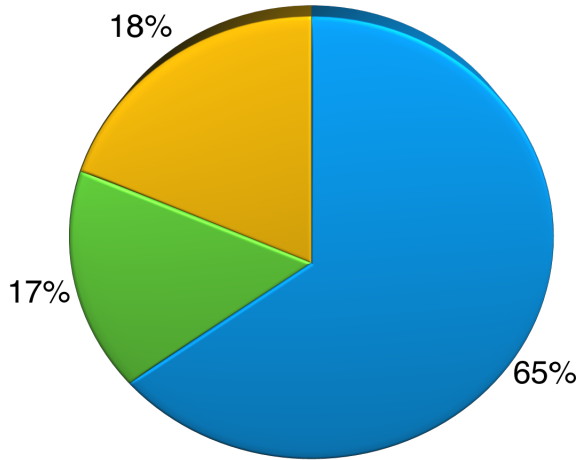
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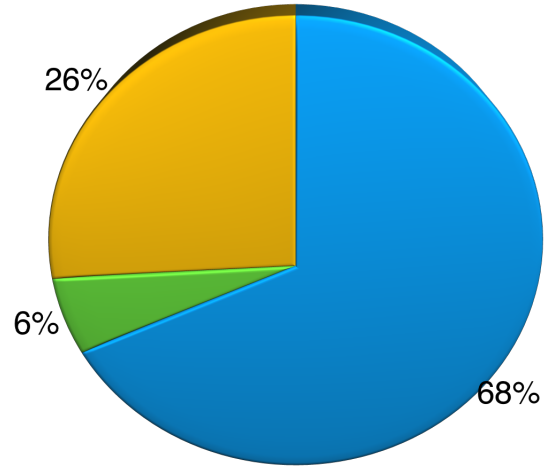
● University ● School ● Program - Gen ● Program - Spec



University - School - Program



Program Only



مادة (1): رسالة البرنامج:

يهدف قسم الهندسة الميكانيكية إلى توفير المستوى التعليمي المتميز للطلاب، ووضع برامج بحثية قوية لتعزيز شراكة وثيقة مع الصناعة، بهدف توفير الخدمات الهندسية المتخصصة للمجتمع الصناعي في مصر وخارجها. ويلتزم القسم في تحقيقه لرسائلته بتحسين المستمر في الجودة الشاملة للتدريس والبحث العلمي والأكاديمي. كما يتحمل القسم مسؤولية المشاركة في التقدم العلمي والتكنولوجي في مجال تخصصه عن طريق توفير الأساس النظري والعملية والتقني للطلاب ليسمح لهم بممارسة العمل المهني والبحث سواء كان هذا العمل في المجتمع الصناعي أو في المجال الأكاديمي أو في مراكز البحوث والتطوير في المنشآت الصناعية وبحيث يتحول التعليم بالقسم إلى نواة صالحة لإستكمال الدراسات العليا على مستوى الماجستير والدكتوراة. كما يتحمل القسم المسؤولية المهنية لتقديم وسائل التعليم المستمر والتدريب المتخصص للمهندسين العاملين في الصناعة بهدف تنمية قدراتهم وإكسابهم المهارات اللازمة لتتماشى مع النمو المطرد في التكنولوجيا الذي يشهده العالم حالياً.

مادة (2): توصيف البرنامج الدراسي:

يعتمد خريجي أقسام الهندسة الميكانيكية على المستوى العالمي في عملهم على الحواسيب المتطورة، وأجهزة الإستشعار الذكية والتكنولوجيا الإلكترونية لتصميم وتصنيع المنتجات الحديثة بالموصفات العالمية المطلوبة وبالتكلفة المنافسة. ويصاحب التطور المستمر في العلوم والتكنولوجيا زيادة الطلب على المهندسين الميكانيكيين المهرة.

وتماشياً مع معدلات التطور في العلوم والتكنولوجيا الهندسية فإن كلية الهندسية والعلوم التطبيقية بجامعة النيل قامت بتقديم برنامج لإنشاء قسم الهندسة الميكانيكية في الجامعة والذي يقدم برنامجاً يؤدي إلى درجة البكالوريوس في الهندسة الميكانيكية معتمداً نظام الساعات المعتمدة والمتوافق أيضاً مع نظام النقاط الأوروبي. ومن المتعارف عليه حالياً أن الهندسة الميكانيكية تعد من بين الأكثر تنوعاً في حقول الهندسة والذي يؤثر تقريباً في كل جوانب الحياة. ويحتضن القسم حالياً ثلاثة تخصصات أساسية:

1. هندسة الميكاترونيات والروبوتات.
2. هندسة العلوم الحرارية والطاقة المتجددة.
3. هندسة التصميم الميكانيكى.

ويعتمد برنامج الهندسة الميكانيكية على توفير أساساً صلباً للطلاب في التخصصات التي يقدمها. ويتم التركيز أثناء الدراسة (معتمداً على الأساس العلمى والتكنولوجى المكتسب) على التطبيقات العملية الحديثة من خلال خطط معملية مدروسة تمكن الطالب من ربط الأساس النظرى بالجانب العملى فى تخصصات القسم وذلك عن طريق ربط الدراسة الأكاديمية مع إحتياجات الصناعة الحديثة.

مادة (3): أهداف البرنامج:

يهدف البرنامج الدراسى فى قسم الهندسة الميكانيكية بكلية الهندسة والعلوم التطبيقية بجامعة النيل إلى تحقيق المستوى الأكاديمى والتقنى اللازم للطلاب ليتواكب مع النمو المطرد فى التكنولوجيا الحديثة فى المجتمعات المتطورة وذلك عن طريق تعليم الطلاب المبادئ الأساسية والتقنيات الحديثة فى مجال تخصصات القسم مع تدريب الطلاب على ممارسة المنهجية فى التفكير وإستخدام الأساليب الحديثة فى حل المشاكل الهندسية مع دراية شاملة بدور الهندسة الميكانيكية فى نمو المجتمعات الصناعية الحديثة. ولتحقيق هذا فإن البرنامج يهدف إلى أن يكون الخريج:

1. مجهزاً علمياً وتقنياً لممارسة مهنة الهندسة الميكانيكية كمهندس حديث التخرج أو الإلتحاق ببرامج دراسات عليا فى مجالات الهندسة الميكانيكية المختلفة.
2. قادراً على التعرف على المشاكل الهندسية فى مجال تخصصه وتوصيفها بدقة والتعامل معها بمنهجية للوصول إلى حل لهذه المشاكل الهندسية وأن يكون قادراً على التواصل مع الآخرين بهذه النتائج.
3. قادراً على التدرج الوظيفى الناجح فى مجال تخصصه ليتبوأ المناصب القيادية كنتيجة لتمكنه من مهارات العمل المتكامل مع فريق العمل وقدرات التواصل مع الآخرين ومهارات حل المشاكل الهندسية بأسلوب منهجى.
4. مجهزاً للعمل فى مجالات عريضة فى الهندسة الميكانيكية من خلال اكتسابه العلوم والمهارات التقنية فى مجال التخصص الدقيق من خلال المقررات الإلجبارية والاختيارية وكذلك العلوم والمهارات التقنية فى مجالات التخصص العام من خلال المقررات الإلجبارية ومتطلبات قسم الهندسة الميكانيكية بالجامعة.
5. قادراً على تطبيق المعرفة فى مجالات الرياضيات والعلوم والهندسة لتحديد وصياغة وحل المشاكل المتعلقة بمجال الهندسة الميكانيكية.

مادة (4): مواصفات الخريج:

المخرج الرئيسى للبرنامج المقترح هو جيل من المهندسين الميكانيكيين فى تخصصات البرنامج بحيث يكون الخريج على المستوى العام:

1. قادراً على تطبيق المعرفة فى مجالات الرياضيات والعلوم والهندسة لتحديد وصياغة وحل المشاكل المتعلقة بمجال الهندسة الميكانيكية.

2. قادراً على استخدام التقنيات والمهارات والأدوات الهندسية الحديثة اللازمة لممارسة الهندسة الميكانيكية.
3. قادراً على تصميم وإجراء الاختبارات الهندسية في مجال التخصص.
4. قادراً على إجراء التحليل الإقتصادي الهندسي الصحيح وتطبيق أدوات الجودة المناسبة للتطبيق محل الدراسة.
5. قادراً على العمل بكفاءة وتكامل في فريق متعدد التخصصات سواء كانوا في نفس تخصصه أو في تخصصات هندسية أو غير هندسية أخرى.
6. قادراً على تحديد قضايا السلامة والبيئة والأخلاقيات في المشاكل الهندسية.
7. مقدراً للأدب والفنون والعلوم الإنسانية وكذلك الوعي بالقضايا المعاصرة.

وعلى المستوى المتخصص في مجال هندسة الميكاترونيات والروبوتات يكون:

8. قادراً على استخدام العلوم الرياضية والفيزيائية وأساليب تحليل المنظومات بكفاءة.
9. قادراً على تطبيق العلوم الهندسية المكتسبة في مجال الأنظمة الكهروميكانيكية.
10. قادراً على تحليل ودراسة الخصائص المتشعبة للأنظمة الميكانيكية والكهربية والهيدروليكية.
11. قادراً على تعميق تخصصه في مجال التصميم الميكانيكي والإلكترونيات وعلوم الحاسب وبرمجياته في مجال تخصصه.

وسيكون الخريج من هذا التخصص مؤهلاً للعمل في:

- مجالات أنظمة التحكم الإلكتروني والحاسب والذي تعتمد عليها معظم وسائل الانتاج الحديثة.
- عمليات الانتاج والتصنيع في مجال الصناعات التعدينية، صناعة الطيران والفضاء والصناعات العسكرية المتطورة.
- جميع المجالات الصناعية التي يكون هناك تفاعل وتكامل بين الأنظمة الميكانيكية والأنظمة الالكترونية وأنظمة الحاسب ومن المتوقع أن يتزايد الطلب على المهندسين المتخصصين في الميكاترونيات.

وعلى المستوى المتخصص في مجال هندسة العلوم الحرارية والطاقة يكون:

8. قادراً على المساهمة في تطوير محطات الطاقة المتجددة، الغلايات، توربينات الغاز أو البخار، محركات الاحتراق الداخلي وأنظمة التبريد... الخ.
9. قادراً على تطبيق الدراسة الأكاديمية في مجال الطاقة الجديدة والمتجددة في تحسين أداء تلك الأنظمة والتعامل معها وصيانتها في مجال تخصصه.
10. تقييم القضايا البيئية ذات الصلة بأنظمة الطاقة المتجددة الميكانيكية.
11. تطبيق ودمج المعرفة والفهم والمهارات المكتسبة من المواد الدراسية المختلفة مع برامج الحاسب المتخصصة من أجل حل المشاكل الحقيقية في الصناعات ومحطات توليد الكهرباء والإشراف على مجموعة من المهندسين والفنيين.

وسيكون الخريج من هذا التخصص مؤهلاً للعمل في:

- الصناعات التجهيزية.
- محطات الطاقة ومصانع البتروكيماويات.

- إدارة العمليات الصناعية.
- الصناعات المتعلقة بالسيارات والسفن وتوليد الطاقة والتبريد والتكييف.
- مجال السلامة البيئية.
- المجالات البحثية المتعلقة بالتخصص.

وعلى المستوى المتخصص فى مجال هندسة التصميم الميكانيكى يكون:

8. قادراً على تطبيق مبادئ وأسس التصميم الميكانيكى سواء كان ذلك على مستوى المكونات والمنظومات ككل مع تقديم إختيارات متعددة للمواد وعمليات التصنيع المناسبة والمتاحة لتطبيقات التصميم آخذاً فى الاعتبار الأبعاد البيئية المترتبة على الإختيارات المقدمة والتكلفة المناسبة.
9. قادراً على تحديد أنواع وأنماط التحميل المختلفة مع أنماط الفشل والإنهيار المرتبطة بها وبالتالي إتخاذ تدابير وقائية بداية من تصميم المكونات وصولاً إلى التصميم النهائى للنظام المتكامل.
10. قادراً على تصور شامل للأنظمة الميكانيكية وتفكيك تلك الأنظمة إلى الأنظمة الفرعية والأنظمة تحت الفرعية وصولاً إلى مستوى المكونات.
11. قادراً على تعلم واستخدام برامج CAD/CAM والأجهزة المرتبطة بها.

وسيكون الخريج من هذا التخصص مؤهلاً لإنجاز التصميم والأبحاث والقيام بالمهام الميدانية من خلال العمل فى المجالات التالية:

- الصناعات البتروكيماوية ومحطات توليد الطاقة.
- صناعات النقل بما فى ذلك:
- 1. صناعات السيارات
- 2. صناعات الطيران المدني والعسكري
- 3. الصناعات البحرية المدنية والعسكرية
- 4. صناعات السكك الحديدية
- صناعة الحديد والصلب والصناعات الثقيلة.
- الصناعات التعدينية.
- صناعات تشكيل المعادن.
- شركات ومكاتب التصميم المتخصصة.
- الإلتحاق ببرامج الدراسات العليا فى المجالات البحثية ذات الصلة بالتخصص.

مادة (5): المعايير الأكاديمية للبرنامج:

يلتزم البرنامج المقدم بالمعايير الأساسية المقترحة من قبل الهيئة القومية لضمان جودة التعليم والاعتماد كحد أدنى . والمعايير الأكاديمية لبرنامج الهندسة الميكانيكية بتخصصاته الثلاث يحدد المستوى والإمكانيات والقدرات المتوقعة للخريج كالاتى:

الإمكانيات المعرفية والفهم:

شعبة هندسة الميكاترونيات:

The graduates of the Mechanical Engineering (Mechatronics Specialization Track) should be able to demonstrate the knowledge and understanding of:

12. Basic science and engineering fundamentals;
13. Fundamentals of problem identification, formulation and solution in the areas of Mechatronics;
14. The approach to design and operational performance;
15. Social, cultural, global and environmental responsibilities of the professional engineering, and the need for sustainable development;
16. The principles of sustainable design and development;
17. Professional and ethical responsibilities and commitment to them

شعبة هندسة العلوم الحرارية والطاقة:

The graduates of the Mechanical Engineering (Thermal Sciences and Energy Specialization Track) should be able to demonstrate the knowledge and understanding of:

18. Essential facts, fundamentals, concepts, principles and theories relevant to Mechanical Engineering;
19. The constraints which mechanical power and energy engineers have to judge to reach at an optimum solution.
20. Concepts and theories of basic sciences, mathematics and the technological base relevant to Mechanical Power and Energy Engineering.
21. Business and management techniques and practices appropriate to mechanical power and energy engineering applications.
22. The professional and ethical responsibilities of mechanical power and energy engineers.
23. The impact of mechanical power and energy engineering solutions in a global and societal context.
24. Mechanical power and energy engineering contemporary issues.
25. Relevant mathematical and numerical methods and the principles of engineering and mechanical engineering sciences as applied to mechanical power and energy engineering systems.
26. The basic theories and principles of some other engineering and mechanical engineering disciplines providing support to mechanical power and energy disciplines.
27. The role of information technology in providing support for mechanical power and energy engineers.
28. Engineering design principles and techniques and their applications to mechanical power and energy engineering.
29. Characteristics and properties of materials relevant to mechanical engineering applications.

شعبة هندسة التصميم الميكانيكي:

The graduates of the Mechanical Engineering (Mechanical Design Specialization Track) should be able to demonstrate the knowledge and understanding of:

30. Concepts, principles and theories relevant to Mechanical Engineering and manufacture;
31. The constraints within which his/her engineering judgment will have to be exercised;
32. The specifications, programming and range of application of CAD and CAD/CAM facilities
33. Relevant contemporary issues in mechanical engineering.
34. Basic electrical, control and computer engineering subjects related to the discipline
35. The role of information technology in providing support for mechanical engineers
36. Engineering design principles and techniques
37. Management and business techniques and practices appropriate to engineering industry.

المهارات الفكرية:

شعبة هندسة الميكاترونيات:

The graduates of Mechanical Engineering (Mechatronics Specialization Track) should be able to:

1. Apply knowledge of basic science and engineering fundamentals;
2. Undertake problem identification, formulation and solution;
3. Utilize a systems approach to design, analysis and development and practical investigations;
4. Apply the principles of sustainable design and development;
5. Full awareness of the needs to undertake lifelong learning, and capacity to do so.

شعبة هندسة العلوم الحرارية والطاقة:

The graduates of Mechanical Engineering (Thermal Sciences and Energy Specialization Track) should be able to:

6. Solve engineering problems and design mechanical power and energy systems, components and elements in a creative and innovative attitude.
7. Apply the appropriate tools from mathematics, science, technology, and the know-how gained from the professional experience to analyze mechanical engineering design problems to meet certain needs.
8. Solve mechanical engineering problems, often on the basis of limited and possibly contradictory information.
9. Analyze and interpret data, and design experiments to obtain new data.

10. Evaluate mechanical power and energy engineering designs, processes and performances and propose improvements.
11. Maintain a sound theoretical approach in dealing with new and advancing technology.
12. Assess risks, and consider appropriate steps to manage them.
13. Use the principles of engineering sciences in developing solutions to practical mechanical engineering problems.
14. Create new engineering components and processes through the synthesis of ideas from a range of sources.
15. Analyze the results of numerical models and acknowledge their limitations.

شعبة هندسة التصميم الميكانيكي:

The graduates of Mechanical Engineering (Mechanical Design Specialization Track) should be able to:

1. Apply the principles of mathematics, science and technology in problem solving scenarios in mechanical engineering;
2. Analyze and interpret data, and design experiments to obtain primary data;
3. Evaluate and appraise designs, processes and products, and propose improvements;
4. Interpret numerical data and apply analytical methods for engineering design purposes
5. Use the principles of engineering science in developing solutions to practical mechanical engineering problems.

المهارات العملية والفنية:

شعبة هندسة الميكاترونيات:

The graduates of Mechanical Engineering (Mechatronics Specialization Track) should be able to:

1. Compete, in-depth, in at least one engineering discipline;
2. Manage field problem, identification, formulation and solution;
3. Utilize practical systems approach to design and performance evaluation;
4. Apply the principles of sustainable design and development;

شعبة هندسة العلوم الحرارية والطاقة:

The graduates of Mechanical Engineering (Thermal Sciences and Energy Specialization Track) should be able to:

5. Use a wide range of analytical and technical tools, techniques and equipment including pertinent software.
6. Use basic workshop equipment safely and appropriately.
7. Analyze experimental results and determine their accuracy and validity.

8. Prepare engineering drawings, computer graphics and specialized technical reports.
9. Refer to scientific literature effectively.
10. Use computational tools and packages and write computer programs pertaining to mechanical power and energy engineering.
11. Apply numerical modeling methods and/or appropriate computational techniques to engineering problems.
12. Use appropriate computer software and laboratory equipment.
13. Search for information.
14. Demonstrate basic organizational and project management skills.
15. Carryout specialized engineering design.
16. Work in mechanical power and energy operations, maintenance and overhaul.

شعبة هندسة التصميم الميكانيكي:

The graduates of Mechanical Engineering (Mechanical Design Specialization Track) should be able to:

17. Prepare engineering drawings, computer graphics and specialized technical reports and communicate accordingly.
18. Employ the traditional and modern CAD and CAD/CAM facilities in design and production processes
19. Use basic workshop equipment safely;

المهارات العامة:

The graduates of Mechanical Engineering program should be able to:

1. Collaborate effectively within multidisciplinary team.
2. Work in stressful environment and within constraints.
3. Communicate effectively.
4. Demonstrate efficient IT capabilities.
5. Lead and motivate individuals.
6. Effectively manage tasks, time, and resources.
7. Search for information and engage in life-long self learning discipline.
8. Acquire entrepreneurial skills.
9. Refer to relevant literatures.

مادة (6): تفاعل البرنامج مع احتياجات السوق:

من الأهداف الرئيسية للبرنامج المقترح هو التفاعل المستمر مع احتياجات سوق العمل حيث أن ذلك السوق هو ما يمثل المستهلك الحقيقي لنتائج قسم الهندسة الميكانيكية المقترح. وتماشياً مع نظام الجودة الشاملة فإن مخرجات القسم لابد وأن تتوافق مع متطلبات المستهلك وعليه فإن الجامعة ملتزمة بالتواصل

مع الغرف التجارية والصناعية والممثلة للمجتمع الصناعي للتعرف على الاحتياجات الحقيقية للخريجين من القسم وكذلك لتشكيل قنوات مستمرة لتدريب الطلاب فى تلك المصانع.

وتحديداً فيما يخص أفرع البرنامج المقترح (هندسة الميكاترونيات والروبوتات وهندسة العلوم الحرارية والطاقة المتجددة وهندسة التصميم الميكانيكى) فقد تم إختيارهم لما يشهده العصر من إحتياج لتطبيق أنظمة التحكم الآلى فى الإنتاج لزيادة الإنتاجية مع المحافظة على المواصفات العالمية مع الحفاظ على سعر إنتاجى ملائم. هذا مع تنامى مستويات الطلب على مصادر الطاقة المختلفة سواء التقليدية أو المتجددة لتواكب إرتفاع مستويات المعيشة والإحتياجات الصناعية المتزايدة مع الأخذ فى الإعتبار معايير التصميمات القابلة للتعديل بتكلفة مقبولة ومنافسة مما يساهم فى توافق تخصص الخريجين مع إحتياجات السوق الفعلية.

مادة (7): التشابه والتمايز عن البرامج المشابهة:

يقدم البرنامج نموذجاً للأسلوب المنهجى فى التعليم الجامعى فى تخصص هندسة الميكاترونيات والروبوتات وهندسة العلوم الحرارية والطاقة المتجددة وهندسة التصميم الميكانيكى حيث يستفيد البرنامج من الخبرات المتراكمة فى البرامج المشابهة على المستوى المحلى والمستوى الدولى لتقديم برنامج دراسى يعتمد على:

1. توفير الأساس النظرى المناسب للتخصص بما يواكب ما يتم تدريسه فى الجامعات العريقة محلياً وعالمياً وينقسم هذا إلى شقين أساسيين:
 - تقديم الأساس النظرى والذى يخدم فئة المهندسين الميكانيكيين بصفة عامة لتكوين الأرضية الثابتة للتقدم فى علوم التخصص.
 - تقديم الأساس النظرى والذى يرتفع بمستوى الطلاب إلى مستوى التخصص معتمداً على دراسة لما يتم تدريسه بالأقسام المماثلة فى مصر وخارجها.
2. توفير نظام الساعات المعتمدة والذى يتيح للطلبة الإختيار من مجموعة من المقررات للتعلم فى تخصص أكثر دقة من التخصص العام.
3. توفير معامل متكاملة للتطبيقات العملية المصاحبة للدراسة النظرية.
4. توفير خطة تدريب عملى داخل وخارج الجامعة لتتماشى مع متطلبات المقررات الدراسية والتطور المستمر فى إحتياجات الصناعة.

مادة (8): مخرجات البرنامج المستهدفة Program ILOs

لقد تم تصميم برنامج الهندسة الميكانيكية المقترح فى جامعة النيل لكى يتميز خريجو القسم بخصائص تمكنهم من التكامل بنجاح مع أقرانهم فى مجال العمل المهنى والأكاديمى. وعليه فإنه كان من الضرورى تحديد مخرجات البرنامج المستهدفة والتى تؤدى إلى تقديم خريجى بمواصفات وقدرات كما

تم توصيفها سابقاً. ويتم تقسيم مخرجات البرنامج المستهدفة إلى 4 أقسام لكل شعبة من شعب القسم (هندسة الميكاترونيات أو هندسة العلوم الحرارية والطاقة) كالآتي:

الامكانيات المعرفية والفهم:

شعبة الميكاترونيات:

- A. متوقع ان يكون خريج برنامج الهندسة الميكانيكية ملماً بالآتي:
- A.1. مبادئ وأسس ميكانيكا الجوامد والخصائص الميكانيكية للمواد.
 - A.2. مبادئ وأسس تكنولوجيا التصنيع.
 - A.3. مبادئ وأسس التصميم الميكانيكي.
 - A.4. الأساليب الرياضية والعددية في تحليل الأنظمة الميكانيكية والديناميكية.
 - A.5. مبادئ وأسس الاهتزازات الميكانيكية ونمذجة وتمثيل الأنظمة الديناميكية.
 - A.6. تصميم وتحليل الدوائر الكهربائية والإلكترونيات في أنظمة التحكم العددي.
 - A.7. أساليب تصميم واختبار وتصنيع أنظمة التحكم الألى التناظرية والرقمية.
 - A.8. مبادئ وأسس التعامل مع الإشارات الرقمية في الأنظمة الميكاترونية.
 - A.9. أساليب تحليل وتصميم الأنظمة الميكاترونية فيما يتعلق بالمكونات والبرامج.
 - A.10. خصائص المواد الذكية واستخداماتها وتركيبها ونمذجتها رياضياً لاستخدامها في الحساسات والمحركات.
 - A.11. تصميم وتركيب وبرمجة المعالجات وأنظمة التحكم الدقيقة.
 - A.12. مبادئ وأسس في تصميم وتحليل أداء أنظمة الروبوتات.
 - A.13. مبادئ وأسس الأنظمة الكهروميكانيكية فائقة الدقة.
 - A.14. مبادئ وأسس إدارة وبحوث العمليات وأخلاقيات المهنة والأثر البيئي للتطبيقات الهندسية.

شعبة العلوم الحرارية والطاقة:

- A.15. مبادئ وأسس ميكانيكا الجوامد والخصائص الميكانيكية للمواد.
- A.16. مبادئ وأسس التصميم الميكانيكي وتكنولوجيا التصنيع.
- A.17. الأساليب الرياضية والعددية في تحليل الأنظمة الميكانيكية والديناميكية ونمذجتها.
- A.18. مبادئ وأسس الإهتزازات الميكانيكية ونمذجة وتمثيل الأنظمة الديناميكية.
- A.19. تصميم وتحليل الدوائر الكهربائية والإلكترونيات في أنظمة التحكم العددي.
- A.20. أساليب وأسس إنتقال الحرارة والموائع والديناميكا الحرارية.
- A.21. أنظمة الإحتراق ومحركات الإحتراق الداخلي تصميماً وأداءً.
- A.22. المضخات والكباسات ومحركات التربو والأنظمة الهيدروليكية.
- A.23. أنظمة التبريد والتكييف وفيزياء درجات الحرارة المتدنية.
- A.24. تصميم وعمل محطات الطاقة التقليدية والنووية.
- A.25. أنظمة الطاقة المختلفة والتحويل بينها وأمثلة أدائها.
- A.26. مبادئ وأسس ميكانيكا الموائع الحسابية.
- A.27. مبادئ وأسس وأنواع الطاقة الجديدة والمتجددة وطرق عملها وكفاءتها.

A.28. مبادئ وأسس ريادة الأعمال وبحوث العمليات وأخلاقيات المهنة والأثر البيئي للتطبيقات الهندسية.

A.29. مبادئ وأسس تحليل مياه الآبار والبحار.

A.30. مبادئ وأسس ميكانيكا الأوساط المتصلة.

شعبة التصميم الميكانيكي:

A.31. مبادئ وأسس ميكانيكا الجوامد والخصائص الميكانيكية للمواد.

A.32. مبادئ وأسس التصميم الميكانيكي وتكنولوجيا التصنيع.

A.33. الأساليب الرياضية والعديدية في تحليل الأنظمة الميكانيكية والديناميكية ونمذجتها.

A.34. مبادئ وأسس التصميم الميكانيكي.

A.35. الأساليب الرياضية والعديدية في تحليل الأنظمة الميكانيكية والديناميكية.

A.36. مبادئ وأسس الاهتزازات الميكانيكية ونمذجة وتمثيل الأنظمة الديناميكية.

A.37. تصميم وتحليل دورة حياة المنتج وتحديد عوامل التصميم المختلفة لتحسين دورة حياة المنتج.

A.38. أسس ومنهجية برامج CAD / CAM والأجهزة المرتبطة بها.

A.39. مبادئ وأسس إدارة وبحوث العمليات وأخلاقيات المهنة والأثر البيئي للتطبيقات الهندسية.

المهارات الفكرية:

شعبة الميكاترونيات:

B. متوقع أن يكون خريج برنامج الهندسة الميكانيكية بجامعة النيل قادراً على الآتي:

B.1. التعرف على مشكلات أنظمة التحكم في المنشآت الصناعية وتحليلها وتطوير أسلوب علاجي أمثل لها.

B.2. استخدام العلوم الرياضية والفيزيائية المكتسبة في تصميم وتطوير أساليب التحكم المختلفة.

B.3. الاختيار من عدد من الأساليب المحتملة لحل المشكلات الهندسية في مجال التحكم الآلي والميكاترونيات لاختيار الأنسب منها.

B.4. استنباط حلول متكاملة للأنظمة الميكاترونية والمتعلقة بالتصنيع والصيانة والبرمجة ومركبات متطلبات السوق واحتياجاته.

B.5. التعرف على القضايا الهندسية المعاصرة التي لها صلة (ولو بعيدة) بمجال التخصص ومحاولة ربطها علمياً وهندسياً بالخبرات المكتسبة في مجال التخصص لإيجاد أساليب محتملة للحل.

شعبة العلوم الحرارية والطاقة:

B.6. التعرف على مشكلات أنظمة توليد الطاقة المختلفة وتحليلها وتطوير أسلوب علاجي أمثل لها.

B.7. استخدام العلوم الرياضية والفيزيائية المكتسبة في تصميم وتطوير وصيانة الكباسات والطلبات والتوربينات ومحركات الاحتراق الداخلي.

- B.8. الاختيار من عدد من الأساليب المحتملة لحل المشكلات الهندسية في مجال التبريد والتكييف والمبردات ووحدات مناولة الهواء.
- B.9. استنباط حلول متكاملة للأنظمة الحرارية وأنظمة وشبكات نقل الموائع والمتعلقة بالتصنيع والصيانة ومدرسين متطلبات السوق واحتياجاته.
- B.10. التعرف على القضايا الهندسية المعاصرة التي لها صلة (ولو بعيدة) بمجال التخصص ومحاولة ربطها علمياً وهندسياً بالخبرات المكتسبة في مجال التخصص لإيجاد أساليب محتملة للحل.

شعبة التصميم الميكانيكي:

- B.11. التعرف على مشكلات التصميم في المنشآت الصناعية وتحليلها وتطوير أسلوب علاجي أمثل لها.
- B.12. استخدام العلوم الرياضية والفيزيائية المكتسبة في تصميم وتطوير المنشآت الميكانيكية والماكينات.
- B.13. الاختيار من عدد من الأساليب المحتملة لحل المشكلات الهندسية في مجال التصميم الميكانيكي لاختيار الأنسب منها.
- B.14. استنباط حلول متكاملة للأنظمة المتكاملة والمتعلقة بالتصميم مدرسين متطلبات السوق واحتياجاته.
- B.15. التعرف على القضايا الهندسية المعاصرة التي لها صلة (ولو بعيدة) بمجال التخصص ومحاولة ربطها علمياً وهندسياً بالخبرات المكتسبة في مجال التخصص لإيجاد أساليب محتملة للحل.

المهارات العملية والفنية

شعبة الميكاترونيات:

- C. متوقع أن يكون خريج برنامج الهندسة الميكانيكية قادراً على الآتي:
- C.1. استخدام أساليب القياس والاستشعار للتعرف على حالة المعدات الميكانيكية والالكترونية والهيدروليكية لجمع البيانات بهدف الصيانة أو مراقبة التشغيل أو التطوير.
- C.2. استخدام الحاسب الآلي وبرمجياته المتخصصة في تحليل البيانات المحلة من المعدات للوصول إلى أفضل تصور عن حالة المعدة الحقيقية.
- C.3. برمجة الحاسب الآلي والمعالجات الدقيقة لتصميم وتنفيذ أنظمة تحكم آلي دقيقة وفعالة.
- C.4. تصميم وتنفيذ دوائر كهربائية وإلكترونية للأنظمة الميكاترونية.
- C.5. كتابة التقارير الفنية في مجال هندسة الميكاترونيات وما يتعلق بها من التخصصات الأخرى.

شعبة العلوم الحرارية والطاقة:

- C.6. استخدام أساليب القياس والاستشعار للتعرف على حالة المعدات الميكانيكية والهيدروليكية والحرارية لجمع البيانات بهدف الصيانة أو مراقبة التشغيل أو التطوير.
- C.7. استخدام الحاسب الآلي وبرمجياته المتخصصة في تحليل البيانات المحلة من المعدات للوصول إلى أفضل تصور عن حالة المعدة الحقيقية.

- C.8. برمجة الحاسب الآلى والمعالجات الدقيقة لتصميم وحساب كفاءة الأنظمة الحرارية وشبكات نقل الموائع ورفعها.
- C.9. كتابة التقارير الفنية فى مجال هندسة العلوم الحرارية والطاقة وما يتعلق بها من التخصصات الأخرى.

شعبة التصميم الميكانيكي:

- C.10. استخدام الحاسب الآلى وبرمجياته فى تحليل أداء المنشآت الميكانيكية الاستاتيكية والديناميكية من حيث تحمل الإجهادات وآليات الانهيار.
- C.11. استخدام الحاسب الآلى وبرمجياته فى مجال CAD/CAM لإنجاز تصميم ميكانيكي قابل للتصنيع بكفاءة.
- C.12. كتابة التقارير الفنية فى مجال هندسة التصميم الميكانيكي وما يتعلق بها من التخصصات الأخرى.

المهارات العامة:

- D. متوقع أن يكون خريج برنامج الهندسة الميكانيكية بجامعة النيل قادراً على الآتى:
- D.1. العمل فى فريق متكامل.
- D.2. مشاركة الأفكار والآراء والتواصل مع الآخرين بكفاءة.
- D.3. التعامل مع الآخرين فى إطار أخلاقيات المهنة الحميدة.
- D.4. إدراك أهمية التعليم المستمر والحاجة إلى التطوير وتحكيم العقل فى تفسير الأمور واختيار القرارات الإستراتيجية.

مادة (9): مقارنة مخرجات البرنامج المستهدفة مع المرجعيات المحلية والعالمية

الجدول المرفق يستعرض مقارنة بين مخرجات البرنامج المقترح المستهدفة مع متطلبات الهيئة القومية لضمان جودة التعليم والاعتماد (NARS) ومتطلبات (ABET).

MENG courses/ILOS mapped to NARS and ABET Graduates Attributes

Attributes of program graduates as per ABET Criterion (3) for program outcomes and assessment	Attributes of program graduates as per NARS Requirements for engineering programs, in general	Corresponding ILO's in Current Program	Courses Covering such ILO's
a. Ability to apply knowledge of mathematics, science and engineering.	a. Ability to apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.	A1-A39	CSCE 101, MATH 111, MATH 112, MATH 202, MATH 203, MATH 301, MATH 303, PHYS 101, PHYS 102, ECEN 101, CSCE 201, NSCI 102, MENG 101, MENG 102, CHEM 101, MENG 201, MENG 203, MENG 301, MENG 303, IENG 241, MENG 304, MENG 306, MENG 401, MENG 305, MENG 308, MENG 307, MENG 202, MENG 321, MENG 322, MENG 323, MENG 324, MENG 325, MENG 326, MENG 327, MENG 421, MENG 422, MENG 423, MENG 424, MENG 425, MENG 426, MENG 430, MENG 431, MENG 432, MENG 433, MENG 434, MENG 435, MENG 436, IENG 202, IENG 344, MATH 341, MENG 342, MENG 343, MENG 344, MENG 421, MENG 441, MENG 442, MENG 443, MENG 444, MENG 445, MENG 446, MENG 422, MENG 451, MENG 452, MENG 453, MENG 454, MENG 455, MENG 456, MENG 461, MENG 460, MENG 462, MENG 463, MENG 464, MENG 465, MENG 466, MENG 469

a. Ability to design and conduct experiments, as well as to analyze and interpret data.	c. Ability to Design and conduct experiments as well as analyze and interpret data.	B1, B5, B6, B10, B11, B15, C1, C2, C6, C7,C10	CSCE 101, MATH 202, NSCI 102, SSCI 103, SSCI 101, IENG 241, ECEN 101, CSCE 201, ENGR 102, MENG 204, MENG 202, MENG 391, MENG 493, MENG 495, MENG 421, MENG 424, MENG 323, MENG 324, MENG 325, MENG 326, MENG 431, MENG 433, MENG 434, MENG 435, MENG 436, IENG 202, IENG 344, MENG 444, MENG 445, MENG 452, MENG 453, MENG 454, MENG 455, MENG 460, MENG 461, MENG 462, MENG 463, MENG 464, MENG 465, MENG 466, MENG 469,
b. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	b. Ability to Design a system; component and process to meet the required needs within realistic constraints.	B1-B8, and B11-B15	MATH 202, NSCI 102, SSCI 103, SSCI 101, MATH 112, MATH 203, MATH 301, MATH 303, PHYS 101, ENGR 101, PHYS 201, IENG 241, MENG 391, MENG 493, MENG 495, MENG 421, MENG 424, MENG 426, MENG 321, MENG 323, MENG 324, MENG 325, MENG 326, MENG 327, MENG 431, MENG 433, MENG 434, MENG 435, MENG 436, IENG 202, IENG 344, MENG 344, MENG 421, MENG 441, MENG 442, MENG 444, MENG 445, MENG 446, MENG 452, MENG 453, MENG 454, MENG 455, MENG 460, MENG 461, MENG 462, MENG 463, MENG 464, MENG 465, MENG 466, MENG 469
c. Ability to function on multi-disciplinary teams	f. Work effectively within multi-disciplinary teams	D1	ENGR 101, MENG 493, MENG 495, ENTR 301

d. Ability to identify, formulate and solve engineering problems	d. Ability to Identify, formulate and solve fundamental engineering problems	B1-B8 and B11-B15	MATH 202, NSCI 102, SSCI 103, SSCI 101, MATH 112, MATH 203, MATH 301, MATH 303, PHYS 101, ENGR 101, PHYS 201, IENG 241, MENG 391, MENG 493, MENG 495, MENG 421, MENG 424, MENG 426, MENG 321, MENG 323, MENG 324, MENG 325, MENG 326, MENG 327, MENG 431, MENG 433, MENG 434, MENG 435, MENG 436, IENG 202, IENG 344, MENG 344, MENG 421, MENG 441, MENG 442, MENG 444, MENG 445, MENG 446, MENG 452, MENG 453, MENG 454, MENG 455, MENG 460, MENG 461, MENG 462, MENG 463, MENG 464, MENG 465, MENG 466, MENG 469
e. Understanding of professional and ethical responsibility	j. Ability to Display professional and ethical responsibilities; and contextual understanding	D9, A14, A28, A39	CSCE 101, MATH 111, MATH 112, NSCI 102, SSCI 103, ENGR 101, MENG 321, MENG 322, IENG 202, IENG 344, MENG 444, MENG 461, MENG 462, MENG 463, MENG 464, MENG 465,
f. Ability to communicate effectively	g. Ability to communicate effectively	D3	ENGR101, MENG 321, MENG 322, MENG 343, MENG 460, MENG 461, MENG 462, MENG 463, MENG 464, MENG 465,
g. Having the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	h. Ability to Consider the impacts of engineering solutions on society & environment	D9, A14, A28, A39	CSCE 101, MATH 111, MATH 112, NSCI 102, SSCI 103, MENG 321, MENG 322, IENG 202, IENG 344, MENG 444, MENG 461, MENG 462, MENG 463, MENG 464, MENG 465, MENG 493, MENG 495, ENTR 301
h. Recognition of the need for, and ability to engage in life-long learning	k. Ability to Engage in self- and life- long learning	D4	MENG 493, MENG 495, MENG 391
i. Knowledge of contemporary issues	i. Ability to Demonstrate knowledge of contemporary engineering issues	B5, B10, B15	IENG 241, NSCI 102 , MENG 303, MENG 306, MENG 324, MENG 421, MENG 423, MENG 431, MENG 435, MENG 436, MENG 453, MENG 454, MENG 461, MENG 462, MENG 464, MENG 465, MENG 466, MENG 469, MENG 391, MENG493, MENG495

j. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	e. Ability to Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management	C1-C12	CSCE 101, MATH 203, NSCI 102, ECEN 101, CSCE 201, IENG 241, MENG 202, MENG 204, MENG 391, MENG 493, MENG 495, MENG 321, MENG 322, MENG 323, MENG 324, MENG 325, MENG 326, MENG 327, MENG 422, MENG 424, MENG 425, MENG 426, MENG 430, MENG 431, MENG 433, MENG 434, MENG 435, MENG 436, MENG 441, MENG 444, MENG 445, MENG 455, MENG 456, MENG 461, MENG 462, MENG 463, MENG 464, MENG 465, MENG 466, MENG 469, ENTR 301

مادة (10): مطابقة مخرجات البرنامج المستهدفة مع المعايير الأكاديمية طبقاً لمتطلبات (NARS)

الجدول المرفق يستعرض مدى تحقيق مخرجات البرنامج المستهدفة (Program ILOs) للمعايير الأكاديمية له طبقاً لمتطلبات (NARS):

مخرجات البرنامج المستهدفة المحققة للمعايير	المعايير الأكاديمية للبرنامج
	الإمكانيات المعرفية والفهم
	شعبة الميكاترونيات
A1 - A14	• Basic science and engineering fundamentals;
A4 - A14	• Fundamentals of problem identification, formulation and solution in the areas of Mechatronics;
A6 - A14	• The approach to design and operational performance;
A14	• Social, cultural, global and environmental responsibilities of the professional engineering, and the need for sustainable development;
A6 – A14	• The principles of sustainable design and development;
A14	• Professional and ethical responsibilities and commitment to them
	شعبة العلوم الحرارية والطاقة
A15 – A30	• Essential facts, fundamentals, concepts, principles and theories relevant to Mechanical Engineering;
A15 – A30	• The constraints which mechanical power and energy engineers have to induce to reach an optimum solution;
A15 – A30	• Concepts and theories of basic sciences, mathematics and the technological base relevant to Mechanical Power and Energy Engineering;
A28	• Business and management techniques and practices appropriate to mechanical power and energy engineering;
A28	• The professional and ethical responsibilities of mechanical power and energy engineers;
A20 – A30	• The impact of mechanical power and energy engineering solutions in a global and societal context;
A20 – A30	• Mechanical power and energy engineering contemporary issues;
A15 – A20,	• Relevant mathematical and numerical methods and the principles of engineering and mechanical engineering;
A15 – A20,	• The basic theories and principles of some other engineering and mechanical engineering disciplines providing support to mechanical power and energy engineers;
A19	• The role of information technology in providing support for mechanical power and energy engineers;
A15 – A19,	• Engineering design principles and techniques and their applications to mechanical power and energy engineering;
A15, A16	• Characteristics and properties of materials relevant to mechanical power and energy engineering;
	شعبة التصميم الميكانيكي
A31 – A38	• Concepts, principles and theories relevant to Mechanical Engineering and manufacture;

مخرجات البرنامج المستهدفة المحققة للمعايير	المعايير الأكاديمية للبرنامج
A37 – A39	• The constraints within which his/her engineering judgment will have to be exercised;
A33, A35, A37, A38	• The specifications, programming and range of application of CAD and CAD/CAM facilities
A31 – A39	• Relevant contemporary issues in mechanical engineering.
A33, A35, A36, A38	• Basic electrical, control and computer engineering subjects related to the discipline
A33, A35, A36, A37, A38	• The role of information technology in providing support for mechanical engineers
A31, A32, A34, A37	• Engineering design principles and techniques
A37, A39	• Management and business techniques and practices appropriate to engineering industry.
المهارات الفكرية	
شعبة الميكاترونيات	
B1 – B5	• Apply knowledge of basic science and engineering fundamentals;
B1, B3, B4, B5	• Undertake problem identification, formulation and solution;
B3 – B5	• Utilize a systems approach to design, analysis and development and practical investigations;
B3 – B5	• Apply the principles of sustainable design and development;
B5	• Full awareness of the needs to undertake lifelong learning, and capacity to do so.
شعبة العلوم الحرارية والطاقة	
B6 – B10	• Solve engineering problems and design mechanical power and energy systems, components and elements in a creative and innovative attitude.
B7	• Apply the appropriate tools from mathematics, science, technology, and the know-how gained from the professional experience to analyze mechanical engineering design problems to meet certain needs.
B8 – B10	• Solve mechanical engineering problems, often on the basis of limited and possibly contradictory information.
B6, B8 – B10	• Analyze and interpret data, and design experiments to obtain new data.
B6, B8 – B10	• Evaluate mechanical power and energy engineering designs, processes and performances and propose
B7, B10	• Maintain a sound theoretical approach in dealing with new and advancing technology.

مخرجات البرنامج المستهدفة المحققة للمعايير	المعايير الأكاديمية للبرنامج
B6, B8, B10	Assess risks, and consider appropriate steps to manage them.
B6 – B10	Use the principles of engineering sciences in developing solutions to practical mechanical engineering problems.
B7, B10	Create new engineering components and processes through the synthesis of ideas from a range of sources.
B6 – B10	Analyze the results of numerical models and acknowledge their limitations.
	شعبة التصميم الميكانيكي
B12	Apply the principles of mathematics, science and technology in problem solving scenarios in mechanical engineering;
B11 – B15	Analyze and interpret data, and design experiments to obtain primary data;
B13 – B15	Evaluate and appraise designs, processes and products, and propose improvements;
B12, B13, B15	Interpret numerical data and apply analytical methods for engineering design purposes
B12, B15	Use the principles of engineering science in developing solutions to practical mechanical engineering problems.
	المهارات العملية والفنية
	شعبة الميكاترونيات
C1 – C5	Compete, in-depth, in at least one engineering discipline;
C1, C2	Manage field problem, identification, formulation and solution.
C3, C4	Utilize practical systems approach to design and performance evaluation;
C3, C4	Apply the principles of sustainable design and development;
	شعبة العلوم الحرارية والطاقة
C6 – C9	Use a wide range of analytical and technical tools, techniques and equipment including pertinent software.
C6, C7	Use basic workshop equipment safely and appropriately.
C6, C7	Analyze experimental results and determine their accuracy and validity.
C9	Prepare engineering drawings, computer graphics and specialized technical reports.
C8, C9	Refer to scientific literature effectively.
C8	Use computational tools and packages and write computer programs pertaining to mechanical power and energy engineering.
C8	Apply numerical modeling methods and/or appropriate computational techniques to engineering problems.
C6 – C8	Use appropriate computer software and laboratory

مخرجات البرنامج المستهدفة المحققه للمعايير	المعايير الأكاديمية للبرنامج
C6 – C9	• Search for information.
C9	• Demonstrate basic organizational and project management skills.
C8	• Carryout specialized engineering design.
C6, C7	• Work in mechanical power and energy operations, maintenance and overhaul.
شعبة التصميم الميكانيكي	
C10 – C12	• Prepare engineering drawings, computer graphics and specialized technical reports and communicate accordingly.
C11	• Employ the traditional and modern CAD and CAD/CAM facilities in design and production processes
C11	• Use basic workshop equipment safely;
المهارات العامة	
D1	• Collaborate effectively within multidisciplinary team.
D2	• Work in stressful environment and within constraints.
D3	• Communicate effectively.
D4	• Demonstrate efficient IT capabilities.
D5	• Lead and motivate individuals.
D6	• Effectively manage tasks, time, and resources.
D7	• Search for information and engage in life-long self learning discipline.
D8	• Acquire entrepreneurial skills.
D9	• Refer to relevant literatures.

مادة (11): المقررات الدراسية ومدى ملاءمتها لمخرجات البرنامج المستهدفة:

University Core Requirements (10 courses = 16 CH)

Code No.	Course Title	No. of hours / week			CH	ECTS	SW L	ILOs
		Lec	Tut	Lab				
ENGL 001	Intensive English	0	0	0	0	0	0	A1, A2, C1-C4
ENGL 101	English I	0	0	0	0	0	50	A1, A2, C1-C4
ENGL 102	English II	0	0	0	0	0	50	A1, A2, C1-C4
ENGL 201	Writing Skills	3.75	0	0	3	5	125	C4, C9, C12
ENGL 202	Communication and Presentation Skills	3.75	0	0	3	5	125	D1-D6
HUMA 101	Introduction to Scientific & Critical Thinking	2.5	0	0	2	3	75	B1-B4
HUMA 102	Introduction to Ethics	2.5	0	0	2	3	75	D4-D9
HUMA 103	Selected Topics in Humanities & Arts	2.5	0	0	2	3	75	B1-B4, D3-D6
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2.5	0	0	2	3	75	B1-B4, D1-D4
SSCI 103	Selected Topics in Social Sciences	2.5	2.5	0	2	3	75	B4, D4
Total Number	10	20	3	0	16	25	725	

Engineering Core Requirements (16 courses = 48 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	SW L	ILOs
		Lec	Tut	Lab				
CSCE 101	Computer & Information Skills	1.25	0	3.75	3	5	125	D1-D4
ECEN 101	Electric Circuits	2.5	0	1.25	3	5	125	C2, C7, C11
ENGR 101	Introduction to Engineering Disciplines	2.5	0	1.25	3	5	125	C2, C3, C7, C11
ENGR 102	Engineering Design	2.5	0	1.25	3	5	125	A4, A17, A35
MATH 111	Analytical Geometry & Calculus I	2.5	1.25	0	3	5	125	A4, A17, A35
MATH 112	Calculus II	2.5	1.25	0	3	5	125	A33, B3, B8, B13
MATH 202	Probability & Statistics for Engineers	2.5	1.25	0	3	5	125	B2, B7, B12
MATH 203	Differential Equations	2.5	1.25	0	3	5	125	B2, B7, B12
MATH 301	Linear Algebra	2.5	1.25	0	3	5	125	B2, B7, B12
MATH 303	Numerical Methods	2.5	1.25	0	3	5	125	B2, B7, B12
PHYS 101	Physics I	2.5	1.25	1.25	4	7	175	B2, B7, B12
PHYS 102	Physics II	2.5	1.25	1.25	4	7	175	A6, A19
CSCE 201	Introduction to Programming	1.25	0	3.75	3	5	125	A38, C3, C7, C8, C10, C11
MENG 101	Engineering Mechanics I - Statics	2.5	0	0	2	4	100	A1, A15, A31
MENG 102	Engineering Mechanics II - Dynamics	2.5	0	0	2	4	100	A1, A15, A31
CHEM 101	Chemical Principles	2.5	0	1.25	3	5	125	A20, A21, A23
Total Number	16	37.5	10	15	48	82	2050	

MENG Program Core Requirements (17 courses = 49 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	S WL	ILOs
		Lec	Tut	Lab				
IENG 241	Engineering Economics	2.5	1.25	0	3	5	125	A14, A28, A39
MENG 201	Introduction to Solid Mechanics and Strength of Materials	2.5	-	-	2	4	100	A1, A15, A31
MENG 202	Solid Modeling and Workshop	2.5	0	1.25	3	5	125	A3, A16, A32
MENG 203	Introduction to Engineering Materials and Manufacturing Processes	2.5	1.25	0	3	5	125	A2, A16, A32
MENG 204	Mechanical Measurements	2.5	0.625	0.625	3	5	125	A8, A19, A35
MENG 301	Mechanical Behavior of Engineering Materials	2.5	0.625	0.625	3	5	125	A1, A15, A31
MENG 303	Machine Design	2.5	1.25	-	3	5	125	A34, B12 B13, B14, B15, C10
MENG 304	Thermodynamics I	1.25	1.25	1.25	2	3	75	A20, B9, C2, D1
MENG 305	Fluid Mechanics I	2.5	0.625	0.625	3	5	125	A20, A23, C2
MENG 306	Kinematics and Dynamics of Mechanical Systems	2.5	1.25	-	3	5	125	A35, B11, B12, B13 B14, D1
MENG 307	Modeling and Simulation of Dynamic Systems	2.5	1.25	0	3	5	125	A4, A18, A35
MENG 308	Heat Transfer I	2.5	0.625	0.625	3	5	125	A20, A23, C2
MENG 391	Practical Training	2.5	-	-	3	6	150	B1, B6, B11, C5, C9, C12, D3
MENG 401	Mechanical Vibrations	2.5	1.25	-	3	5	125	A5, A18, A36
MENG 493	Graduation Project I	2.5	-	-	3	6	180	B5, B10, B15, C2-C7, C11, D1, D4
MENG 495	Graduation Project II	2.5	-	-	3	6	180	B5, B10, B15, C2-C7, C11, D1, D4
NSCI 102	Selected Topics in Environmental Science	2.5	1.25	0	3	5	125	A14, A28, A39, B5, B10, B15
Total Number	17	41	13	5	49	85	2185	

Mechatronics (Track #1) (16 courses = 47 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	SW L	ILOs
		Le c	Tut	Lab				
ENTR 301	Selected Topics in Entrepreneurship	2.5	1.25	0	3	5	125	A14, A28, A39
MENG 321	Electronic devices and applications	1.25	1.25	1.25	2	3	75	A6, A8, B2, C4, D9
MENG 322 / ECEN 304	Electric Machines	2.5	0	1.25	3	5	150	A6, A8, B2, C4, D9
MENG 323	Fundamentals of Mechatronics Engineering	2.5	1.25	0	3	5	125	A7, A8, A10, B1, C1, C4
MENG 324	Signal Processing & Logic Design	2.5	1.25	0	3	5	125	A6, A13, B2, B5, C4, C5
MENG 325	Computer Control of Manufacturing Processes	2.5	0	1.25	3	5	125	A2, A13, B1, B3, C2
MENG 326	Computer Programming in Mechatronics Application	2.5	0	1.25	3	5	125	A7, A9, B4, C2, C3, D2
MENG 327	Power Electronics	2.5	0	1.25	3	5	125	A6, A7, A8, B2, C4, C5
MENG 421	Automatic Control Systems	2.5	0	1.25	3	5	125	A7, A8, A12, B4, B5
MENG 422	Pneumatics and Hydraulics Control Systems	2.5	0	1.25	3	5	125	A4, A6, A9, B3, C5
MENG 423	Digital Control Systems	2.5	0	1.25	3	5	125	A7, A8, A12, B4, B5
MENG 424	Embedded Systems and Computer Interface	2.5	0	1.25	3	5	125	A11, A13, B4, C2, C5, D4
MENG 425	Robotics	2.5	0	1.25	3	5	125	A6, A13, B3, B4, C5, D1
MENG 426	Programmable Logic Controller	2.5	0	1.25	3	5	125	A11, A13, B4, C3, C5, D3
MENG xxx	Elective (1)	2.5	—	1.25	3	5	150	From list below
MENG xxx	Elective (2)	2.5	—	1.25	3	5	150	From list below
Total Number	16	38.8	5.00	16	47	78	2025	

List of Electives for Mechatronics (Track #1) (2 courses = 6 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	Tut	Lab				
IENG 202	Operations research	2.5	1.25	--	3	5	150	A14, B1, B3, B4
IENG 344	Project management	2.5	1.25	0	3	5	125	A14, B1, B3, B4
MENG 430	MEMS Devices and Systems	2.5	1.25	0	3	5	125	A10, A9, C5, D4
MENG 431	Advanced Mechatronics	2.5	0	1.25	3	5	125	A11, A12, B5, C2, C5, D1
MENG 432	Modern Control Systems	2.5	0	1.25	3	5	125	A7, A8, A12, B4, B5
MENG 433	Introduction to Autotronics	2.5	1.25	0	3	5	125	A7, A9, A13, B1, B3, C4
MENG 434	Introduction to Autonomous	2.5	0	1.25	3	5	125	A13, B4, C2, C3, C5, D2
MENG 435	Intelligent Control Systems	2.5	0	1.25	3	5	125	A9, A12, B4, C2, C5, D5
MENG 436	Computer Vision & Image processing	2.5	0	1.25	3	5	125	A9, A12, B4, B5, C2, D2

Thermal Science and Energy (Track #2) (16 courses = 47 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	SW L	ILOs
		Lec	Tut	Lab				
ENTR 301	Selected Topics in Entrepreneurship	2.5	1.25	0	3	5	125	A14, A28, A39
MATH 341	Partial Differential Equations and Simulations Tools	2.5	1.25	----	3	5	125	A17, B7, C7, C8
MENG 321	Electronic devices and applications	1.25	1.25	1.25	2	3	75	A6, A8, A19, B2, C4, D9
MENG 342	Thermodynamics II	2.5	0.625	0.625	3	5	125	A20, B7, C8, C9, D1, D2
MENG 343	Heat Transfer II	2.5	0.625	0.625	3	5	125	A20, B7, C8, C9, D3, D4
MENG 344	Fluid mechanics II	2.5	0.625	0.625	3	5	125	A20, B7, C8, C9, D5, D6
MENG 421	Automatic Control Systems	2.5	0	1.25	3	5	125	A7, A8, A12, B4, B5
MENG 422	Pneumatics and Hydraulics Control Systems	2.5	0	1.25	3	5	125	A4, A6, A9, B3, C5, C6
MENG 441	Finite Element Method and Applications in Mechanical Engineering	2.5	0.625	0.625	3	5	125	A17, A26, B7, C7, C8, B10
MENG 442	Combustion	2.5	1.25	-	3	5	125	A21, B9, D5, D8
MENG 443	Powerplant Technology	2.5	1.25	-	3	5	125	A24, A25, B6, B8, C6, C8
MENG 444	Internal combustion Engines	2.5	0.625	0.625	3	5	125	A21, A22, B7, C7, D8, D9
MENG 445	Turbomachinery I	2.5	1.25	--	3	5	125	A22, B7, C7, C9
MENG 446	Refrigeration and Air-Conditioning	2.5	0.625	0.625	3	5	125	A23, B8, B9, C8-C9, D1
MENG xxx	Elective (1)	2.5	2.5	0	3	5	125	From list below
MENG xxx	Elective (2)	2.5	2.5	0	3	5	125	From list below
Total Number	16	38.75	16.25	7.5	47	78	1950	

Electives for Thermal Sciences and Energy (Track #2) (2 courses = 6

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	Tut	Lab				
IENG 202	Operations research I	2.5	1.25	0	3	5	125	A28
IENG 344	Project management	2.5	1.25	0	3	5	125	A28, B6, B8, B10
MENG 451	Renewable Energy Systems Engineering	2.5	1.25	-	3	5	125	A25, A27, B6, B10, C7, D1-D4
MENG 452	Computational Thermo-Fluid Mechanics	2.5	0.625	0.625	3	5	125	A17, A26, B6, C7, C8
MENG 453	Introduction to Continuum Mechanics	2.5	1.25	-	3	5	125	A30, B10
MENG 454	Water Desalination	2.5	1.25	—	3	5	125	A29, B9, C7
MENG 455	Turbomachinery II	2.5	1.25	0	3	5	125	A22, B7, C7, C9
MENG 456	Nuclear Powerplant Engineering	2.5	1.25	-	3	5	125	A24-A25, B6, C7, C9
MENG 457	Advanced Selected Topic in Mechanical Power	2.5	1.25	-	3	5	125	A25, A28, B9, B10, C9

Mechanical Design (Track #3) (16 courses = 47 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	SW L	ILOs
		Lec	Tut	Lab				
ENTR 301	Selected Topics in Entrepreneurship	2.5	1.25	0	3	5	125	A39, D1, D3, D6
MATH 341	Partial Differential Equations and Simulations Tools	2.5	1.25	----	3	5	125	A33, B12, C10
MENG 342	Thermodynamics II	2.5	0.625	0.625	3	5	125	B12, C10, C12
MENG 344	Fluid mechanics II	2.5	0.625	0.625	3	5	125	B12, C10, C12
MENG 421	Automatic Control Systems	2.5	0	1.25	3	5	125	A33, B14, B15, D1
MENG 422	Pneumatics and Hydraulics Control Systems	2.5	0	1.25	3	5	125	A33, B13, C12, D1
MENG 425	Robotics	2.5	0	1.25	3	5	125	A33, B13, B14, D7
MENG 441	Finite Element Method and Applications in Mechanical Engineering	2.5	0.625	0.625	3	5	125	A33, B12, B13, C10, D1
MENG 460	Mechanics of Materials and Applications in Design	2.5	1.25	-	3	5	125	A33, B11, B12, B13, C10, D3
MENG 461	Failure of Mechanical Components and Prevention	2.5	1.25	-	3	5	125	A35, B11, B15, C10, C12, D3
MENG 462	Selection of Materials and Processes for Design	2.5	1.25	-	3	5	125	A37, B11, C10, C12, D1
MENG 463 / IENG 314	Computer-Aided Design and Prototyping	2.5	-	1.25	3	5	125	A38, B13, B14, C11, D1
MENG 464	Design of Engineering Systems	2.5	-	-	2	3	75	A37, B11, B15, C10, C12, D1
MENG 465	Machine Design II	2.5	0.625	0.625	3	5	125	A35, B11, B15, C10, C12, D1
MENG xxx	Elective (1)	1.25	2.5	—	3	5	125	From list below
MENG xxx	Elective (2)	1.25	2.5	—	3	5	125	From list below
Total Number	16	37.5	14	7.5	47	78	1950	

List of Electives for Mechanical Design (Track #3)

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	Tut	Lab				
IENG 202	Operations research I	2.5	1.25	0	3	5	125	A39, D1, D3, D8
IENG 344	Project management	2.5	1.25	0	3	5	125	A39, D1, D2
MENG 443	Powerplant Technology	2.5	1.25	-	3	5	125	A37, B11, B12, B13, C10, D1
MENG 451	Renewable Energy Systems Engineering	2.5	1.25	-	3	5	125	A37, A39, B14, B15, D1
MENG 453	Introduction to Continuum Mechanics	2.5	1.25	-	3	5	125	B15, D1, D3, D7
MENG 454	Water Desalination	2.5	1.25	-	3	5	125	A37, B14, B15, D1, D6, D7
MENG 466	Fault Diagnosis utilizing Vibrations Analysis	2.5	-	1.25	3	5	125	B11, B13, B15, C11, D1, D7
MENG 469	Selected Topics in Design	2.5	1.25	-	3	5	125	B15, C10, D4, D7

مادة (12): توزيع مقررات البرنامج على الفئات المقترحة في (NARS):

MENG Course Mapping to Subject Categories (NARS)

Course Code	Course Title			Busine ss Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.						
		C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	
	University Requirements															
ENGL 001	Intensive English															
ENGL 101	English I	0	0													
ENGL 102	English II	0	0													
ENGL 201	Writing Skills	3	5													
ENGL 202	Communication and Presentation Skills	3	5													
HUMA 101	Introduction to Scientific & Critical Thinking	2	3													
HUMA 102	Introduction to Ethics	2	3													
HUMA 103	Selected Topics in Humanities & Arts	2	3													
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3													
SSCI 103	Selected Topics in Social Sciences	2	3													
	Total University Requirements	16	25	0	0	0	0	0	0	0	0	0	0	0	0	
	Engineering Requirements															
CHEM 101	Chemical Principles					3	5									
CSCE 101	Computer & Information Skills									3	5					
CSCE 201	Introduction to Programming									3	5					
ECEN 101	Electric Circuits									3	5					
ENGR 101	Introduction to Engineering Disciplines							3	5							
ENGR 102	Engineering Design									3	5					
MATH 111	Analytical Geometry & Calculus I					3	5									
MATH 112	Calculus II					3	5									
MATH 202	Probability & Statistics for Engineers					3	5									
MATH 203	Differential Equations					3	5									
MATH 301	Linear Algebra					3	5									
MATH 303	Numerical Methods					3	5									
MENG 101	Engineering Mechanics I - Statics									2	4					
MENG 102	Engineering Mechanics II - Dynamics									2	4					
PHYS 101	Physics I					4	7									
PHYS 102	Physics II					4	7									
	Total Engineering Requirements	0	0	0	0	29	49	3	5	16	28	0	0	0	0	
	Program Requirements															
IENG 241	Engineering Economics			3	5											
MENG 201	Introduction to Solid Mechanics and Strength of Materials									2	4					
MENG 202	Solid Modeling and Workshop									3	5					
MENG 203	Introduction to Engineering Materials and Manufacturing Processes									3	5					
MENG 204	Mechanical Measurements									3	5					
MENG 301	Mechanical Behavior of Engineering Materials									3	5					
MENG 303	Machine Design									3	5					
MENG 304	Thermodynamics I									2	3					
MENG 305	Fluid Mechanics I									3	5					
MENG 306	Kinematics and Dynamics of Mechanical Svstems									3	5					

Course Code	Course Title			Busine ss Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.					
		C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS
MENG 307	Modeling and Simulation of Dynamic Systems											3	5		
MENG 308	Heat Transfer I									3	5				
MENG 391	Practical Training													3	6
MENG 401	Mechanical Vibrations											3	5		
MENG 493	Graduation Project I													3	6
MENG 495	Graduation Project II													3	6
NSCI 102	Selected Topics in Environmental Science							3	5						
	Total Program Requirements	0	0	3	5	0	0	3	5	28	47	6	10	9	18
	Track #1 (Mechatronics)														
ENTR 301	Selected Topics in Entrepreneurship			3	5										
MENG 321	Electronic devices and applications									2	3				
MENG 322 / ECEN 304	Electric Machines											3	5		
MENG 323	Fundamentals of Mechatronics Engineering											3	5		
MENG 324	Signal Processing & Logic Design											3	5		
MENG 325	Computer Control of Manufacturing Processes											3	5		
MENG 326	Computer Programming in Mechatronics Application											3	5		
MENG 327	Power Electronics											3	5		
MENG 421	Automatic Control Systems											3	5		
MENG 422	Pneumatics and Hydraulics Control Systems											3	5		
MENG 423	Digital Control Systems											3	5		
MENG 424	Embedded Systems and Computer Interface											3	5		
MENG 425	Robotics											3	5		
MENG 426	Programmable Logic Controller											3	5		
MENG xxx	Elective (1)											3	5		
MENG xxx	Elective (2)											3	5		
	Total Track 1 Requirements	0	0	3	5	0	0	0	0	2	3	42	70	0	0
	Total MENG - Mechatronics	16	25	6	10	29	49	6	10	46	78	48	80	9	18
	Course Category % (Track 1)	10.0%		3.8%		18.1%		3.8%		28.8%		30.0%		5.6%	
	Track #2 (Thermal Science and Energy)														
ENTR 301	Selected Topics in Entrepreneurship			3	5										
MATH 341	Partial Differential Equations and Simulations Tools					3	5								
MENG 321	Electronic devices and applications									2	3				
MENG 342	Thermodynamics II											3	5		
MENG 343	Heat Transfer II											3	5		
MENG 344	Fluid mechanics II											3	5		
MENG 421	Automatic Control Systems											3	5		
MENG 422	Pneumatics and Hydraulics Control Systems											3	5		
MENG 441	Finite Element Method and Applications in Mechanical Engineering											3	5		
MENG 442	Combustion											3	5		

Course Code	Course Title			Busine ss Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.					
		C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS
MENG 443	Powerplant Technology											3	5		
MENG 444	Internal combustion Engines											3	5		
MENG 445	Turbomachinery I											3	5		
MENG 446	Refrigeration and Air-Conditioning											3	5		
MENG xxx	Elective (1)											3	5		
MENG xxx	Elective (2)											3	5		
	Total Track 2 Requirements	0	0	3	5	3	5	0	0	2	3	39	65	0	0
	Total MENG - Thermal Sci.	16	25	6	10	32	54	6	10	46	78	45	75	9	18
	Course Category % (Track 1)	10.0%		3.8%		20.0%		3.8%		28.8%		28.1%		5.6%	
	Track #3 (Mechanical Design)														
ENTR 301	Selected Topics in Entrepreneurship			3	5										
MATH 341	Partial Differential Equations and Simulations Tools					3	5								
MENG 342	Thermodynamics II											3	5		
MENG 344	Fluid mechanics II											3	5		
MENG 421	Automatic Control Systems											3	5		
MENG 422	Pneumatics and Hydraulics Control Systems											3	5		
MENG 425	Robotics											3	5		
MENG 441	Finite Element Method and Applications in Mechanical Engineering											3	5		
MENG 460	Mechanics of Materials and Applications in Design											3	5		
MENG 461	Failure of Mechanical Components and Prevention											3	5		
MENG 462	Selection of Materials and Processes for Design											3	5		
MENG 463 / IENG 314	Computer-Aided Design and Prototyping											3	5		
MENG 464	Design of Engineering Systems											2	3		
MENG 465	Machine Design II											3	5		
MENG xxx	Elective (1)											3	5		
MENG xxx	Elective (2)											3	5		
	Total Track 3 Requirements	0	0	3	5	3	5	0	0	0	0	41	68	0	0
	Total MENG - Mech. Design	16	25	6	10	32	54	6	10	44	75	47	78	9	18
	Course Category % (Track 3)	10.0%		3.8%		20.0%		3.8%		27.5%		29.4%		5.6%	
		C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS
		Hum. & Social Sci.		Busine ss Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.		Eng. App. & Design		Project & PT	

MENG Core Requirements		a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	a18	a19	a20	a21	a22	a23	a24	a25	a26	a27	a28	a29	a30	a31	a32	a33	a34	a35
MENG 308	Heat Transfer I																				X		X													
MENG 391	Practical Training																																			
MENG 401	Mechanical Vibrations				X														X																	
MENG 493	Graduation Project I																																			
MENG 495	Graduation Project II																																			
NSCI 102	Selected Topics in Environmental Science												X														X									

MENG Program Requirements Courses - ILOs matrix - Part 2

MENG Core Requirements		A36	a37	a38	a39	B12	B23	B34	B45	B56	B67	B78	B89	B90	B101	B112	B123	B134	B145	C12	C23	C34	C45	C56	C67	C78	C89	C90	C101	C112	C123	D12	D23	D34	D45	D56	D67	D78	D89			
		University Requirements																																								
ENGL 001	Intensive English																			X	X	X	X																			
ENGL 101	English I																			X	X	X	X																			
ENGL 102	English II																			X	X	X	X																			
ENGL 201	Writing Skills																										X			X												
ENGL 202	Communication and Presentation Skills																																X	X	X	X	X	X				
HUMA 101	Introduction to Scientific & Critical Thinking					X	X	X	X																																	
HUMA 102	Introduction to Ethics																																			X	X	X	X	X	X	X
HUMA 103	Selected Topics in Humanities & Arts					X	X	X	X																										X	X	X	X				
SSCI 101	Selected Topics in Egyptian & Arab Heritage					X	X	X	X																								X	X	X	X						
SSCI 103	Selected Topics in Social Sciences								X																											X						
		Engineering Requirements																																								
CHEM 101	Chemical Principles																																									
CSCE 101	Computer & Information Skills																				X	X			X			X														
CSCE 201	Introduction to Programming			X																X				X	X		X	X														
ECEN 101	Electric Circuits																																									
ENGR 101	Introduction to Engineering Disciplines																																X	X	X	X						
ENGR 102	Engineering Design																			X				X			X															
MATH 111	Analytical Geometry & Calculus I																																									
MATH 112	Calculus II																																									
MATH 202	Probability & Statistics for Engineers						X						X																													
MATH 203	Differential Equations					X						X					X																									
MATH 301	Linear Algebra					X						X					X																									
MATH 303	Numerical Methods					X						X					X																									
MENG 101	Engineering Mechanics I - Statics																																									
MENG 102	Engineering Mechanics II - Dynamics																																									
PHYS 101	Physics I					X						X					X																									
PHYS 102	Physics II					X						X					X																									
		Program Requirements																																								
IENG 241	Engineering Economics				X																																					
MENG 201	Introduction to Solid Mechanics and Strength of Materials																																									
MENG 202	Solid Modeling and Workshop																																									
MENG 203	Introduction to Engineering Materials and Manufacturing Processes																																									

MENG Core Requirements		A	a	a	a	B	B	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C	C	D	D	D	D	D	D	D
		3	3	3	3	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
MENG 204	Mechanical Measurements																																	
MENG 301	Mechanical Behavior of Engineering Materials																																	
MENG 303	Machine Design																X	X	X	X									X					
MENG 304	Thermodynamics I												X						X										X					
MENG 305	Fluid Mechanics I																		X															
MENG 306	Kinematics and Dynamics of Mechanical Systems																X	X	X	X									X					
MENG 307	Modeling and Simulation of Dynamic Systems																																	
MENG 308	Heat Transfer I																		X															
MENG 391	Practical Training				X					X					X						X			X		X			X					
MENG 401	Mechanical Vibrations	X																																
MENG 493	Graduation Project I								X				X				X	X				X			X		X		X					
MENG 495	Graduation Project II								X				X				X	X				X			X		X		X					
NSCI 102	Selected Topics in Environmental Science				X				X				X				X																	

MENG (Track 1) Specialization Courses - ILOs matrix - Part 1

Track #1: Mechatronics		a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	a18	a19	a20	a21	a22	a23	a24	a25	a26	a27	a28	a29	a30	a31	a32	a33	a34	a35
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
		Compulsory (Track 1)																																		
ENTR 301	Selected Topics in Entrepreneurship																																			
MENG 321	Electronic devices and applications						x		x																											
MENG 322	Electric Machines						x		x																											
MENG 323	Fundamentals of Mechatronics Engineering							x	x		x																									
MENG 324	Signal Processing and logic design						x							x																						
MENG 325	Computer Control of Manufacturing Processes		x											x																						
MENG 326	Computer Programming in Mechatronics Application							x		x			x																							
MENG 327	Power Electronics and Electric Drives						x	x	x																											
MENG 421	Automatic Control Systems							x	x				x																							
MENG 422	Pneumatics and Hydraulics Control Systems				x			x		x																										
MENG 423	Digital Control Systems							x	x					x																						
MENG 424	Embedded Systems and Computer Interface											x		x																						
MENG 425	Robotics						x						x	x																						
MENG 426	Programmable Logic Controller											x		x																						
		Electives (Track 1)																																		
IENG 202	Operations Research													x																						
IENG 344	Project management													x																						
MENG 430	MEMS Devices and Systems									x	x																									
MENG 431	Advanced Mechatronics											x	x	x																						
MENG 432	Modern Control Systems							x	x				x																							
MENG 433	Autotronics Applications											x		x																						
MENG 434	Autonomous Systems											x		x																						
MENG 435	Intelligent Control Systems									x			x																							
MENG 436	Computer Vision & Image processing									x			x																							
COUNT		7	5	1	4	1	7	6	8	5	2	5	8	8	4	4	1	3	2	2	4	1	0	3	0	0	0	0	2	0	0	4	2	1	1	5

MENG (Track 1) Specialization Courses - ILOs matrix - Part 2

Track #1: Mechatronics		A36	a37	a38	a39	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	D1	D2	D3	D4	D5	D6	D7	D8	D9		
		Compulsory (Track 1)																																								
ENTR 301	Selected Topics in Entrepreneurship																																									
MENG 321	Electronic devices and applications						x																x																		x	
MENG 322	Electric Machines						x																x																		x	
MENG 323	Fundamentals of Mechatronics Engineering					x															x			x																		
MENG 324	Signal Processing and logic design						x				x												x	x																		
MENG 325	Computer Control of Manufacturing Processes					x			x													x																				
MENG 326	Computer Programming in Mechatronics Application									x												x	x													x						
MENG 327	Power Electronics and Electric Drives						x																x	x																		
MENG 421	Automatic Control Systems								x	x																																
MENG 422	Pneumatics and Hydraulics Control Systems							x																x																		
MENG 423	Digital Control Systems								x	x																																
MENG 424	Embedded Systems and Computer Interface								x													x	x		x												x					
MENG 425	Robotics							x	x															x											x							
MENG 426	Programmable Logic Controller								x													x	x		x											x						
		Electives (Track 1)																																								
IENG 202	Operations Research						x		x	x																																
IENG 344	Project management						x		x	x																																
MENG 430	MEMS Devices and Systems																							x																x		
MENG 431	Advanced Mechatronics										x											x			x										x							
MENG 432	Modern Control Systems								x	x																																
MENG 433	Autotronics Applications								x															x																		
MENG 434	Autonomous Systems								x													x	x		x										x							
MENG 435	Intelligent Control Systems								x	x												x			x													x				
MENG 436	Computer Vision & Image processing								x	x												x			x												x					
COUNT		1	0	1	2	8	12	9	17	10	1	5	1	1	3	2	7	2	2	4	4	17	9	11	12	0	5	1	2	1	5	2	10	6	5	10	4	4	1	1	3	

MENG (Track 2) Specialization Courses - ILOs matrix - Part 1

Track #2: Thermal Science and Energy		a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	a18	a19	a20	a21	a22	a23	a24	a25	a26	a27	a28	a29	a30	a31	a32	a33	a34	a35
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
		Compulsory (Track 2)																																		
ENTR 301	Selected Topics in Entrepreneurship												X																X							
MATH 341	Partial Differential Equations and Simulations Tools																																			
MENG 321	Electronic devices and applications							X		X																										
MENG 342	Thermodynamics II																																			
MENG 343	Heat Transfer II																																			
MENG 344	Fluid Mechanics II																																			
MENG 421	Automatic Control Systems									X	X			X																						
MENG 422	Pneumatics and Hydraulics Control Systems				X		X			X																										
MENG 441	Finite Element Method and Applications in Mechanical Engineering																																			
MENG 442	Combustion																																			
MENG 443	Powerplant Technology																																			
MENG 444	Internal combustion Engines																																			
MENG 445	Turbomachinery I																																			
MENG 446	Refrigeration and Air-Conditioning																																			
		Electives (Track 2)																																		
IENG 202	Operations Research																																			
IENG 344	Project Management																																			
MENG 451	Renewable Energy Systems Engineering																																			
MENG 452	Computational Thermo-Fluid Mechanics																																			
MENG 453	Introduction to Continuum Mechanics																																			
MENG 454	Water Desalination																																			
MENG 455	Turbomachinery II																																			
MENG 456	Nuclear Powerplant Engineering																																			
MENG 457	Advanced Selected Topic in Mechanical Power																																			
COUNT		7	4	1	4	1	3	1	3	1	0	0	1	0	3	4	1	6	2	3	7	3	1	4	2	4	2	1	6	1	1	4	2	1	1	5

MENG (Track 2) Specialization Courses - ILOs matrix - Part 2

Track #2: Thermal Science and Energy		A36	a37	a38	a39	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	D1	D2	D3	D4	D5	D6	D7	D8	D9	
		Compulsory (Track 2)																																								
ENTR 301	Selected Topics in Entrepreneurship			X																																						
MATH 341	Partial Differential Equations and Simulations Tools										X															X	X															
MENG 321	Electronic devices and applications					X																	X																			X
MENG 342	Thermodynamics II										X																X	X						X	X							
MENG 343	Heat Transfer II										X																X	X								X	X					
MENG 344	Fluid Mechanics II										X															X	X										X	X				
MENG 421	Automatic Control Systems						X	X																																		
MENG 422	Pneumatics and Hydraulics Control Systems					X																	X																			
MENG 441	Finite Element Method and Applications in Mechanical Engineering										X				X											X	X															
MENG 442	Combustion													X																							X	X	X	X		
MENG 443	Powerplant Technology								X	X															X	X																
MENG 444	Internal combustion Engines																																									
MENG 445	Turbomachinery I									X															X	X																
MENG 446	Refrigeration and Air-Conditioning										X	X														X	X			X	X	X	X									
		Electives (Track 2)																																								
IENG 202	Operations Research																																									
IENG 344	Project Management									X		X		X																												
MENG 451	Renewable Energy Systems Engineering									X				X												X																
MENG 452	Computational Thermo-Fluid Mechanics									X																X	X															
MENG 453	Introduction to Continuum Mechanics													X																												
MENG 454	Water Desalination												X												X																	
MENG 455	Turbomachinery II										X															X	X															
MENG 456	Nuclear Powerplant Engineering									X																X	X															
MENG 457	Advanced Selected Topic in Mechanical Power												X	X													X															
COUNT		1	0	1	3	4	9	5	5	4	6	12	4	5	8	2	7	2	2	4	3	9	5	6	2	1	13	9	10	1	5	2	10	5	6	11	5	5	2	2	2	

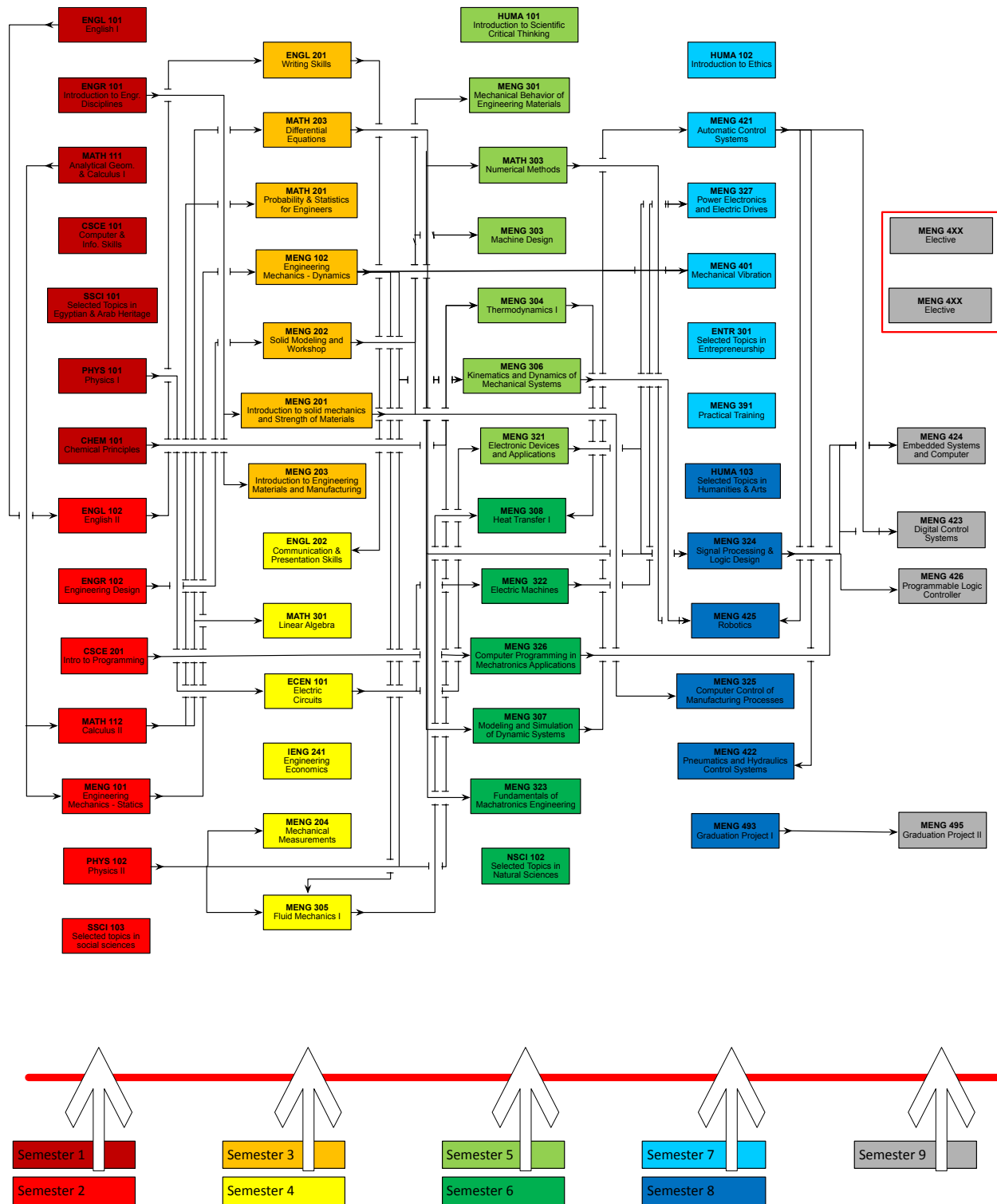
MENG (Track 3) Specialization Courses - ILOs matrix - Part 1

Track #3: Mechanical Design		a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	a18	a19	a20	a21	a22	a23	a24	a25	a26	a27	a28	a29	a30	a31	a32	a33	a34	a35	
		Compulsory (Track 3)																																			
ENTR 301	Selected Topics in Entrepreneurship																																				
MATH 341	Partial Differential Equations and Simulations Tools																																	X			
MENG 342	Thermodynamics II																																				
MENG 344	Fluid Mechanics II																																				
MENG 421	Automatic Control Systems																																	X			
MENG 422	Pneumatics and Hydraulics Control Systems																																	X			
MENG 425	Robotics																																	X			
MENG 441	Finite Element Method and Applications in Mechanical Engineering																																	X			
MENG 460	Mechanics of Materials and Application in Design																																	X			
MENG 461	Failure of Mechanical Components and Prevention																																			X	
MENG 462	Selection of Materials and Processes for Design																																				
MENG 463	Computer-Aided Design and Prototyping																																				
MENG 464	Design of Engineering Systems																																				
MENG 465	Machine Design II																																			X	
		Electives (Track 3)																																			
IENG 202	Operations Research																																				
IENG 344	Project Management																																				
MENG 443	Powerplant Technology																																				
MENG 451	Renewable Energy Systems Engineering																																				
MENG 453	Introduction to Continuum Mechanics																																				
MENG 454	Water Desalination																																				
MENG 466	Fault Diagnosis utilizing Vibrations Analysis																																				
MENG 469	Selected Topics in Design																																				
COUNT		7	4	1	3	1	1	0	1	0	0	0	0	0	0	1	4	1	3	2	2	4	1	0	3	0	0	0	0	1	0	0	4	2	7	1	6

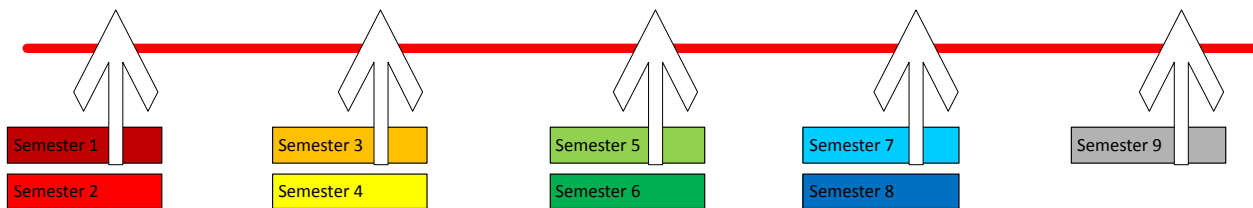
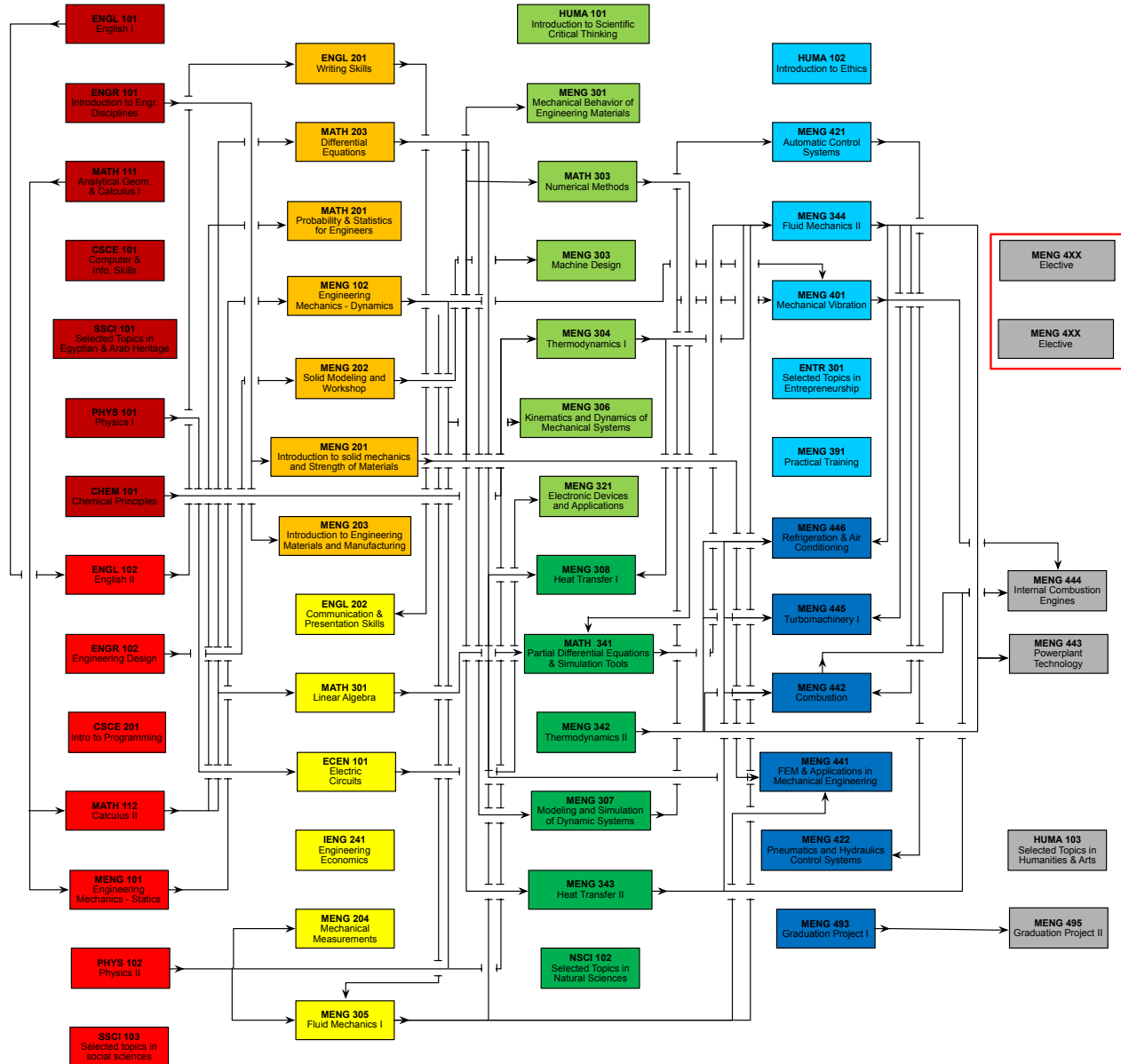
MENG (Track 3) Specialization Courses - ILOs matrix - Part 2

Track #3: Mechanical Design		A36	a37	a38	a39	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	D1	D2	D3	D4	D5	D6	D7	D8	D9	
		Compulsory (Track 3)																																							
ENTR 301	Selected Topics in Entrepreneurship			X																													X		X				X		
MATH 341	Partial Differential Equations and Simulations Tools															X															X										
MENG 342	Thermodynamics II															X															X		X								
MENG 344	Fluid Mechanics II															X															X		X								
MENG 421	Automatic Control Systems																	X	X														X								
MENG 422	Pneumatics and Hydraulics Control Systems																X																X	X							
MENG 425	Robotics																X	X																							X
MENG 441	Finite Element Method and Applications in Mechanical Engineering															X	X														X			X							
MENG 460	Mechanics of Materials and Application in Design															X	X	X													X				X						
MENG 461	Failure of Mechanical Components and Prevention															X			X												X		X		X						
MENG 462	Selection of Materials and Processes for Design		X													X															X		X	X							
MENG 463	Computer-Aided Design and Prototyping			X														X	X													X		X							
MENG 464	Design of Engineering Systems		X													X			X												X		X	X							
MENG 465	Machine Design II															X			X												X		X	X							
		Electives (Track 3)																																							
IENG 202	Operations Research				X																											X		X							X
IENG 344	Project Management				X																												X	X				X		X	
MENG 443	Powerplant Technology		X													X	X	X													X		X								
MENG 451	Renewable Energy Systems Engineering		X		X													X	X														X								
MENG 453	Introduction to Continuum Mechanics																	X														X		X					X		
MENG 454	Water Desalination		X															X	X														X					X	X		
MENG 466	Fault Diagnosis utilizing Vibrations Analysis															X		X	X													X		X					X		
MENG 469	Selected Topics in Design																	X													X					X			X		
COUNT		1	5	2	5	4	7	4	3	2	1	4	1	1	2	7	12	9	8	11	3	9	5	5	1	0	5	1	2	11	7	8	22	4	9	9	3	6	6	3	1

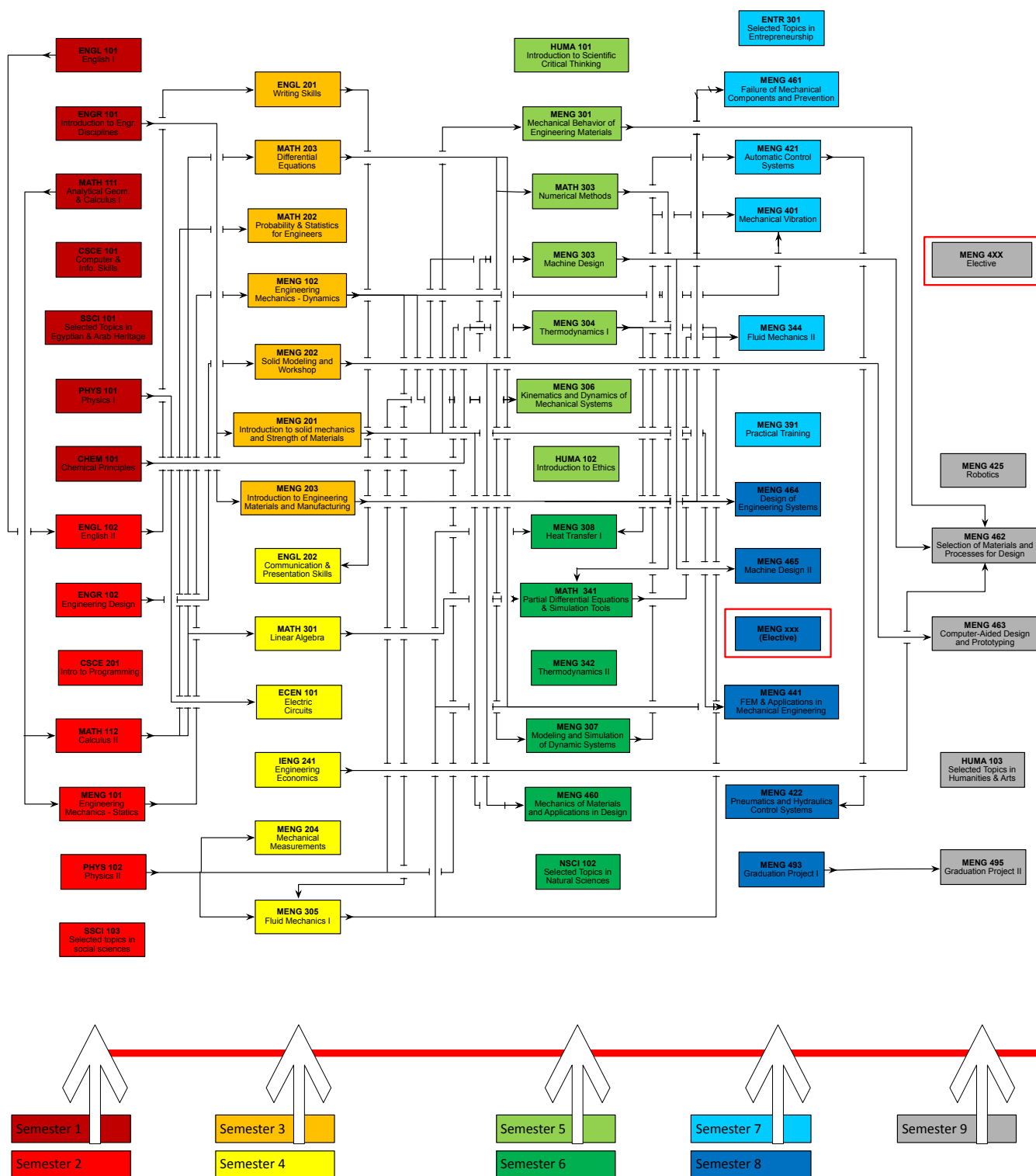
Course Dependency Flow Diagram (Track 1) - Mechatronics



Course Dependency Flow Diagram (Track 2) - Therm. Sci. & Energy



Course Dependency Flow Diagram (Track 3) - Mechanical Design



MENG Sample Study Plan

(Track 1) - Mechatronics

MENG (Track 1) Study Plan (Year 1)

Semester 1							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 101	English I	0	0	50	A minimum score of 500 on the TOEFL. Students will also be required to pass a written NU test (essay).		
MATH 111	Analytical Geometry & Calculus I	3	5	125	None		
CSCE 101	Computer & Information Skills	3	5	125	None		
ENGR 101	Introduction to Engineering Disciplines	3	5	125	None		
CHEM 101	Chemical Principles	3	5	125	None		
PHYS 101	Physics I	4	7	175	None		
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3	75	None		
TOTAL		18	30	800			
Semester 2							
ENGL 102	English II	0	0	50	ENGL 101 - English I		
MATH 112	Calculus II	3	5	125	MATH 111 - Analytical Geometry & Calculus I		
CSCE 201	Introduction to Programming	3	5	125	None		
ENGR 102	Engineering Design	3	5	125	ENGR 101 - Introduction to Engineering Disciplines		
MENG 101	Engineering Mechanics I - Statics	2	4	100	MATH 111 - Analytical Geometry & Calculus I		
PHYS 102	Physics II	4	7	175	PHYS 101 - Physics I		
SSCI 103	Selected Topics in Social Sciences	2	3	75	None		
TOTAL		17	29	775			

MENG (Track 1) Study Plan (Year 2)

Semester 3							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 201	Writing Skills	3	5	125	ENGL 102 - English II - or IELTS 6.5 or equivalent		
MATH 203	Differential Equations	3	5	125	MATH 112 - Calculus II		
MATH 202	Probability & Statistics for Engineers	3	5	125	MATH 112 - Calculus II		
MENG 102	Engineering Mechanics II - Dynamics	2	4	100	MENG 101 - Engineering Mechanics I - Statics		
MENG 202	Solid Modeling and Workshop	3	5	125	ENGR 102 - Engineering Design		
MENG 203	Introduction to Engineering Materials and Manufacturing Processes	3	5	125	ENGR 101 - Introduction to Engineering Disciplines		
MENG 201	Introduction to Solid Mechanics and Strength of Materials	2	4	100	MENG 101 - Engineering Mechanics I - Statics		
TOTAL		19	33	825			
Semester 4							
ENGL 202	Communication and Presentation Skills	3	5	125	ENGL 201 - Writing Skills		
MATH 301	Linear Algebra	3	5	125	MATH 112 - Calculus II		
ECEN 101	Electric Circuits	3	5	125	PHYS 101 - Physics I		
IENG 241	Engineering Economics	3	5	125	NONE		
MENG 204	Mechanical Measurements	3	5	125	PHYS 102 - Physics II		
MENG 305	Fluid Mechanics I	3	5	125	PHYS 102 - Physics II	MENG 102 - Engineering Mechanics II - Dynamics	
TOTAL		18	30	750			

MENG (Track 1) Study Plan (Year 3)

	Semester 5						
Code	Title	CH	ECTS	SWL	Prerequisite		
HUMA 101	Introduction to Scientific & Critical Thinking	2	3	75	None		
MATH 303	Numerical Methods	3	5	125	MATH 203 - Differential Equations		
MENG 306	Kinematics and Dynamics of Mechanical Systems	3	5	125	PHYS 102 - Physics II	MENG 102 - Engineering Mechanics II - Dynamics	
MENG 303	Machine Design	3	5	125	MENG 201 - Introduction to Solid Mechanics and Strength of Materials	MENG 202 - Solid Modeling and Workshop	
MENG 304	Thermodynamics I	2	3	75	PHYS 102 - Physics II	CHEM 101 - Chemical Principles	
MENG 301	Mechanical Behavior of Engineering Materials	3	5	125	MENG 201 - Introduction to Solid Mechanics and Strength of Materials		
MENG 321	Electronic devices and applications	2	3	75	ECEN 101 - Electric Circuits		
TOTAL		18	29	725			
	Semester 6						
MENG 322 / ECEN 304	Electric Machines	3	5	125	ECEN 101 - Electric Circuits		
MENG 326	Computer Programming in Mechatronics Application	3	5	125	CSCE 201 - Introduction to Programming		
MENG 308	Heat Transfer I	3	5	125	MENG 304 - Thermodynamics I	MENG 305 - Fluid Mechanics I	
MENG 307	Modeling and Simulation of Dynamic Systems	3	5	125	MATH 203 - Differential Equations		
MENG 323	Fundamentals of Mechatronics Engineering	3	5	125	MATH 203 - Differential Equations		
NSCI 102	Selected Topics in Environmental Science	3	5	125	None		
TOTAL		18	30	750			

MENG (Track 1) Study Plan (Year 4)

	Semester 7						
Code	Title	CH	ECTS	SWL	Prerequisite		
MENG 401	Mechanical Vibrations	3	5	125	MENG 102 - Engineering Mechanics II - Dynamics	MENG 307 - Modeling and Simulation of Dynamic Systems	
HUMA 102	Introduction to Ethics	2	3	75	None		
MENG 421	Automatic Control Systems	3	5	125	MENG 307 - Modeling and Simulation of Dynamic Systems		
MENG 327	Power Electronics	3	5	125	MENG 321 - Electronic devices and applications	MENG 322 / ECEN 304 - Electric Machines	
MENG 391	Practical Training	3	6	150	After 6th semester		
ENTR 301	Selected Topics in Entrepreneurship	3	5	125	NONE		
TOTAL		17	29	725			
	Semester 8						
MENG 422	Pneumatics and Hydraulics Control Systems	3	5	125	MENG 421 - Automatic Control Systems		
HUMA 103	Selected Topics in Humanities & Arts	2	3	75	None		
MENG 324	Signal Processing & Logic Design	3	5	125	MENG 321 - Electronic devices and applications	MATH 203 - Differential Equations	
MENG 425	Robotics	3	5	125	MATH 303 - Numerical Methods	MENG 306 - Kinematics and Dynamics of Mechanical Systems	MENG 421 - Automatic Control Systems
MENG 325	Computer Control of Manufacturing Processes	3	5	125	MENG 203 - Introduction to Engineering Materials and Manufacturing Processes		
MENG 493	Graduation Project I	3	6	180	Senior Standing		
TOTAL		17	29	755			

MENG (Track 1) Study Plan (Year 5)

	Semester 9						
Code	Title	CH	ECTS	SWL	Prerequisite		
MENG 424	Embedded Systems and Computer Interface	3	5	125	MENG 324 - Signal Processing & Logic Design	MENG 326 - Computer Programming in Mechatronics Application	
MENG 423	Digital Control Systems	3	5	125	MENG 421 - Automatic Control Systems	MENG 324 - Signal Processing & Logic Design	
MENG 426	Programmable Logic Controller	3	5	125	MENG 324 - Signal Processing & Logic Design		
MENG xxx	Elective course	3	5	125			
MENG 495	Graduation Project II	3	6	180	MENG 493 - Graduation Project I		
MENG xxx	Elective course						
TOTAL		15	26	680			

MENG (Track 1) Electives

	Electives						
Code	Title	CH	ECTS	SWL	Prerequisite		
MENG 430	MEMS Devices and Systems	3	5	125	MENG 321 - Electronic devices and applications		
MENG 431	Advanced Mechatronics	3	5	125	MENG 323 - Fundamentals of Mechatronics Engineering		
MENG 432	Modern Control Systems	3	5	125	MENG 421 - Automatic Control Systems		
MENG 433	Introduction to Autotronics	3	5	125	MENG 325 - Computer Control of Manufacturing Processes	MENG 327 - Power Electronics	
MENG 434	Introduction to Autonomous Systems	3	5	125	MENG 424 - Embedded Systems and Computer Interface		
MENG 435	Intelligent Control Systems	3	5	125	MATH 301 - Linear Algebra	MENG 326 - Computer Programming in Mechatronics Application	
MENG 436	Computer Vision & Image processing	3	5	125	MATH 301 - Linear Algebra	MENG 326 - Computer Programming in Mechatronics Application	

	Electives				
IENG 344	Project management	3	5	125	IENG 202 - Operations research I
IENG 202	Operations research I	3	5	125	MATH 111 - Analytical Geometry & Calculus I

(Track 2) - Thermal Science and Energy

MENG (Track 2) Study Plan (Year 1)

Semester 1							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 101	English I	0	0	50	A minimum score of 500 on the TOEFL. Students will also be required to pass a written NU test (essay).		
MATH 111	Analytical Geometry & Calculus I	3	5	125	None		
CSCE 101	Computer & Information Skills	3	5	125	None		
ENGR 101	Introduction to Engineering Disciplines	3	5	125	None		
CHEM 101	Chemical Principles	3	5	125	None		
PHYS 101	Physics I	4	7	175	None		
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3	75	None		
TOTAL		18	30	800			
Semester 2							
ENGL 102	English II	0	0	50	ENGL 101 - English I		
MATH 112	Calculus II	3	5	125	MATH 111 - Analytical Geometry & Calculus I		
CSCE 201	Introduction to Programming	3	5	125	None		
ENGR 102	Engineering Design	3	5	125	ENGR 101 - Introduction to Engineering Disciplines		
MENG 101	Engineering Mechanics I - Statics	2	4	100	MATH 111 - Analytical Geometry & Calculus I		
PHYS 102	Physics II	4	7	175	PHYS 101 - Physics I		
SSCI 103	Selected Topics in Social Sciences	2	3	75	None		
TOTAL		17	29	775			

MENG (Track 2) Study Plan (Year 2)

Semester 3							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 201	Writing Skills	3	5	125	ENGL 102 - English II - or IELTS 6.5 or equivalent		
MATH 203	Differential Equations	3	5	125	MATH 112 - Calculus II		
MATH 202	Probability & Statistics for Engineers	3	5	125	MATH 112 - Calculus II		
MENG 102	Engineering Mechanics II - Dynamics	2	4	100	MENG 101 - Engineering Mechanics I - Statics		
MENG 202	Solid Modeling and Workshop	3	5	125	ENGR 102 - Engineering Design		
MENG 201	Introduction to Solid Mechanics and Strength of Materials	2	4	100	MENG 101 - Engineering Mechanics I - Statics		
MENG 203	Introduction to Engineering Materials and Manufacturing Processes	3	5	125	ENGR 101 - Introduction to Engineering Disciplines		
TOTAL		19	33	825			
Semester 4							
ENGL 202	Communication and Presentation Skills	3	5	125	ENGL 201 - Writing Skills		
MATH 301	Linear Algebra	3	5	125	MATH 112 - Calculus II		
ECEN 101	Electric Circuits	3	5	125	PHYS 101 - Physics I		
IENG 241	Engineering Economics	3	5	125	NONE		
MENG 204	Mechanical Measurements	3	5	125	PHYS 102 - Physics II		
MENG 305	Fluid Mechanics I	3	5	125	PHYS 102 - Physics II	MENG 102 - Engineering Mechanics II - Dynamics	
TOTAL		18	30	750			

MENG (Track 2) Study Plan (Year 3)

	Semester 5						
Code	Title	CH	ECTS	SWL	Prerequisite		
HUMA 101	Introduction to Scientific & Critical Thinking	2	3	75	None		
MENG 301	Mechanical Behavior of Engineering Materials	3	5	125	MENG 201 - Introduction to Solid Mechanics and Strength of Materials		
MATH 303	Numerical Methods	3	5	125	MATH 203 - Differential Equations		
MENG 303	Machine Design	3	5	125	MENG 201 - Introduction to Solid Mechanics and Strength of Materials	MENG 202 - Solid Modeling and Workshop	
MENG 304	Thermodynamics I	2	3	75	PHYS 102 - Physics II	CHEM 101 - Chemical Principles	
MENG 306	Kinematics and Dynamics of Mechanical Systems	3	5	125	PHYS 102 - Physics II	MENG 102 - Engineering Mechanics II - Dynamics	
MENG 321	Electronic devices and applications	2	3	75	ECEN 101 - Electric Circuits		
TOTAL		18	29	725			
	Semester 6						
MENG 308	Heat Transfer I	3	5	125	MENG 304 - Thermodynamics I	MENG 305 - Fluid Mechanics I	
MATH 341	Partial Differential Equations and Simulations Tools	3	5	125	MATH 301 - Linear Algebra	MATH 303 - Numerical Methods	
MENG 307	Modeling and Simulation of Dynamic Systems	3	5	125	MATH 203 - Differential Equations		
MENG 343	Heat Transfer II	3	5	125	MENG 308 - Heat Transfer I		
MENG 342	Thermodynamics II	3	5	125	MENG 304 - Thermodynamics I	MENG 305 - Fluid Mechanics I	
NSCI 102	Selected Topics in Environmental Science	3	5	125	None		
TOTAL		18	30	750			

MENG (Track 2) Study Plan (Year 4)

Semester 7							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENTR 301	Selected Topics in Entrepreneurship	3	5	125	NONE		
MENG 421	Automatic Control Systems	3	5	125	MENG 307 - Modeling and Simulation of Dynamic Systems		
HUMA 102	Introduction to Ethics	2	3	75	None		
MENG 401	Mechanical Vibrations	3	5	125	MENG 102 - Engineering Mechanics II - Dynamics	MENG 307 - Modeling and Simulation of Dynamic Systems	
MENG 344	Fluid mechanics II	3	5	125	MENG 304 - Thermodynamics I	MENG 305 - Fluid Mechanics I	MATH 341 - Partial Differential Equations and Simulations Tools
MENG 391	Practical Training	3	6	150	After 6th semester		
TOTAL		17	29	725			
Semester 8							
MENG 441	Finite Element Method and Applications in Mechanical Engineering	3	5	125	MATH 203 - Differential Equations	MENG 201 - Introduction to Solid Mechanics and Strength of Materials	MENG 305 - Fluid Mechanics I
MENG 445	Turbomachinery I	3	5	125	MENG 342 - Thermodynamics II	MENG 343 - Heat Transfer II	MENG 344 - Fluid mechanics II
MENG 442	Combustion	3	5	125	MENG 342 - Thermodynamics II	MENG 343 - Heat Transfer II	MENG 344 - Fluid mechanics II
MENG 446	Refrigeration and Air-Conditioning	3	5	125	MENG 342 - Thermodynamics II	MENG 343 - Heat Transfer II	MENG 344 - Fluid mechanics II
MENG 422	Pneumatics and Hydraulics Control Systems	3	5	125	MENG 421 - Automatic Control Systems		
MENG 493	Graduation Project I	3	6	180	Senior Standing		

Semester 7							
TOTAL		18	31	805			

MENG (Track 2) Study Plan (Year 5)

	Semester 9						
Code	Title	CH	ECTS	SWL	Prerequisite		
HUMA 103	Selected Topics in Humanities & Arts	2	3	75	None		
MENG xxx	Elective Course	3	5	125			
MENG 444	Internal combustion Engines	3	5	125	MENG 343 - Heat Transfer II	MENG 401 - Mechanical Vibrations	MENG 442 - Combustion
MENG 443	Powerplant Technology	3	5	125	MENG 342 - Thermodynamics II	MENG 344 - Fluid mechanics II	
MENG xxx	Elective Course	3	5	125			
MENG 495	Graduation Project II	3	6	180	MENG 493 - Graduation Project I		
TOTAL		17	29	755			

MENG (Track 2) Electives

Electives							
Code	Title	CH	ECTS	SWL	Prerequisite		
MENG 451	Renewable Energy Systems Engineering	3	5	125	MENG 342 - Thermodynamics II		
MENG 452	Computational Thermo-Fluid Mechanics	3	5	125	MENG 342 - Thermodynamics II	MENG 343 - Heat Transfer II	MENG 344 - Fluid mechanics II
MENG 453	Introduction to Continuum Mechanics	3	5	125	MENG 201 - Introduction to Solid Mechanics and Strength of Materials	MENG 344 - Fluid mechanics II	

	Electives						
MENG 454	Water Desalination	3	5	125	MENG 342 - Thermodynamics II	MENG 344 - Fluid mechanics II	MENG 401 - Mechanical Vibrations
MENG 455	Turbomachinery II	3	5	125	MENG 342 - Thermodynamics II	MENG 343 - Heat Transfer II	MENG 344 - Fluid mechanics II
MENG 456	Nuclear Powerplant Engineering	3	5	125	MENG 342 - Thermodynamics II	MENG 344 - Fluid mechanics II	
MENG 457	Nuclear Powerplant Engineering	3	5	125	MENG 342 - Thermodynamics II	MENG 344 - Fluid mechanics II	
IENG 241	Engineering Economics	3	5	125	NONE		
IENG 344	Project management	3	5	125	IENG 202 - Operations research I		

(Track 3) - Mechanical Design

MENG (Track 3) Study Plan (Year 1)

Semester 1							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 101	English I	0	0	50	A minimum score of 500 on the TOEFL. Students will also be required to pass a written NU test (essay).		
MATH 111	Analytical Geometry & Calculus I	3	5	125	None		
CSCE 101	Computer & Information Skills	3	5	125	None		
ENGR 101	Introduction to Engineering Disciplines	3	5	125	None		
CHEM 101	Chemical Principles	3	5	125	None		
PHYS 101	Physics I	4	7	175	None		
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3	75	None		
TOTAL		18	30	800			
Semester 2							
ENGL 102	English II	0	0	50	ENGL 101 - English I		
MATH 112	Calculus II	3	5	125	MATH 111 - Analytical Geometry & Calculus I		
CSCE 201	Introduction to Programming	3	5	125	None		
ENGR 102	Engineering Design	3	5	125	ENGR 101 - Introduction to Engineering Disciplines		
MENG 101	Engineering Mechanics I - Statics	2	4	100	MATH 111 - Analytical Geometry & Calculus I		
PHYS 102	Physics II	4	7	175	PHYS 101 - Physics I		
SSCI 103	Selected Topics in Social Sciences	2	3	75	None		
TOTAL		17	29	775			

MENG (Track 3) Study Plan (Year 2)

Semester 3							
Code	Title	CH	ECTS	SWL	Prerequisite		
MENG 102	Engineering Mechanics II - Dynamics	2	4	100	MENG 101 - Engineering Mechanics I - Statics		
ENGL 201	Writing Skills	3	5	125	ENGL 102 - English II - or IELTS 6.5 or equivalent		
MATH 202	Probability & Statistics for Engineers	3	5	125	MATH 112 - Calculus II		
MATH 203	Differential Equations	3	5	125	MATH 112 - Calculus II		
MENG 201	Introduction to Solid Mechanics and Strength of Materials	2	4	100	MENG 101 - Engineering Mechanics I - Statics		
MENG 202	Solid Modeling and Workshop	3	5	125	ENGR 102 - Engineering Design		
MENG 203	Introduction to Engineering Materials and Manufacturing Processes	3	5	125	ENGR 101 - Introduction to Engineering Disciplines		
TOTAL		19	33	825			
Semester 4							
ENGL 202	Communication and Presentation Skills	3	5	125	ENGL 201 - Writing Skills		
ECEN 101	Electric Circuits	3	5	125	PHYS 101 - Physics I		
MENG 204	Mechanical Measurements	3	5	125	PHYS 102 - Physics II		
IENG 241	Engineering Economics	3	5	125	NONE		
MATH 301	Linear Algebra	3	5	125	MATH 112 - Calculus II		
MENG 305	Fluid Mechanics I	3	5	125	PHYS 102 - Physics II	MENG 102 - Engineering Mechanics II - Dynamics	
TOTAL		18	30	750			

MENG (Track 3) Study Plan (Year 3)

	Semester 5						
Code	Title	CH	ECTS	SWL	Prerequisite		
HUMA 101	Introduction to Scientific & Critical Thinking	2	3	75	None		
HUMA 102	Introduction to Ethics	2	3	75	None		
MATH 303	Numerical Methods	3	5	125	MATH 203 - Differential Equations		
MENG 301	Mechanical Behavior of Engineering Materials	3	5	125	MENG 201 - Introduction to Solid Mechanics and Strength of Materials		
MENG 303	Machine Design	3	5	125	MENG 201 - Introduction to Solid Mechanics and Strength of Materials	MENG 202 - Solid Modeling and Workshop	
MENG 304	Thermodynamics I	2	3	75	PHYS 102 - Physics II	CHEM 101 - Chemical Principles	
MENG 306	Kinematics and Dynamics of Mechanical Systems	3	5	125	PHYS 102 - Physics II	MENG 102 - Engineering Mechanics II - Dynamics	
TOTAL		18	29	725			
	Semester 6						
NSCI 102	Selected Topics in Environmental Science	3	5	125	None		
MATH 341	Partial Differential Equations and Simulations Tools	3	5	125	MATH 301 - Linear Algebra	MATH 303 - Numerical Methods	
MENG 307	Modeling and Simulation of Dynamic Systems	3	5	125	MATH 203 - Differential Equations		
MENG 308	Heat Transfer I	3	5	125	MENG 304 - Thermodynamics I	MENG 305 - Fluid Mechanics I	
MENG 342	Thermodynamics II	3	5	125	MENG 304 - Thermodynamics I	MENG 305 - Fluid Mechanics I	
MENG 460	Mechanics of Materials and Applications in Design	3	5	125	MENG 201 - Introduction to Solid Mechanics and Strength of Materials	MENG 202 - Solid Modeling and Workshop	
TOTAL		18	30	750			

MENG (Track 3) Study Plan (Year 4)

	Semester 7						
Code	Title	CH	ECTS	SWL	Prerequisite		
ENTR 301	Selected Topics in Entrepreneurship	3	5	125	NONE		
MENG 344	Fluid mechanics II	3	5	125	MENG 304 - Thermodynamics I	MENG 305 - Fluid Mechanics I	MATH 341 - Partial Differential Equations and Simulations Tools
MENG 391	Practical Training	3	6	150	After 6th semester		
MENG 401	Mechanical Vibrations	3	5	125	MENG 102 - Engineering Mechanics II - Dynamics	MENG 307 - Modeling and Simulation of Dynamic Systems	
MENG 421	Automatic Control Systems	3	5	125	MENG 307 - Modeling and Simulation of Dynamic Systems		
MENG 461	Failure of Mechanical Components and Prevention	3	5	125	MENG 203 - Introduction to Engineering Materials and Manufacturing Processes	MENG 303 - Machine Design	
TOTAL		18	31	775			
	Semester 8						
MENG 422	Pneumatics and Hydraulics Control Systems	3	5	125	MENG 421 - Automatic Control Systems		
MENG 441	Finite Element Method and Applications in Mechanical Engineering	3	5	125	MATH 203 - Differential Equations	MENG 201 - Introduction to Solid Mechanics and Strength of Materials	MENG 305 - Fluid Mechanics I
MENG 464	Design of Engineering Systems	2	3	75	MENG 203 - Introduction to Engineering Materials and Manufacturing Processes	MENG 303 - Machine Design	
MENG 465	Machine Design II	3	5	125	MENG 303 - Machine Design		
MENG xxx	Elective Course	3	5	125			

Semester 7						
MENG 493	Graduation Project I	3	6	180	Senior Standing	
TOTAL		17	29	755		

MENG (Track 3) Study Plan (Year 5)

Semester 9						
Code	Title	CH	ECTS	SWL	Prerequisite	
HUMA 103	Selected Topics in Humanities & Arts	2	3	75	None	
MENG 425	Robotics	3	5	125	MATH 303 - Numerical Methods	MENG 306 - Kinematics and Dynamics of Mechanical Systems MENG 421 - Automatic Control Systems
MENG 462	Selection of Materials and Processes for Design	3	5	125	IENG 241 - Engineering Economics	MENG 301 - Mechanical Behavior of Engineering Materials MENG 303 - Machine Design
MENG 463 / IENG 314	Computer-Aided Design and Prototyping	3	5	125	MENG 202 - Solid Modeling and Workshop	
MENG xxx	Elective Course	3	5	125		
MENG 495	Graduation Project II	3	6	180	MENG 493 - Graduation Project I	
TOTAL		17	29	755		

MENG (Track 3) Electives

Electives					
Code	Title	CH	ECTS	SWL	Prerequisite

Electives							
MENG 453	Introduction to Continuum Mechanics	3	5	125	MENG 201 - Introduction to Solid Mechanics and Strength of Materials	MENG 344 - Fluid mechanics II	
MENG 466	Fault Diagnosis utilizing Vibrations Analysis	3	5	125	MENG 401 - Mechanical Vibrations	MENG 465 - Machine Design II	
MENG 469	Selected Topics in Design	3	5	125	MENG 344 - Fluid mechanics II	Senior Standing	
MENG 451	Renewable Energy Systems Engineering	3	5	125	MENG 342 - Thermodynamics II	MENG 344 - Fluid mechanics II	
MENG 443	Powerplant Technology	3	5	125	MENG 342 - Thermodynamics II	MENG 344 - Fluid mechanics II	
MENG 454	Water Desalination	3	5	125	MENG 342 - Thermodynamics II	MENG 344 - Fluid mechanics II	MENG 401 - Mechanical Vibrations
IENG 202	Operations research I	3	5	125	MATH 111 - Analytical Geometry & Calculus I		
IENG 344	Project management	3	5	125	IENG 202 - Operations research I		

توصيف مقررات برنامج الهندسة الميكانيكية

(MENG) - ENTR 301

Course Title	Selected Topics in Entrepreneurship	
Course Code	ENTR 301	
Prerequisites	NONE	
Classification within the curriculum	Compulsory (All Tracks)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Business	
Topic Level	Specialization	
Description In this course, students get an overview about the definition of entrepreneurship, examples of successful innovations, and the prospects of starting a company. The course covers idea generation and identifying opportunities, business model canvas, and an overview of some business fundamentals such as types of businesses and business functions, in addition to communication and presentation skills.		

(MENG) - IENG 202

Course Title	Operations research I	
Course Code	IENG 202	
Prerequisites	MATH 111 - Analytical Geometry & Calculus I	
Classification within the curriculum	Elective (All Tracks)	
Course Position in Study Plan	Fall (Semester 9)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Specialization	
Description		
The aim of this course is to introduce the decision making process criteria to students and differentiate between different decision making environments. Students are given the knowledge and experience of problem solving techniques through using different operations research modeling and solution techniques. Through practical applications, assignments and the final projects students learn how to utilize suitable tools at different problem solving situations.		
Lab and Tutorials		
The course requires practice and problem solving training during tutorials, in addition to training on software to solve general OR problems.		
Literature-		
- Barry Render, Ralph M. Stair, JR, and Michael E. Hanna, “Quantitative Analysis for Management”, 10th Edition, Pearson Prentice Hall, 2009. - Frederick S. Hillier and Gerald J. Lieberman, Introduction to Operations Research (8th ed.), McGraw Hill, New York (2005). - Hamdy A. Taha, Operations Research: An Introduction (6th ed.),		

(MENG) - IENG 241

Course Title	Engineering Economics	
Course Code	IENG 241	
Prerequisites	NONE	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Business	
Topics Level	Program Requirements	
Description		
The main aim of this course is make the students acquainted with rational meaningful approaches to evaluating economically different (alternatives) investment opportunities while accomplishing given objectives. The course will also provide the students with the required tools and techniques to consider economic and non-economic factors in evaluating a wide range of industrial and business applications.		
Lab and Tutorials		
The course requires practice and problem solving training during tutorials		
Literature		
- Fraser, N. M., Jewkes, E. M., Bernhardt I. & Tajima, M., Global Engineering Economics: Financial Decision Making for Engineers, 4th Edition, Pearson Education, 2009. - Chan S. Park, Fundamentals of Engineering Economics, 3rd Edition, Pearson Education, ISBN 13:978-0273772910		

(MENG) - IENG 344

Course Title	Project management	
Course Code	IENG 344	
Prerequisites	IENG 202 - Operations research I	
Classification within the curriculum	Elective (Track 1)	
Course Position in Study Plan	Fall (Semester 9)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Specialization	
Description		
This course addresses the fundamental of project management, as well as the tools and techniques necessary to manage complex projects. These principles, largely developed and tested on engineering projects, are being successfully applied to projects of all sizes and types within the business world. They are also fully aligned with the industry standard Project Management Book of Knowledge (PMBOK), published by the worldwide Project Management Institute (PMI). The course will enable students to master projects planning, scheduling and estimating; developing approval process, including testing for alternatives; understanding project information and control systems; properly selecting resources, allocation and implementation, and post project evaluation. PERT, CPM		
Lab and Tutorials		
The course requires practice and problem solving training during tutorials, in addition to software training.		
Literature		
• Project Management: A Systems Approach to Planning, Scheduling, and Controlling, Harold Kerzner.		

(MENG) - MATH 341

Course Title	Partial Differential Equations and Simulations Tools	
Course Code	MATH 341	
Prerequisites	MATH 301 - Linear Algebra	MATH 303 - Numerical Methods
Classification within the curriculum	Compulsory (Track 2 and Track 3)	
Course Position in Study Plan	Spring (Semester 6)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	----
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Mathematics and Basic Sciences	
Topic Level	Specialization	
Description Partial differential equations are mathematical tools used in studying systems and modeling its phenomena. They are widely used in diverse areas of engineering, physical sciences, biology, economics and finance. The aim of this course is to teach the students how to solve partial differential equations and interpret the resulting solutions. The course first discusses the solutions of PDEs using different methods such as separation of variables, integral transforms and Fourier series for both homogeneous and non-homogeneous cases. It also introduces the series solutions of differential equations using Frobenius method. Some theoretical concepts about the Sturm-Liouville problem are discussed. It also provides solutions of partial differential equations using finite difference method. Computer software simulation tool (MATLAB, SciLab or any other suitable software) is used to solve linear and non-linear partial differential equations.		
Tutorials Examples are discussed in detail during the tutorial as well as the software package is covered. Help is provided during the tutorial regarding the course project.		
Literature: “Advanced Engineering Mathematics,” Dennis G. Zill and Warren S. Wright, 5th edition. “Applied Partial Differential Equations with Fourier Series and Boundary Value Problems,” R. Haberman, 5th edition. “Differential Equations with Boundary Value Problems” John Polking, Albert Boggess and David Arnold, 2nd edition. - Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 201

Course Title	Introduction to Solid Mechanics and Strength of Materials	
Course Code	MENG 201	
Prerequisites	MENG 101 - Engineering Mechanics I - Statics	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 3)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	-
	TOTAL	2.50
EG Credit Hours	2	
ECTS	4	
Student Workload (SWL)	100	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description Concepts of stress and strain. Mechanical behavior of materials. Internal reactions in rods. Axial deflections in rods due to mechanical and/or thermal loadings. Statically indeterminate rods. Lateral deflections (Poisson’s ratio). Generalized Hooke’s law. Normal and shear stress in beams. Pure bending. Bending due to eccentric forces (2D and 3D). Torsion of solid and hollow circular members. Combined loading. Transformation of stresses and strains. Yield criteria for ductile materials (Maximum distortion energy criterion, von Mises and Maximum shear stress criterion, Tresca).		
Lab and Tutorials Not Applicable		
Literature “Mechanics of Materials”, F. P. Beer, E. R. Johnston, J. T. DeWolf, and David F. Mazurek. McGraw-Hill, New York, 6th edition. - Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 202

Course Title	Solid Modeling and Workshop	
Course Code	MENG 202	
Prerequisites	ENGR 102 - Engineering Design	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 3)	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Engineering Requirements	
Description This course is designed to teach the use of 3D solid modeling CAD packages. Instruction includes how to use a 3D CAD package to develop solid models in order to generate assemblies and 2D drawings. This course enables students to develop basic spatial skill through the use of a solid modelling system. Students develop skills in interpreting and visualising 3D objects in 2D format. They create and assemble solid model representation of machine components and create 2D engineering drawings from solid models. Students develop advanced technical sketching skills to aid communication in engineering design.		
Lab and Tutorials Students are exposed to basic workshop practice techniques & application of the basic skills to undertake a project.		
Literature 1. Course Textbook: Dugan Solid Modeling and Applications: Rapid Prototyping, CAD and CAE Theory. Springer, 2017 2. M. P. Groover , “principles of Modern Technologies”, John Wiley Additional Resources: - William E. Howard. Introduction to Solid Modeling Using SolidWorks 2017, McGraw-Hill Education; 13 Ed, 2017 - Donald E. Lacourse. Handbook of Solid Modeling, McGraw-Hill, 1995		

(MENG) - MENG 203

Course Title	Introduction to Engineering Materials and Manufacturing Processes	
Course Code	MENG 203	
Prerequisites	ENGR 101 - Introduction to Engineering Disciplines	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 3)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Program Requirements	
Description This course provides an introduction to engineering materials and their mechanical and thermal properties, production of common metals. Types of manufacturing firms, basic manufacturing processes such as: casting, metal forming, forging, common welding techniques, hydroforming, friction steer welding, machining, and introduction to mechanics of metal cutting.		
Tutorials Regular weekly problem solving tutorial sessions are conducted.		
Literature Fundamentals of Modern Manufacturing”, 2nd edition, John Wiley & Sons Inc., 2004		

(MENG) - MENG 204

Course Title	Mechanical Measurements	
Course Code	MENG 204	
Prerequisites	PHYS 102 - Physics II	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring (Semester 4)	
Contact Hours	Lectures	2.5
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description This course focuses on basics of mechanical measurement systems including static and dynamic characteristics of instruments, static analysis of measurement errors, variable conversion elements and signal conditioning and amplification. Also, it covers metrology and mechanical measuring instruments, and introduces different types of sensors (like strain, force, pressure, flow, power, temperature)		
Lab and Tutorials Regular tutorial sessions are given to cover theory of operation of different physics and labs are conducted as well to show students metrology devices and DAQ process.		
Literature Course Textbook: Richard S. Figliola, Donald E. Beasley, “Theory and Design for Mechanical Measurements” 5th edition, John Wiley, 2006		

(MENG) - MENG 301

Course Title	Mechanical Behavior of Engineering Materials	
Course Code	MENG 301	
Prerequisites	MENG 201 - Introduction to Solid Mechanics and Strength of Materials	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 5)	
Contact Hours	Lectures	2.5
	Tutorials	0.63
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The aim of the course is to give students an introduction to the science of engineering materials and their properties and behavior. Topics include the atomic structure, structure of crystalline solids, imperfections in solids, mechanical behavior of metals, failure, phase diagrams and phase transformations, properties and processing of metals alloys, ceramics, polymers and composites, corrosion and degradation of materials and their environmental effects.		
Tutorials Teach the students the necessary skills of engineering calculations needed for the selection and design of material components. Demonstration of the materials properties and their behavior under different loading conditions.		
Literature <u>Course Textbook:</u> - Materials science and Engineering: An Introduction. 8Th edition. William D. Callister, Jr. and David G. Rethwisch, 2010 John Wiley & Sons, Inc. <u>Additional Resources:</u> - The Science and Engineering of Materials. 6Th edition. Donald R. Askeland, Pradeep P. Fulay and Wendelin J. Wright, 2011 Cengage Learning. - Lecture Notes		

(MENG) - MENG 303

Course Title	Machine Design	
Course Code	MENG 303	
Prerequisites	MENG 201 - Introduction to Solid Mechanics and Strength of Materials	MENG 202 - Solid Modeling and Workshop
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 5)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	-
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description Introduction to design concepts. Engineering materials used for design of mechanical components. Stress concentrations. Design for Different Types of Loading (steady and cyclic loadings). Fasteners, connections, and power screws. Spur gears. Helical gears. Design of shafts. Selection of bearings. Design of helical compression springs. Design of columns and struts. Utilization of interactive computer programs for design of mechanical components and assembly. Project required.		
Tutorials Regular weekly problem solving tutorial sessions are conducted.		
Literature • “Machine Elements in Mechanical Design”, Robert L. Mott, Pearson, 5th edition. • SolidWorks, Users Guide 2016, Dassault Systèmes. • Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 304

Course Title	Thermodynamics I	
Course Code	MENG 304	
Prerequisites	PHYS 102 - Physics II	CHEM 101 - Chemical Principles
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 5)	
Contact Hours	Lectures:	1.25
	Tutorials:	1.25
	Labs:	1.25
	TOTAL	3.75
EG Credit Hours	2	
ECTS	3	
Student Workload (SWL)	75	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The course gives an introduction to the basics concepts of thermodynamics as related to the conversion of heat to mechanical work. Topics include, properties of pure substance, 1 st law of thermodynamics for open and closed systems, 2 nd law of thermodynamics, entropy and entropy change.		
Lab and Tutorials Teach the students the necessary skills to solve thermodynamics problems. Demonstrate some of the fundamental concepts tough in the course like the properties of pure substance, the conversion of work and energy.		
Literature Course Textbook: - Thermodynamics: An Engineering Approach, <i>8th edition</i>. Yunus A. Cengel and Michael A. Boles, 2014 McGraw-Hill Education. Additional Resources: - Property Tables Booklet for Thermodynamics: An Engineering Approach, <i>8th edition</i>. Yunus A. Cengel, 2014 McGraw-Hill Europe. - Lecture Notes		

(MENG) - MENG 305

Course Title	Fluid Mechanics I	
Course Code	MENG 305	
Prerequisites	PHYS 102 - Physics II	MENG 102 - Engineering Mechanics II - Dynamics
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring (Semester 4)	
Contact Hours	Lectures:	2.5
	Tutorials:	0.625
	Labs:	0.625
	TOTAL:	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The aim of the course is to introduce the students to the topic of fluid mechanics. Topics include the difference between a fluid and a solid, properties of fluids, fluid statics and hydro-static forces, continuity equation and steady flow, jet forces and momentum equations, Bernoulli equation and its applications, pressure losses and pipes and fittings.		
Lab and Tutorials Teach the students the necessary skills to deal with real life problems as related to fluid mechanics. Demonstrate some of the fundamental concepts taught in the course like the Bernoulli equation and jet forces.		
Literature Course Textbook: - Fluid Mechanics: Fundamentals and Applications, <i>4th edition</i>. Yunus A. Cengel and John M. Cimbala, 2017 McGraw-Hill Education. Additional Resources: - Fluid Mechanics, <i>8th edition</i>. Frank White 2015 McGraw-Hill Education - Munson, Young and Okiishi's Fundamentals of Fluid Mechanics, <i>8th edition</i>, Philip M. Gerhart, Andrew L. Gerhart and John I. Hochstein 2016 Wiley - Lecture Notes		

(MENG) - MENG 306

Course Title	Kinematics and Dynamics of Mechanical Systems	
Course Code	MENG 306	
Prerequisites	PHYS 102 - Physics II	MENG 102 - Engineering Mechanics II - Dynamics
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 5)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	-
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description Introduction to linkages, types and classification of joints, mechanisms and machines. Calculation of degrees of freedom (mobility) for planar mechanisms utilizing Gruebler and Kutzbach equations. Grashof and non-Grashof conditions. Paradoxes. Intermittent motion. Toggle. Transmission angle. Compliant mechanisms. Cognates. Function generation. Motion generation. Path generation. Kinematics fundamentals of fourbar linkage mechanisms and inversions. Graphical linkage synthesis including fourbar quick-return mechanism. Analytical position analysis of fourbar, five-bar (ordinary and geared five-bar), and six-bar (Watt and Stephenson) mechanisms using Euler’s mathematical notation. Analytical position synthesis of fourbar mechanisms with and without fixed pivots. Velocity and acceleration analyses. Design and analyses of gear trains [simple, compound (ordinary and reverted), and planetary gear trains]. Types of cams. Design of roller-follower cams (<i>s-v-a-j</i> diagrams). Dynamic force analysis for fourbar mechanisms and inversions. Project required.		
Tutorials Regular weekly problem solving tutorial sessions are conducted infusing computer based solving and animation software.		
Literature • “Design of Machinery – An Introduction to the Synthesis and Analysis of Mechanisms and Machines”, Robert L. Norton. McGraw-Hill, New York, 5th edition. • MATLAB. User's Guide Release 2009a. The MathWorks, Inc. Natick, Massachusetts, United States. • ADAMS. Documentation 2017. MSC Software. Newport Beach, California, United States. • DYNACAM. User’s Guide – Student Edition, Robert L. Norton. • Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 307

Course Title	Modeling and Simulation of Dynamic Systems	
Course Code	MENG 307	
Prerequisites	MATH 203 - Differential Equations	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring (Semester 6)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The course will also provide students with thorough understanding of the sequence of activities related to computer simulation (problem statement, data acquisition, model design, simulation experiment, verification, techniques and methods in different industrial and research applications. Topics covered: Analogy between different physical and electrical systems, modeling of electrical systems, modeling of mechanical systems, modeling of electromechanical systems, modeling of hydraulic systems, modeling of pneumatic systems, modeling of thermal systems, transducers functions for different physical systems, state space representations for different physical systems, simulation and soft testing of electromechanical systems (MATLAB with Simulink can be used as a simulation tool).		
Lab and Tutorials Students will be required to complete Tutorial and laboratory assignments and to perform practical projects.		
Literature Course Textbook: - Katsuhiko Ogata (2003) System Dynamics. Pearson; 4 edition Additional Resources: - Devendra K. Chaturvedi (2010) Modeling and Simulation of systems using MATLAB and Simulink, CRC Press Taylor & Francis Group.		

(MENG) - MENG 308

Course Title	Heat Transfer I	
Course Code	MENG 308	
Prerequisites	MENG 304 - Thermodynamics I	MENG 305 - Fluid Mechanics I
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring (Semester 6)	
Contact Hours	Lectures:	2.5
	Tutorials:	0.625
	Labs:	0.625
	TOTAL:	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description This course is a first course in Heat Transfer. The main goal is to gain a deep physical understanding of the heat transfer process by either conduction or convection. Topics include introduction to the concept of heat transfer, conduction heat transfer equation, steady state heat conduction, transient heat conduction, introduction to convection, forced and free convection.		
Lab and Tutorials Teach the students the necessary skills to solve heat transfer related problems. Demonstrate some of the fundamental concepts taught in the course like the thermal conductivity of materials and the calculation of the convective heat transfer coefficient,		
Literature Course Textbook: - Heat and Mass Transfer: Fundamentals and Applications, <i>5th edition</i>. Yunus A. Cengel and Afshin J. Ghajar, 2015 McGraw-Hill Education. Additional Resources: - Fundamentals of Heat and Mass Transfer. <i>7th edition</i>. Theodore L. Bergman, Adrienne S. Lavine, France P. Incropera and David P. DeWitt, 2011 Wiley. - Lecture Notes		

(MENG) - MENG 321

Course Title	Electronic devices and applications

Course Code	MENG 321	
Prerequisites	ECEN 101 - Electric Circuits	
Classification within the curriculum	Compulsory (Track 1 and Track 2)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	1.25
	Tutorials	1.25
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	2	
ECTS	3	
Student Workload (SWL)	75	
Topic Category	Basic Engineering Sciences	
Topic Level	Specialization	
Description Crystal structure of semiconductors (electrons, holes, impurities, Fermi level, diffusion, continuity equation), semiconductor diodes (P-N junction, V-I characteristics, forward and reverse bias), diode circuit applications (rectifier and clipping circuits) BJT, MOS, JFET transistors, V-I characteristics, physical construction, signal amplifiers, bias circuits, transistor circuit model, AC and DC analysis.		
Lab and Tutorials In the tutorials the students should be able to solve the problems of semiconductor-based circuits. The students should receive better understanding of the course concepts via a well-defined set of experimental work done at labs using resistors, capacitors in addition to semiconductor elements.		
Literature 1. Course Textbook: <i>Microelectronics circuits</i> by Adel S. Sedra and Kenneth C. Smith, 6 th edition 2. Additional Resources: - Reference #2: Laboratory notes. - Reference #3.		

(MENG) - MENG 322

Course Title	Electric Machines	
Course Code	MENG 322 / ECEN 304	
Prerequisites	ECEN 101 - Electric Circuits	
Classification within the curriculum	Compulsory (Track 1)	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description The course covers the basics electromagnetic fields in electromechanical devices: Production of magnetic field, Faraday’s law (transformer action), production of induced force on a wire (motor action), Production of induced voltage on conductor moving in magnetic field (generator action). <u>DC Machines:</u> construction, Theory of operation. <u>DC Generators:</u> Separately-excited generator, Self-excited generators (shunt, series and compound types) Characteristics of different types of DC generators, Efficiency of DC generators. <u>DC Motors:</u> Separately-excited Motor, Self-excited Motor (shunt, series and compound types) Characteristics of different types of DC motors, Efficiency of DC motors. <u>Transformers:</u> Single phase transformers, principle of operation, equivalent circuit, efficiency, three phase transformers, connections of transformers. AC Machine Fundamentals; Synchronous Machines; Induction Motors: Construction, theory of operation, equivalent circuit. Special Machines.		
Lab and Tutorials Students will be required to complete Tutorial and laboratory assignments and to perform practical projects to understand basic characteristics of different types of electric machines.		
Literature Course Textbook: Fitzgerald, A. E., Charles Kingsley, Jr., and Stephen D. Umans. Electric Machinery. 6th ed. McGraw-Hill, 2007. ISBN: 9780071230100. Additional Resources: - Kirtley Jr., James L. Electric Power Principles: Sources, Conversion, Distribution and Use. Wiley, 2010. ISBN: 9780470686362 - Beaty, H. Wayne, and James L. Kirtley, Jr. Electric Motor Handbook. McGraw-Hill, 1998. ISBN: 9780070359710.		

(MENG) - MENG 323

Course Title	Fundamentals of Mechatronics Engineering	
Course Code	MENG 323	
Prerequisites	MATH 203 - Differential Equations	
Classification within the curriculum	Compulsory (Track 1)	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Electromechanical system modeling, Control and Applications. Design of Electronic Interfaces and Controllers for Mechanical Devices. Sensor Technology, Signal acquisition, Filtering, and Conditioning. Microcontroller-based Closed-loop Control. Device Communications Sensor and actuator selection, installation, and application strategies.		
Lab and Tutorials		
Literature Course Textbook: Clarence W. de Silva, Farbod Khoshnoud, Maoqing Li, Saman K. Halgamuge, “Mechatronics: Fundamentals and Applications” 2015. Additional Resources: Class notes.		

(MENG) - MENG 325

Course Title	Computer Control of Manufacturing Processes	
Course Code	MENG 325	
Prerequisites	MENG 203 - Introduction to Engineering Materials and Manufacturing Processes	
Classification within the curriculum	Compulsory (Track 1)	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description The student will be introduced to the field of manufacturing as a control's application area with an emphasis on machining systems. The student will be exposed to the issues in manufacturing systems and learn how to model, control, and simulate machining systems. Topics include machine structures, servomechanisms, CNC programming, interpolation, coordinated control, process modeling and control, and manufacturing systems. Upon completion of this course, the student will be able to successfully apply their knowledge to model, control, and simulate manufacturing systems and processes..		
Lab and Tutorials Students will be required to complete Tutorial and laboratory assignments and to perform practical experiments like Computer numerical controller (CNC) demonstration and introduction of the architecture, CNC automated programming, CNC-PLC integration and communication.		
Literature 1. Course Textbook: J. Bollinger and N. Duffie, Computer Control of Machines and Processes, Addison-Wesley, 1988.. Additional Resources: - Ulrich Rembold. Interface Technology for Computer Controlled Manufacturing Processes. CRC Press - Ken Evans. Programming of CNC Machines 4th Edition. Industrial Press, Inc.; 4 edition (2016)		

(MENG) - MENG 326

Course Title	Computer Programming in Mechatronics Application	
Course Code	MENG 326	
Prerequisites	CSCE 201 - Introduction to Programming	
Classification within the curriculum	Compulsory (Track 1)	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description The course is focused on the development of algorithms that include electromechanical. While the objectives of the course are similar to those of a traditional programming course (flowcharting, algorithm development, loops, logical structures, and data arrays), the course presents these topics using C, C++, and MatLab programming languages and tools.		
Lab and Tutorials In the labs, different mechatronics applications are used to provide the students with immediate, concrete, visual feedback on their programming implementations.		
Literature Course Textbook: 1- Marc E Herniter, “Programming in MATLAB”, 2000 2- <u>Brian W. Kernighan</u> & Dennis M. Ritchie , <u>C Programming Language, 2nd Edition</u> Apr 1, 1988 Additional Resources: Class notes.		

(MENG) - MENG 327

Course Title	Power Electronics	
Course Code	MENG 327	
Prerequisites	MENG 321 - Electronic devices and applications	MENG 322 / ECEN 304 - Electric Machines
Classification within the curriculum	Compulsory (Track 1)	
Course Position in Study Plan	FALL	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Introduction to power electronics, Power diodes, Thyristors, Ac voltage controllers, Single phase converters, Three phase converters, Phase control of ac controllers, Integral cycle control, Thyristors commutation techniques, Natural commutation, Forced Commutation, Circuits. Dc choppers, the single Thyristors chopper, Two Thyristors Choppers, Inverters. Single phase circuits, Bridge inverter circuits. Industrial applications: Adjusted speed dc Drives, Induction motor drives, Starting, speed control and electric braking of induction motors. Slip power recovery from an induction motor, Forced commutated, Variable frequency ac motor drives.		
Lab and Tutorials Students will be required to complete laboratory assignments and to perform practical projects		
Literature 1. Course Textbook: Muhammad H. Rashid. Power Electronics: Circuits, Devices, and Applications. Pearson. Additional Resources: R. W. Erickson, “Fundamentals of Power Electronics”, Kluwer Academic Publications, 1997. D. W. Hart, “Introduction to Power Electronics”, Prentice Hall International, 1997.		

(MENG) - MENG 342

Course Title	Thermodynamics II	
Course Code	MENG 342	
Prerequisites	MENG 304 - Thermodynamics I	MENG 305 - Fluid Mechanics I
Classification within the curriculum	Compulsory (Track 2 and Track 3)	
Course Position in Study Plan	Fall (Semester 7)	
Contact Hours	Lectures	2.5
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Starting with a review of thermodynamics I, then the performance of gas power cycles for which the working fluid remains a gas throughout the entire cycle is covered. The analysis of vapor power cycles in which the working fluid is alternately vaporized and condensed is then considered. Finally, the mixture theory is presented.		
Tutorials More examples are covered during the tutorial and help is provided for the course project.		
Literature Y. Cengel, M. Boles, Thermodynamics: An engineering Approach, - Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 343

Course Title	Heat Transfer II	
Course Code	MENG 343	
Prerequisites	MENG 308 - Heat Transfer I	
Classification within the curriculum	Compulsory (Track 2)	
Course Position in Study Plan	Fall (Semester 7)	
Contact Hours	Lectures:	2.5
	Tutorials:	0.625
	Labs:	0.625
	TOTAL:	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description This second course in heat transfer focuses on more advanced topics which include. Phase change heat transfer (Boiling and Condensation), Heat Exchangers, Radiation heat transfer and Mass transfer.		
Lab and Tutorials Teach the students the necessary skills to solve heat transfer related problems. Demonstrate some of the fundamental concepts taught in the course like the different regimes in pool and flow boiling and heat transfer by radiation.		
Literature Course Textbook: Heat and Mass Transfer: Fundamentals and Applications, <i>5thedition. Yunus A. Cengel and Afshin J. Ghajar, 2015 McGraw-Hill Education.</i> Additional Resources: - Fundamentals of Heat and Mass Transfer. 7thedition. Theodore L. Bergman, Adrienne S. Lavine, France P. Incropera and David P. DeWitt, 2011 Wiley. - Lecture Notes		

(MENG) - MENG 344

Course Title	Fluid mechanics II		
Course Code	MENG 344		
Prerequisites	MENG 304 - Thermodynamics I	MENG 305 - Fluid Mechanics I	MATH 341 - Partial Differential Equations and Simulations Tools
Classification within the curriculum	Compulsory (Track 2 and Track 3)		
Course Position in Study Plan	Fall (semester 7)		
Contact Hours	Lectures	2.5	
	Tutorials	0.625	
	Labs	0.625	
	TOTAL	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL)	125		
Topic Category	Engineering Applications		
Topic Level	Specialization		
Description Starting with a review of fluid mechanics I, then the fluid kinematics is introduced including the Eulerian and the Lagrangian descriptions. Then the balance laws are derived for a general fluid then types of fluids are presented with emphasis on Newtonian fluids leading to the Navier-Stokes equations. Approximate analytical solutions for incompressible fluids are introduced including the boundary layer approximation. To complete the picture, an introduction to the compressibility effects is presented.			
Laboratory and Tutorial: Teach the students the necessary skills to solve course related problems. Demonstrate some of the fundamental concepts taught in the course and give support for the course project.			
Literature Y. Cengel, J. Cimbala, Fluid Mechanics: Fundamentals and Applications, 3rd edition, McGraw-Hill; 2014. - Class notes prepared by instructor and uploaded on Moodle.			

(MENG) - MENG 391

Course Title	Practical Training	
Course Code	MENG 391	
Prerequisites	After 6th semester	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 7)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	-
	TOTAL	2.50
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL)	150	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description A minimum of four weeks of practical training in off-campus sites elected by the department. Students are required to submit a recognition letter from the site where they received their training, in addition, a report and a presentation are submitted as well. Course is a Pass/Fail course.		
Lab and Tutorials Not Applicable		
Literature Not Applicable		

(MENG) - MENG 401

Course Title	Mechanical Vibrations	
Course Code	MENG 401	
Prerequisites	MENG 102 - Engineering Mechanics II - Dynamics	MENG 307 - Modeling and Simulation of Dynamic Systems
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 7)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	-
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description Free and forced responses of one and two degree of freedom systems. Applications to engineering systems involving vibration isolation, rotating imbalance and vibration absorption. Elements of vibration measuring systems, frequency analysis of mechanical vibration, introduction to condition monitoring fault detection and passive vibration control techniques.		
Tutorial: Textbook problem solving with and without simulation tools (Matlab for example). Experimental measurement and analysis of frequency response of SDOF system, vibration isolation, vibration modes of SDOF and 2 DOF systems.		
Literature Course Textbook: S. S. Rao, Mechanical Vibrations, 6th edition Additional Resources: - Lecture notes.		

(MENG) - MENG 421

Course Title	Automatic Control Systems	
Course Code	MENG 421	
Prerequisites	MENG 307 - Modeling and Simulation of Dynamic Systems	
Classification within the curriculum	Compulsory (All Tracks)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description The first course in control systems introduces: Introduction to feedback control systems, Block Diagram Representation , Signal Flow Graph, Analyzing the performance of control systems either in open or closed loops, transient-response analysis and steady state error analysis, basic control actions (PID), tuning methods of PID controller, Steady State Error analysis, stability analysis through the Routh-Hurwitz. Software simulation primarily with MATLAB and laboratory experiments will complement and supplement the theory.		
Lab and Tutorials The labs are used to help students in implementing and designing conventional controller like PID as well as studying the stability of control systems.		
Literature 1. Ogata K. Modern Control Engineering. Prentice Hall; 5 edition, 2009. 2. Dorf RC, Bishop RH. Modern Control Systems. Twelfth Edition, Prentice Hall, 2011		

(MENG) - MENG 422

Course Title	Pneumatics and Hydraulics Control Systems	
Course Code	MENG 422	
Prerequisites	MENG 421 - Automatic Control Systems	
Classification within the curriculum	Compulsory (All Tracks)	
Course Position in Study Plan	Spring	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Hydraulics: Basics of fluid power transmission, operating principals of hydraulic systems, advantages and limitations, hydraulic systems elements structure and design considerations (pumps, hydraulic motors, cylinders, directional valves, control valves, auxiliaries, servo elements). Hydraulic system circuit design, power circuits, control and logic circuits, standard circuits, power packs and integrated circuits, piping and related matters, economic considerations, application of hydraulic systems in machinery. Mathematical modeling of hydraulic systems. Pneumatics: Basics of power transmission by gas, operating principals of pneumatic systems, advantages and limitations, pneumatic systems elements structure and design considerations. Compressed air production technology and related problems, compressed network, piping design, economic considerations. Design of pneumatic circuits, application of pneumatic in special production machines. Mathematical modeling of hydraulic systems.		
Lab and Tutorials Students will be required to complete laboratory assignments and to perform practical projects.		
Literature 1. Course Textbook: Andrew Parr. Hydraulics and Pneumatics. 3rd Edition ISBN: 978-0-08-096674-8 Additional Resources: - Shizurou Konami, Takao Nishiumi (2016) Hydraulic Control Systems: Theory And Practice. Wspc - Noah D. Manring. Hydraulic Control Systems. Wiley; 1 edition, 2005.		

(MENG) - MENG 423

Course Title	Digital Control Systems	
Course Code	MENG 423	
Prerequisites	MENG 421 - Automatic Control Systems	MENG 324 - Signal Processing & Logic Design
Classification within the curriculum	Compulsory (Track 1)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Introduction, Sampled data systems, Z-transform and its properties, Inverse of Z-transform, closed loop performance and stability, Digital PID control design, Pole placement digital control, Independent regulation and tracking pole placement control; Case Study.		
Lab and Tutorials The labs are used to help students in implementing and designing digital controllers as well as studying the stability of digital control systems		
Literature 1. Course Textbook: B. C. Kuo, Digital Control Systems, Oxford University Press, 2/e, Indian Edition, 2007. 2. K. Ogata, Discrete Time Control Systems, Prentice Hall, 2/e, 1995.. Additional Resources: 1. M. Gopal, Digital Control and State Variable Methods, Tata Mcgraw Hill, 2/e, 2003. 2. G. F. Franklin, J. D. Powell and M. L. Workman, Digital Control of Dynamic Systems,		

(MENG) - MENG 424

Course Title	Embedded Systems and Computer Interface	
Course Code	MENG 424	
Prerequisites	MENG 324 - Signal Processing & Logic Design	MENG 326 - Computer Programming in Mechatronics Application
Classification within the curriculum	Compulsory (Track 1)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Architectural Features of Micro Controllers; The Instruction Set: Instruction format, addressing modes; Interfacing of memory devices; Memory Mapping; Data transfer techniques and I/O ports; Timers; Counters; Programmable Interrupt and DMA controllers; I ² C Interface; General Purpose Input Output (GPIO); Interfacing of keyboard and display devices; Interfacing of sensors, transducers, actuators, A/D & D/A Converters, Data acquisition systems; Standard Interfaces – RS232, USB; Development aids and troubleshooting techniques; Application examples; Case Study.		
Lab and Tutorials Students use Arduino kit to apply the course topics of Interfacing Basic I/O Devices like LED Display, Keypad. Usage of Timers & USART Peripherals, Multi-Port Device access, Stepper Motor Movement Control, Interfacing various peripherals for embedded applications; Building a complete microcontroller-based system. Introduction to Raspberry Pi kit.		
Literature 1. Muhammad Ali Mazidi and Janice Gillispie Mazidi, “The 8051 – Microcontroller and Embedded systems”,7th Edition, Pearson Education , 2004. 2. A.K.Ray and K.M.Bhurchandi, “Advanced Microprocessors and Peripherals”,Tata McGrawHill,2000. 3. PC Interfacing Communications and Windows Programming, William Buchanan, Addison Wesley 4. M. A. Mustafa, Microcomputer Interfacing and Applications, Elsevier. ISBN: 978-0-7506-1752-9		

(MENG) - MENG 425

Course Title	Robotics		
Course Code	MENG 425		
Prerequisites	MATH 303 - Numerical Methods	MENG 306 - Kinematics and Dynamics of Mechanical Systems	MENG 421 - Automatic Control Systems
Classification within the curriculum	Compulsory (Track 1 and Track 3)		
Course Position in Study Plan	Spring		
Contact Hours	Lectures	2.5	
	Tutorials	0	
	Labs	1.25	
	TOTAL	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL)	125		
Topic Category	Engineering Applications		
Topic Level	Specialization		
Description This is an introductory course in robotics for senior undergraduate and junior graduate students who have had little to no other introductory courses on the topic. The course focuses on topics in robotics that relate to modeling, dynamics, and control of robotic manipulators. Mathematical preliminaries include matrix and vector analysis, basic kinematics and kinetics, and classical (frequency-based) control theory. Some background on more advanced topics such as Lagrangian dynamics, and modern linear and non-linear dynamical system analysis will help. The course will also provide a gentle introduction to the ROS software development environment.			
Lab and Tutorials Students will be required to complete laboratory and tutorial assignments and to perform robotic projects.			
Literature 1. Course Textbook: Robot Modeling and Control by Mark M. Spong, Seth Hutchinso, and M. Vidyasagar (ISBN: 9780471649908) Additional Resources: 1. Bruno Siciliano, Oussama Khatib. Springer Handbook of Robotics 2008th Edition 2. Roland Siegwart, Illah Reza Nourbakhsh, Davide Scaramuzza. Introduction to Autonomous Mobile Robots. The MIT Press; second edition, 2011.			

(MENG) - MENG 426

Course Title	Programmable Logic Controller	
Course Code	MENG 426	
Prerequisites	MENG 324 - Signal Processing & Logic Design	
Classification within the curriculum	Compulsory (Track 1)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Arithmetic and logic operations, usage of local and global memory locations, flags, comparators, subroutines, loops, labels, analogue module and real time monitoring, Introduction to OPC Servers and SCADA modules.		
Lab and Tutorials Labs should help students to have hands on practice on the PLC wiring, Interface, programming and control for different applications.		
Literature Course Textbook: Frank D. Petruzella: Programmable Logic Controllers, Mc-Graw Hill, 4 th edition, 2011.		

(MENG) - MENG 430

Course Title	MEMS Devices and Systems	
Course Code	MENG 430	
Prerequisites	MENG 321 - Electronic devices and applications	
Classification within the curriculum	Elective (Track 1)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Introduction to MEMS technology, Benefits of Miniaturization, Fabrication technologies for MEMS (surface, bulk micromachining, and LIGA). MEMS Material. Basic sensing and actuation principles. Microsystems Design, MEMS packaging, assembly and testing. Clean Rooms and its instruments. Case study..		
Lab and Tutorials Tutorials should help students to implement Computer-aided design in MEMS and Microsystems		
Literature Course Textbook: Tai-Ran Hsu: MEMS and Microsystems: design, manufacture, and nanoscale engineering, John Wiley & Sons, 2 nd edition 2008.		

(MENG) - MENG 431

Course Title	Advanced Mechatronics	
Course Code	MENG 431	
Prerequisites	MENG 323 - Fundamentals of Mechatronics Engineering	
Classification within the curriculum	Elective (Track 1)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description The course is a follow up to the introductory mechatronics course and aims at covering advanced topics that are necessary in developing mechatronic systems. Foundational concepts in mechatronics and mechatronics systems including analog and digital electronic circuits, Logic gates, Encoders / decoders, Dc and steppers motors, A/D and D/A conversion, Sensors, actuator, microprocessors, Microprocessor interfacing to electromechanical systems, Combining hardware and software into integrated mechatronics, and Hands on laboratory experiments with components and measurement equipment used in the design of mechatronics products		
Lab and Tutorials Students will be required to complete laboratory assignments and to perform an individual project.		
Literature 1. Course Textbook: J.E.Carryer, R.M.Ohline, and T.W.Kenny, " Introduction to Mechatronic design", Latest Edition, PEARSON. Additional Resources: 1. C.W. deSilva, " Mechatronics; An Integrated Approach," Latest Edition, CRC Press 2. M.B.Histand & D. G. Alciatore" Introduction to Mechatronics and Measurement Systems", McGraw-Hill, Latest Edition..		

(MENG) - MENG 432

Course Title	Modern Control Systems	
Course Code	MENG 432	
Prerequisites	MENG 421 - Automatic Control Systems	
Classification within the curriculum	Elective (Track 1)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description This course includes the modelling in state space; State Space Representation of Scalar Differential Equations; State Space Representation of Transfer Function; Controllability; Observability; Pole Placement; Solving Pole Placement Problem Using MATLAB; Design of Servo Systems; State Observers; Design of Regulator System with Observer; Design of Control System with Observer; Quadratic Optimal Regulator; Introduction to Robust Control.		
Lab and Tutorials The labs are used to help students in implementing and designing control systems using MATLAB.		
Literature 1. Ogata K. Modern Control Engineering. Prentice Hall; 5 edition, 2009. 2. Dorf RC, Bishop RH. Modern Control Systems. Twelfth Edition, Prentice Hall, 2011		

(MENG) - MENG 433

Course Title	Introduction to Autotronics	
Course Code	MENG 433	
Prerequisites	MENG 325 - Computer Control of Manufacturing Processes	MENG 327 - Power Electronics
Classification within the curriculum	Elective (Track 1)	
Course Position in Study Plan	Spring/Fall	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description The course covers the basics of Electronic systems, Input, Output signals, .Input Devices: Switches , Phototransistors , Hall –Effect Devices , Thermistors , Potentiometers , Photoresistors, Variable Reluctance devices , Piezoelectric Sensors . Input sensors: Position / Speed Sensors Crankshaft Position sensors, camshaft position sensor, Sensors Applications .Electronic control Unit (ECU) parts, memories, principle of operation . Internal Processing, RAMs, ADC and DAC. System outputs: Transistors, Actuators, Fueled injectors, Idle Speed control, ABS actuators. Engine load Sensors, Speed and Position Sensors, Temperature Sensors, O2- Sensors, Knock Sensors, Actuators, Relays, static switches, ignition actuators, and Cold start control, Display Devices, Auxiliary Electron.		
Lab and Tutorials Students will be required to complete Tutorial and laboratory assignments and to perform practical projects.		
Literature Course Textbook: Alma Hillier, Fundamentals of Automotive Electronics first edition, 2014. Additional Resources: Fundamentals of Automotive Technology		

(MENG) - MENG 434

Course Title	Introduction to Autonomous Systems	
Course Code	MENG 434	
Prerequisites	MENG 424 - Embedded Systems and Computer Interface	
Classification within the curriculum	Elective (Track 1)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description This course introduces a various concepts and components of <u>autonomous systems</u> in an autonomous mobile robotics context. The main concepts covered include locomotion, vehicle kinematics, autonomous navigation and intelligent path planning and perception, control of robotic manipulators, machine vision, the dynamics of wheeled, air, space and underwater robots, navigation and localization. System components include various types of sensors and actuators and state-of-the-art technologies.		
Lab and Tutorials This is a project-based learning course.		
Literature Course Textbook: Roland Siegwart, Illah Reza Nourbakhsh, Davide Scaramuzza, Introduction to Autonomous Mobile Robots		
Additional Resources: • Mobile Robots: Navigation, Control and Remote Sensing 1st Edition • Introduction to Mobile Robot Control		

(MENG) - MENG 435

Course Title	Intelligent Control Systems	
Course Code	MENG 435	
Prerequisites	MATH 301 - Linear Algebra	MENG 326 - Computer Programming in Mechatronics Application
Classification within the curriculum	Elective (Track 1)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description In the robotics area, the computer vision applies AI techniques to the problem of making devices capable of interacting with the physical world. In this course, the emphasis is on the learning of artificial intelligence and machine learning techniques, which are important for mechatronics applications. Topics include mainly fuzzy logic, genetic algorithms, and neural networks.		
Lab and Tutorials It is a project based learning (PBL) course, and hence it is required to implement the algorithms learnt using Python, MatLab and/or C language. The labs are used to help students in implementing and understanding of the AI and machine learning algorithms.		
Literature Course Textbook: Giuseppe Ciaburro, “MATLAB for Machine Learning: Practical examples of regression, clustering and neural networks” 2017 Additional Resources: Class notes.		

(MENG) - MENG 436

Course Title	Computer Vision & Image processing	
Course Code	MENG 436	
Prerequisites	MATH 301 - Linear Algebra	MENG 326 - Computer Programming in Mechatronics Application
Classification within the curriculum	Elective (Track 1)	
Course Position in Study Plan	Fall	
Contact Hours	Lectures	2.5
	Tutorials	0
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description In this course, an introduction to the theory and practice of computer vision. The students should be able to analyze the patterns in visual images with the view to understanding the objects and processes in the world that generate them. Major topics include image representation, image processing, feature extraction, and object recognition. The emphasis is on the learning of mathematical concepts and techniques for computer vision and its application in robotics area.		
Lab and Tutorials It is a project based learning (PBL) course, and hence it is required to implement the algorithms learnt using MatLab and/or C language. The labs are used to help students in implementing and understanding of the image processing and pattern recognition algorithms.		
Literature Course Textbook: R.C. Gonzalez and R.E. Woods: Digital Image Processing, Prentice-Hall, 3 rd edition 2007.		

(MENG) - MENG 441

Course Title	Finite Element Method and Applications in Mechanical Engineering		
Course Code	MENG 441		
Prerequisites	MATH 203 - Differential Equations	MENG 201 - Introduction to Solid Mechanics and Strength of Materials	MENG 305 - Fluid Mechanics I
Classification within the curriculum	Compulsory (Track 2 and Track 3)		
Course Position in Study Plan	Fall		
Contact Hours	Lectures	2.5	
	Tutorials	0.625	
	Labs	0.625	
	TOTAL	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL)	125		
Topic Category	Engineering Applications		
Topic Level	Specialization		
Description Starting with an introduction to different numerical techniques, then the three basic approaches of the finite element method (FEM) namely; the direct approach, the variational approach and the weighted residual approach, are presented. The direct approach is used in the analysis of simple discrete systems e.g. pipelines, electric circuits, and trusses. Then the weighed residual procedure issued in the analysis of continuous systems. Programming for finite elements is also covered and students are encouraged to design and develop their FEM software. Modeling and simulation using a software package is also covered.			
Laboratory and Tutorials Modeling and simulation of different mechanical systems is covered using a computer software package. Applications covers fluid flow, heat transfer, and stress analysis.			
Literature - Fundamentals of Finite Element Analysis 1st Edition, D. Hutton. - Class notes prepared by instructor and uploaded on Moodle. - Help files of the selected software package			

(MENG) - MENG 442

Course Title	Combustion		
Course Code	MENG 442		
Prerequisites	MENG 342 - Thermodynamics II	MENG 343 - Heat Transfer II	MENG 344 - Fluid mechanics II
Classification within the curriculum	Compulsory (track 2)		
Course Position in Study Plan	Spring (Semester 8)		
Contact Hours	Lectures	2.5	
	Tutorials	1.25	
	Labs	-	
	TOTAL	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL)	125		
Topic Category	Engineering Applications		
Topic Level	Specialization		
Description Introduction to the topic, Combustion Modes and Flame Types, Combustion and thermochemistry, chemical kinetics, Coupling Chemical and Thermal Analyses of Reacting Systems. Conservation Equations for Reacting Flows. Laminar premixed flames. Applications including the combustion process in spark and compression internal combustion engines.			
Tutorial: Help is provided for the course project. More examples are solved. Help is provided for the numerical simulation of the combustion process using a computer software package.			
Literature Course Textbook: Stephen R. Turns, An Introduction to Combustion: Concepts and Applications, McGraw-Hill (2000) Additional Resources: - Lecture notes. - Law C.K., Combustion physics, (2006 - H.N. Gupta "Fundamentals of Internal Combustion Engines", 2009 J. Warnatz U. Maas R.W. Dibble, Combustion, Physical and Chemical Fundamentals, Modeling and Simulation, Experiments, Pollutant Formation. 4th Edition-Springer (2006)			

(MENG) - MENG 443

Course Title	Powerplant Technology	
Course Code	MENG 443	
Prerequisites	MENG 342 - Thermodynamics II	MENG 344 - Fluid mechanics II
Classification within the curriculum	Compulsory (Track 2), Elective (Track 3)	
Course Position in Study Plan	Fall (Semester 9)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	-
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Steam and Gas turbine powerplants. Combined-cycle powerplants. Co-generation. Environmental impacts of powerplants. Circulating water systems. Energy storage. Introduction to Nuclear powerplants.		
Tutorial Help is provided concerning course project. Additionally, examples are solved to clarify concepts covered in the lectures.		
Literature • P. K. Nag, Power Plant Engineering, Tata McGraw-Hill Education, 2002. • Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 444

Course Title	Internal combustion Engines		
Course Code	MENG 444		
Prerequisites	MENG 343 - Heat Transfer II	MENG 401 - Mechanical Vibrations	MENG 442 - Combustion
Classification within the curriculum	Compulsory (Track 2)		
Course Position in Study Plan	Fall (Semester 9)		
Contact Hours	Lectures	2.5	
	Tutorials	0.625	
	Labs	0.625	
	TOTAL	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL)	125		
Topic Category	Engineering Applications		
Topic Level	Specialization		
Description Starting with an overview of the topic, then description of internal combustion engines is introduced. The air-standard cycles namely the Otto, Diesel and the dual cycles are quickly reviewed followed by a step toward a better modelling for the cycles considering the fuel-air cycles. Then the actual cycles are considered. The heat transfer inside the engine and the cooling system are studied followed by the supercharging technology.			
Tutorial: SciLab program is used to solve all the examples presented in the textbook. More examples are covered during the tutorial and finally help is provided for the course project.			
Literature Course Textbook: H.N. Gupta, Fundamentals of Internal Combustion Engines, Prentice-Hall of India Pvt. Ltd, 2006. Additional Resources: - Lecture notes. - SciLab codes for the examples presented in the textbook are provided.			

(MENG) - MENG 445

Course Title	Turbomachinery I		
Course Code	MENG 445		
Prerequisites	MENG 342 - Thermodynamics II	MENG 343 - Heat Transfer II	MENG 344 - Fluid mechanics II
Classification within the curriculum	Compulsory (Track 2)		
Course Position in Study Plan	Spring (Semester 8)		
Contact Hours	Lectures:	2.5	
	Tutorials:	1.25	
	Labs:	--	
	TOTAL:	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL)	125		
Topic Category	Engineering Applications		
Topic Level	Specialization		
Description The course aim is to give an introduction to turbomachinery and focuses on hydraulic machines. Topics include, Dimensionless analysis, Hydraulic pumps, Hydraulic turbines, Cavitation, Steam Turbines.			
Lab and Tutorials Teaching the students, the necessary skill for the successful design and operation of hydraulic machinery.			
Literature 1. Course Textbook: Turbomachinery: Design and Theory . Rama S. R. Gorla and Aijaz A. Khan, 2003 Marcel Dekker, Inc. 2. Additional Resources: Fluid Mechanics and Thermodynamics of Turbomachinery, 7th edition, S. Larry Dixon and Cesare Hall, 2013, Butterworth_Heinemann - Lecture notes			

(MENG) - MENG 446

Course Title	Refrigeration and Air-Conditioning		
Course Code	MENG 446		
Prerequisites	MENG 342 - Thermodynamics II	MENG 343 - Heat Transfer II	MENG 344 - Fluid mechanics II
Classification within the curriculum	Compulsory (Track 2)		
Course Position in Study Plan	Spring (Semester 8)		
Contact Hours	Lectures:	2.5	
	Tutorials:	0.625	
	Labs:	0.625	
	TOTAL:	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL)	125		
Topic Category	Engineering Applications		
Topic Level	Specialization		
Description The aim of the course is to give an introduction to refrigeration and air-conditioning systems. Topics include, Fundamentals, Refrigeration cycles, refrigerants compressors, condensers, evaporators, expansion valves, Air – water vapor mixtures, Air treatment cycles, Air-conditioning load estimation, air movement, Dehumidifiers and Air drying heat pumps and heat recovery.			
Lab and Tutorials Teaching the students, the skills needed for the design and sizing of refrigeration and air-conditioning systems. Demonstrate the basic concepts learned during the course like the function of different components in a refrigeration and air-conditioning systems.			
Literature Course Textbook: Refrigeration and Air Conditioning, <i>4th edition</i> . G. F. Hundy, A. R. Trott, T. C. Welch, 2008, Butterworth-Heinemann. Additional Resources: - Air Conditioning Principles and Systems: An Energy Approach, <i>4th edition</i>. Edwards G. Pita, 2001, Pearsons. - Principles of Regeneration, Roy J. Dossat, 1997, Prentice Hall. - Lecture notes			

(MENG) - MENG 451

Course Title	Renewable Energy Systems Engineering	
Course Code	MENG 451	
Prerequisites	MENG 342 - Thermodynamics II	MENG 344 - Fluid mechanics II
Classification within the curriculum	Elective (Track 2 and Track 3)	
Course Position in Study Plan	Fall/Spring (Semester 8 or 9)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	-
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description This course introduces renewable energy technologies. Emphasizes exploration of principles and concepts as well as the application of renewable energy technologies (RET). Explores topics such as energy consumption, the pros and cons of renewable energy, energy production and cons, energy conversion, environmental issues and concerns, biomass and biofuels, geothermal, wind, power, solar power, nuclear power, and hydropower systems.		
Tutorial Help is provided concerning course project. Additionally, examples are solved to clarify concepts covered in the lectures.		
Literature - Ngo C., Natowitz J. Our Energy Future: Resources, Alternatives and the Environment, 2016. - Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 452

Course Title	Computational Thermo-Fluid Mechanics		
Course Code	MENG 452		
Prerequisites	MENG 342 - Thermodynamics II	MENG 343 - Heat Transfer II	MENG 344 - Fluid mechanics II
Classification within the curriculum	Elective (Track 2)		
Course Position in Study Plan	Fall/Spring (Semester 8 or 9)		
Contact Hours	Lectures	2.5	
	Tutorials	0.625	
	Labs	0.625	
	TOTAL	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL)	125		
Topic Category	Engineering Applications		
Topic Level	Specialization		
Description This is the third part of a three-part series of courses (Fluid Mechanics II and Heat Transfer II) designed to provide core knowledge of the fundamental principles and engineering applications of heat transfer and fluid mechanics. These areas collectively make up the field of Thermo-Fluid Mechanics or Thermal Fluid Sciences but are traditionally taught as separate courses. However, in this course, these areas are presented in a more integrated manner. The finite difference method (FDM) is presented in detail and applied to various types of partial differential equations representing the wave equation, heat equation and Laplace equation. Then the upwinding concept is introduced to deal with convected-dominated flows. Then stability analysis is discussed for different finite difference schemes. The domain-based numerical techniques namely the finite volume method (FVM) and finite element method (FEM) are briefly introduced. In parallel to the theoretical concepts, a computer software package is used for the simulation of different multi-physics applications.			
Tutorial: Help is provided for the course project as well as examples are solved to clarify concepts covered in the lectures. Lab: A computer lab is designed to help the students with the selected software package and the physical interpretations of the results.			
Literature Course Textbook: Klaus A. Hoffmann, Computational Fluid Dynamics for Engineers. Engineering Education System. Additional Resources: Lecture notes.			

(MENG) - MENG 453

Course Title	Introduction to Continuum Mechanics	
Course Code	MENG 453	
Prerequisites	MENG 201 - Introduction to Solid Mechanics and Strength of Materials	MENG 344 - Fluid mechanics II
Classification within the curriculum	Elective (Track 2 and Track 3)	
Course Position in Study Plan	Fall/Spring (Semester 8 or 9)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	-
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description The main goal of this course is to present a unified, mathematically rigorous approach to the two classical branches of mechanics problems: the mechanics of fluids and the mechanics of solids. Topics will include Introduction to tensor calculus, kinematics, the general balance equation, balance laws (mass, momentum, and energy), the entropy inequality, and an introduction to the constitutive theory.		
Tutorial Help is provided for the course project. Additionally, examples are solved to clarify concepts covered in the lectures.		
Literature • M. Epstein, The Elements of Continuum Biomechanics, 1st edition. • E. Tadmor, R. E. Miller, R. S. Elliott, Continuum Mechanics and Thermodynamics: From Fundamental Concepts to Governing Equations, Cambridge University Press, New York, 2012. • Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 454

Course Title	Water Desalination		
Course Code	MENG 454		
Prerequisites	MENG 342 - Thermodynamics II	MENG 344 - Fluid mechanics II	MENG 401 - Mechanical Vibrations
Classification within the curriculum	Elective (Track 2 and Track 3)		
Course Position in Study Plan	Fall/Spring (Semester 8 or 9)		
Contact Hours	Lectures	2.5	
	Tutorials	1.25	
	Labs	-	
	TOTAL	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL)	125		
Topic Category	Engineering Applications		
Topic Level	Specialization		
Description Theoretical and practical aspects of seawater/brackish water desalination technologies, including thermal-based, and membrane-based desalination processes; process design and system performance; fouling, scaling and cleaning; product water quality and post-treatment, innovative desalination technologies (Forward Osmosis (FO), Membrane Distillation (MD), Adsorption Desalination (AD))			
Tutorial Help is provided concerning course project. Additionally, examples are solved to clarify concepts covered in the lectures.			
Literature - Mark Wilf, The Guidebook to Membrane Desalination Technology. Balaban Desalination Publications, 2007 - H.T. El-Dessouky, H.M. Ettouney, Fundamentals of Salt Water Desalination, Elsevier Science B.V. 2002 - Class notes prepared by instructor and uploaded on Moodle.			

(MENG) - MENG 455

Course Title	Turbomachinery II		
Course Code	MENG 455		
Prerequisites	MENG 342 - Thermodynamics II	MENG 343 - Heat Transfer II	MENG 344 - Fluid mechanics II
Classification within the curriculum	Elective (Track 2)		
Course Position in Study Plan	Fall/Spring (Semester 8 or 9)		
Contact Hours	Lectures:	2.5	
	Tutorials:	1.25	
	Labs:		
	TOTAL:	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL)	125		
Topic Category	Engineering Applications		
Topic Level	Specialization		
Description The course aim is to give an introduction to turbomachinery and focuses on Aero turbomachinery. Topics include, Dimensionless analysis, Centrifugal Compressors and Fans, Axial flow compressors and fans, Axial and Radial flow gas turbines.			
Lab and Tutorials Teaching the students the necessary skill for the successful design and operation of Aero turbomachinery.			
Literature Course Textbook: Turbomachinery: Design and Theory. Rama S. R. Gorla and Aijaz A. Khan, 2003 Marcel Dekker, Inc. Additional Resources: - Gas turbine Theory, <i>7th edition</i>. H.I.H. Saravanamuttoo, G.F.C. Rogers, H. Cohen, Paul Straznicky and Andrew Nix, 2017, Pearson - Fluid Mechanics and Thermodynamics of Turbomachinery, <i>7th edition</i>, S. Larry Dixon and Cesare Hall, 2013, Butterworth_Heinemann			

(MENG) - MENG 456

Course Title	Nuclear Powerplant Engineering	
Course Code	MENG 456	
Prerequisites	MENG 342 - Thermodynamics II	MENG 344 - Fluid mechanics II
Classification within the curriculum	Elective (Track 2 and Track 3)	
Course Position in Study Plan	Fall/Spring (Semester 8 or 9)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	-
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Introduction to nuclear engineering principles - the generation, transfer and transmission of energy in nuclear reactor - nuclear powerplant layout and location selection - the pressurized water reactors - boiling water reactors - gas-cooled reactors - fast reactors - the future of nuclear fusion - Nuclear powerplant dynamics and control - Nuclear powerplant safety.		
Tutorial Help is provided concerning course project. Additionally, examples are solved to clarify concepts covered in the lectures.		
Literature - James H. Rust, Nuclear Power Plant Engineering. Haralson Publishing Company. - Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 457

Course Title	Advanced Selected Topic in Mechanical Power	
Course Code	MENG 457	
Prerequisites	MENG 441 - Finite Element Method and Applications in Mechanical Engineering	Senior Standing
Classification within the curriculum	Elective (Track 2)	
Course Position in Study Plan	Spring (Semester 8)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	-
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Specialized topics in thermal sciences and renewable energy are studied with case studies.		
Tutorials Regular weekly problem solving tutorial sessions are conducted. Help is provided for the course project.		
Literature - Textbooks decided upon topics decided by students and instructor. - Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 460

Course Title	Mechanics of Materials and Applications in Design	
Course Code	MENG 460	
Prerequisites	MENG 201 - Introduction to Solid Mechanics and Strength of Materials	MENG 202 - Solid Modeling and Workshop
Classification within the curriculum	Compulsory (Track 3)	
Course Position in Study Plan	Spring (Semester 6)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	-
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Calculation of internal reactions. Stress concentrations. Load versus stress relations and transformation of stresses for generally loaded rods. Failure criteria for ductile materials. Generalized concepts of stress, strain, and material relations. Elastic-plastic behavior of beams. Analysis of thin walled beams. Membrane theory of axisymmetric shells. Energy methods. Emphasis on analysis and design of pressure vessels and pipe line networks. Brief introduction to ASME B31.3 Code-Process Piping. Project required.		
Tutorials Regular weekly problem-solving tutorial sessions are conducted.		
Literature “Mechanics of Materials”, F. P. Beer, E. R. Johnston, J. T. DeWolf, and David F. Mazurek. McGraw-Hill, New York, 6th edition. - Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 461

Course Title	Failure of Mechanical Components and Prevention	
Course Code	MENG 461	
Prerequisites	MENG 203 - Introduction to Engineering Materials and Manufacturing Processes	MENG 303 - Machine Design
Classification within the curriculum	Compulsory (Track 3)	
Course Position in Study Plan	Fall (Semester 7)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	-
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description		
Mechanical failure mechanisms. Introduction to fracture mechanics. Encountered modes of failure including: fracture due to fatigue, buckling, impact, thermal shock, corrosion and erosion, wear, and creep. Diagnosis and prevention of component failures with application on case studies. Project required.		
Tutorials		
Regular weekly problem-solving tutorial sessions are conducted.		
Literature		
“Deformation and Fracture Mechanics of Engineering Materials”, Richard W. Hertzberg. WILEY, 4th edition. - Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 462

Course Title	Selection of Materials and Processes for Design		
Course Code	MENG 462		
Prerequisites	IENG 241 - Engineering Economics	MENG 301 - Mechanical Behavior of Engineering Materials	MENG 303 - Machine Design
Classification within the curriculum	Compulsory (Track 3)		
Course Position in Study Plan	Fall (Semester 9)		
Contact Hours	Lectures	2.5	
	Tutorials	1.25	
	Labs	-	
	TOTAL	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL)	125		
Topic Category	Engineering Applications		
Topic Level	Specialization		
Description Effect of material properties and manufacturing processes on component design. Failure of mechanical components and structures in service. Study of economics of materials and manufacturing processes for component design. Decision making for adequate material selection process with application on case studies. Project required.			
Tutorials Regular weekly problem-solving tutorial sessions are conducted.			
Literature “Materials and Process Selection for Engineering Design”, Mahmoud M. Farag. CRC Press, 3rd edition. “Materials Selection in Mechanical Design”, Michael Ashby. Butterworth-Heinemann, 4th edition. - Class notes prepared by instructor and uploaded on Moodle.			

(MENG) - MENG 463

Course Title	Computer-Aided Design and Prototyping	
Course Code	MENG 463 / IENG 314	
Prerequisites	MENG 202 - Solid Modeling and Workshop	
Classification within the curriculum	Compulsory (Track 3)	
Course Position in Study Plan	Spring (Semester 9)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Introduction to CAD/CAM software and hardware. Three-dimensional geometric modelling. Study of types of curves and surfaces. Data capturing, surface fitting, and rapid prototyping techniques. Utilization of interactive computer graphics packages. Utilizing CAD/CAM software to generate G-code, 3D LASER digitizer scanner, 3D printer, FARO arm, and other CAD/CAM peripherals. Project required.		
Laboratory Regular weekly conducted laboratory sessions utilizing CAD/CAM software and hardware peripherals.		
Literature • “CAD, 3D Modeling, Engineering Analysis, and Prototype Experimentation”, Jeremy Zheng Li. Springer, 1st edition 2015. • SolidWorks, User’s Guide 2016, Dassault Systèmes. • Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 464

Course Title	Design of Engineering Systems	
Course Code	MENG 464	
Prerequisites	MENG 203 - Introduction to Engineering Materials and Manufacturing Processes	MENG 303 - Machine Design
Classification within the curriculum	Compulsory (Track 3)	
Course Position in Study Plan	Spring (Semester 8)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	-
	TOTAL	2.50
EG Credit Hours	2	
ECTS	3	
Student Workload (SWL)	75	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Elements of mechanical system architecture. Holistic view of a mechanical/engineering system and break down from the system level to subsystem level down to component level. Product versus process driven design objectives. Synthesis and analysis in design of systems. This course develops students’ skills to conceive, organize, lead, implement, and evaluate successful design. Case studies.		
Laboratory Not Applicable		
Literature “System Engineering Analysis, Design, and Development: Concepts, Principles, and Practices”, Charles S. Wasson, WILEY, 2nd edition 2015. - Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 465

Course Title	Machine Design II	
Course Code	MENG 465	
Prerequisites	MENG 303 - Machine Design	
Classification within the curriculum	Compulsory (Track 3)	
Course Position in Study Plan	Spring (Semester 8)	
Contact Hours	Lectures	2.5
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Design of machine elements used in power transmission such as couplings, gears, brakes and clutches, roller chain drives, and bearings. Stresses and deformations in rotating cylinders and disks. Design factors and theories of failure to design of machine elements. CAD software is extensively utilized. Project required.		
Laboratory Regular weekly problem-solving tutorial sessions are conducted.		
Literature “Machine Elements in Mechanical Design”, Robert L. Mott, Pearson, 5th edition. - Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 466

Course Title	Fault Diagnosis utilizing Vibrations Analysis	
Course Code	MENG 466	
Prerequisites	MENG 401 - Mechanical Vibrations	MENG 465 - Machine Design II
Classification within the curriculum	Elective (Track 3)	
Course Position in Study Plan	Spring (Semester 8)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	1.25
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Basics of maintenance. Basics of machinery vibration. Data acquisition and signal recording on MATLAB. Signal analysis. Signal processing using MATLAB. Basics of instrumentation and transducers. Vibrations and noise measurements. Faults in rotating machine elements. Faults in bearings and gears, Diagnostic charts. Motor current signature analysis. Wear and debris analysis. Non-destructive test techniques. Case studies.		
Laboratory Regular weekly conducted laboratory sessions utilizing Siemens LMS.		
Literature “Machinery Condition Monitoring: Principles and Practices”, A. R. Mohanty. CRC Press, 2014 - MATLAB. User's Guide Release 2009a. The MathWorks, Inc. Natick, Massachusetts, United States. - Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 469

Course Title	Selected Topics in Design	
Course Code	MENG 469	
Prerequisites	MENG 344 - Fluid mechanics II	Senior Standing
Classification within the curriculum	Elective (Track 3)	
Course Position in Study Plan	Fall (Semester 7) or Spring (Semester 8)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	-
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topic Category	Engineering Applications	
Topic Level	Specialization	
Description Specialized topics in design are studied with case studies such as advanced solid mechanics and strength of materials, finite-elements method and applications in design, power plant analysis and design, design of manufacturing tools, design of materials-handling equipment, fluid machinery and power systems...etc. Project required.		
Tutorials Regular weekly problem-solving tutorial sessions are conducted.		
Literature - Textbooks decided upon topics decided by students and instructor. - Class notes prepared by instructor and uploaded on Moodle.		

(MENG) - MENG 493

Course Title	Graduation Project I	
Course Code	MENG 493	
Prerequisites	Senior Standing	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring (Semester 8)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	-
	TOTAL	2.50
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL)	180	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description		
Application-oriented capstone project to show competence in major academic area, where an independent research project is conducted under the guidance of a faculty member in the MENG Department. The research should contribute to the advancement of knowledge in the field. Written report and formal presentation are required.		
Lab and Tutorials		
Not Applicable		
Literature		
Not Applicable		

(MENG) - MENG 495

Course Title	Graduation Project II	
Course Code	MENG 495	
Prerequisites	MENG 493 - Graduation Project I	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall (Semester 9)	
Contact Hours	Lectures	2.5
	Tutorials	-
	Labs	-
	TOTAL	2.50
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL)	180	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description Continuation and completion of the capstone project.		
Lab and Tutorials Not Applicable		
Literature Not Applicable		

(MENG) - NSCI 102

Course Title	Selected Topics in Environmental Science	
Course Code	NSCI 102	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Culture	
Topic Level	Program Requirements	
Description		
A course in any of the fields of environmental sciences related to the discipline it is offered to.		

الباب التاسع

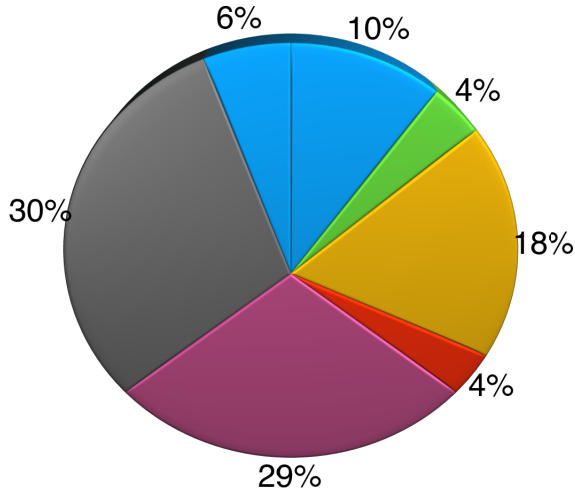
برنامج هندسة وإدارة البنية التحتية المدنية

هندسة وإدارة البنية التحتية المدنية			اسم البرنامج			
هندسة وإدارة نظم النقل			اسم التخصصات			
هندسة وإدارة نظم المياه والصرف						
هندسة وإدارة التشبيد						
الهندسة والعلوم التطبيقية			الكلية			
جامعة النيل الأهلية			الجامعة			
معمل		تمارين	محاضرات		عدد ساعات الاتصال	
26.25		42.5	132.5			
160			(CH) الساعات المعتمدة			
270			(ECTS) النقاط المعتمدة			
58			عدد المقررات			
توزيع المقررات طبقاً لمتطلبات مستويات التعلم						
ECTS			CH			
25			16			متطلبات الجامعة
82			48			متطلبات الكلية
98			57			متطلبات التخصص العام
65			39			متطلبات التخصص الدقيق
توزيع المقررات طبقاً لفئات المهارات والمعارف						
ECTS			CH			
Track 3	Track 2	Track 1	Track 3	Track 2	Track 1	
25	25	25	16	16	16	العلوم الاجتماعية والانسانية
10	10	10	6	6	6	إدارة الأعمال
49	49	49	29	29	29	الرياضيات والعلوم الأساسية
10	10	10	6	6	6	الثقافة الهندسية
78	78	78	46	46	46	العلوم الهندسية الأساسية
80	80	80	48	48	48	التطبيقات الهندسية والتصميم
18	18	18	9	9	9	المشروعات والتدريب الميداني

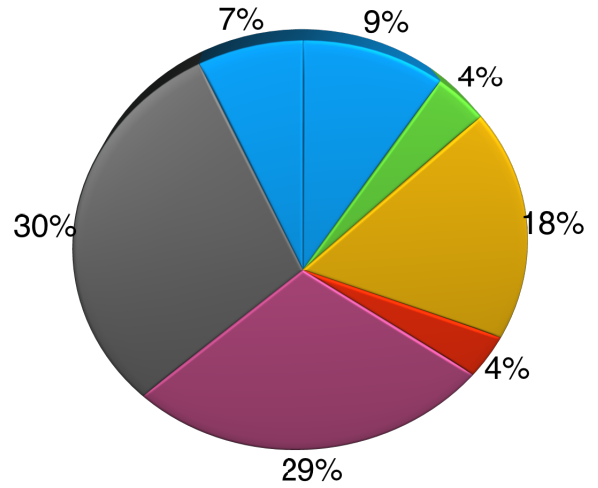
بيانات إحصائية

● Hum-SC ● BA ● Math-BS ● Eng-Cult ● Eng-BS ● Eng-App ● Projects-PT

CIEM - CH

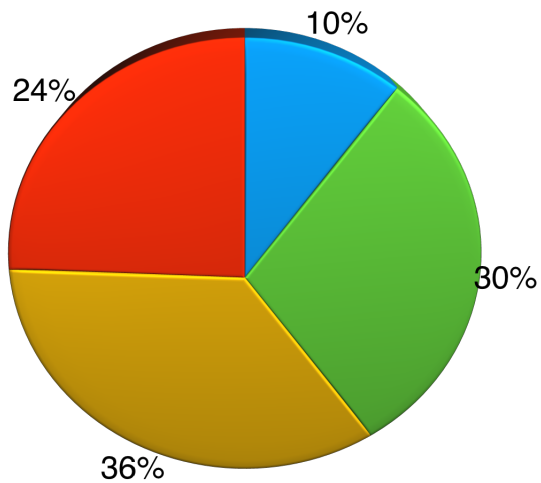


CIEM - ECTS

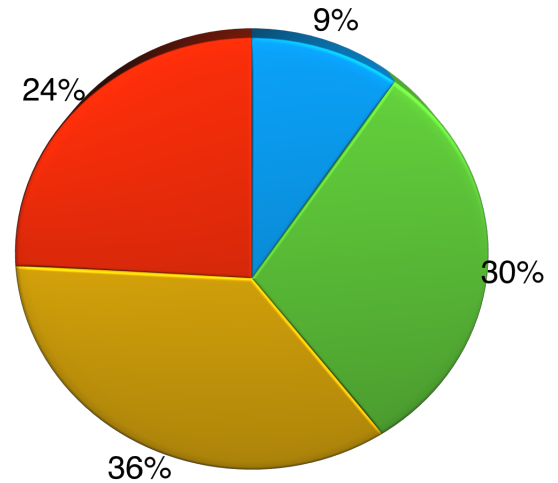


● University ● School ● Program - Gen ● Program - Spec

CIEM - CH



CIEM - ECTS

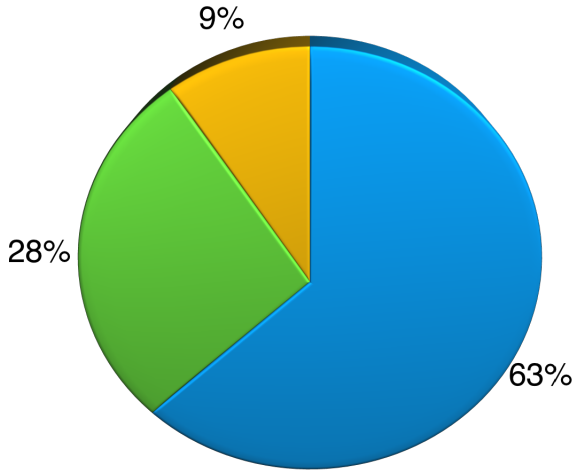


● Lectures

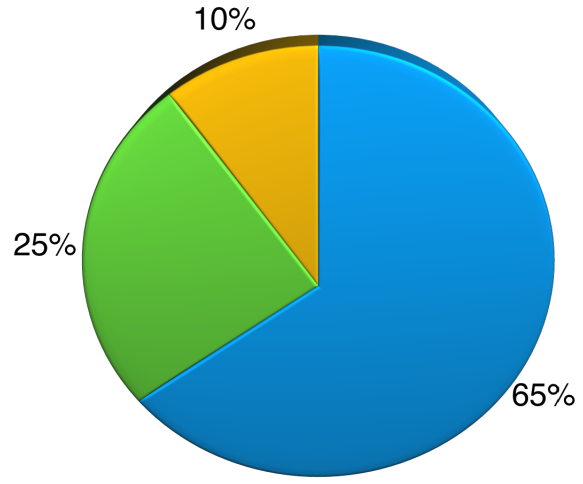
● Tutorials

● Labs

University-School-Program



Program Only



مادة (1): رسالة القسم:

يهدف برنامج هندسة وإدارة البنية التحتية المدنية إلى توفير المستوى التعليمي المتميز للطلاب، وتعزيز شراكة وثيقة مع الصناعة، بهدف توفير الخدمات الهندسية المتخصصة لمجتمع التشييد وتطوير البنية التحتية في مصر وخارجها. ويلتزم البرنامج في تحقيقه لرسالته بالتحسين المستمر في الجودة الشاملة للتدريس والبحث العلمي والأكاديمي. كما يتحمل البرنامج مسؤولية المشاركة في التقدم العلمي والتكنولوجي في مجال تخصصه عن طريق توفير الأساس النظري والعملية والتقني للطلاب ليسمح لهم بممارسة العمل المهني والبحث سواء كان هذا العمل في المجتمع الصناعي أو في المجال الأكاديمي أو في مراكز البحوث وبحيث يتحول التعليم بالبرنامج إلى نواة صالحة لاستكمال الدراسات العليا على مستوى الماجستير والدكتوراة. كما يتحمل البرنامج المسؤولية المهنية لتقديم وسائل التعليم المستمر والتدريب المتخصص للمهندسين العاملين في مجالات هندسة وإدارة التشييد وتطوير البنية التحتية بهدف تنمية قدراتهم وإكسابهم المهارات اللازمة لتنمashi مع النمو المطرد في التكنولوجيا الذي يشهده العالم حالياً.

مادة (2): توصيف البرنامج الدراسي بالقسم:

تعد الهندسة المدنية نواة للتنمية والنمو الإقتصادي للمجتمعات والدول و تؤثر تقريباً في كل جوانب الحياة. يقدم برنامج هندسة وإدارة البنية التحتية المدنية نموذجاً فريداً في التركيز على الاحتياجات المتنامية في مصر والشرق الأوسط في مجالات متعددة مثل هندسة وإدارة النقل، هندسة وإدارة نظم المياه والصرف، وهندسة وإدارة التشييد، حيث يقدم البرنامج للطلاب رؤية شاملة ومتكاملة في مجال الهندسة المدنية والبنية التحتية من خلال التركيز على الدورة الكاملة لأصول التشييد والبناء والبنية التحتية ويشمل ذلك التخطيط والتصميم والتنفيذ وإدارة المشروعات والتشغيل والصيانة والإدارة الشاملة

للأصول طبقاً لأحدث المواصفات وأساليب الإدارة العالمية ليتماشى مع التطور المستمر في العلوم والتكنولوجيا وزيادة الطلب على المهندسين المدنيين.

وتماشياً مع معدلات التطور في العلوم والتكنولوجيا الهندسية فإن كلية الهندسية والعلوم التطبيقية بجامعة النيل تقدم برنامج هندسة وإدارة البنية التحتية المدنية بالجامعة والذي يؤدي إلى درجة البكالوريوس في الهندسة المدنية معتمداً نظام الساعات المعتمدة، وي طرح البرنامج المزعم إنشاؤه حالياً ثلاث تخصصات فرعية:

1. هندسة وإدارة نظم النقل.
2. هندسة وإدارة نظم المياه والصرف.
3. هندسة وإدارة التشييد.

ويعتمد برنامج هندسة وإدارة البنية التحتية المدنية على توفير أساس صلب للطلاب في التخصصات التي يقدمها، ويتم التركيز أثناء الدراسة (معتمداً على الأساس العلمي والتكنولوجي المكتسب) على التطبيقات العملية الحديثة من خلال خطط معملية مدروسة تمكن الطالب من ربط الأساس النظري بالجانب العملي في تخصصات البرنامج وذلك عن طريق ربط الدراسة الأكاديمية مع احتياجات سوق العمل.

مادة (3): أهداف البرنامج:

يهدف برنامج هندسة وإدارة البنية التحتية المدنية بكلية العلوم الهندسية بجامعة النيل إلى تحقيق المستوى الأكاديمي والتقني اللازم للطلاب ليتواكب مع النمو المطرد في التكنولوجيا الحديثة في المجتمعات المتطورة وذلك عن طريق تعليم الطلاب المبادئ الأساسية والتقنيات الحديثة في مجال تخصصات البرنامج مع تدريب الطلاب على ممارسة المنهجية في التفكير واستخدام الأساليب الحديثة في حل المشاكل الهندسية مع دراية شاملة بدور الهندسة المدنية في نمو وتطوير المجتمعات الحديثة، ولتحقيق هذا فإن البرنامج يهدف إلى أن يكون الخريج:

1. مجهزاً علمياً وتقنياً لممارسة مهنة الهندسة المدنية كمهندس حديث التخرج أو الالتحاق ببرامج دراسات عليا في مجالات هندسة النقل أو المياه والصرف أو التشييد.
2. قادراً على التعرف على المشاكل الهندسية في مجالات هندسة وإدارة النقل أو هندسة وإدارة المياه والصرف أو هندسة وإدارة التشييد وتوصيفها بدقة والتعامل معها بمنهجية للوصول إلى الحلول المناسبة وأن يكون قادراً على التواصل مع الآخرين بهذه النتائج.
3. قادراً على التدرج الوظيفي الناجح في مجال تخصصه (هندسة وإدارة النقل أو هندسة وإدارة المياه والصرف أو هندسة وإدارة التشييد) ليتبوأ المناصب القيادية كنتيجة لتمكنه من مهارات العمل المتكامل مع فريق العمل وقدرات التواصل مع الآخرين ومهارات حل المشاكل الهندسية بأسلوب منهجي.
4. مجهزاً للعمل في مجالات عريضة في الهندسة المدنية من خلال اكتسابه العلوم والمهارات التقنية في مجال التخصص الدقيق (هندسة وإدارة النقل أو هندسة وإدارة المياه والصرف أو هندسة وإدارة التشييد) من خلال المقررات الإلزامية والاختيارية وكذلك العلوم والمهارات التقنية في مجالات التخصص العام من خلال المقررات الإلزامية ومتطلبات برامج الهندسة المدنية بالجامعة.

مادة (4): مواصفات الخريج:

المخرج الرئيسى للبرنامج المقترح هو تخريج جيل من المهندسين المدنيين متخصصين في مجالات مختلفة مثل هندسة وإدارة البنية التحتية للنقل، أو هندسة وإدارة المياه والصرف، أو هندسة وإدارة التشييد، وبصفة عامة يكون الخريج:

1. ملماً بالأساس الرياضى والعلمى والتقنى لحل المشاكل الهندسية فى مجال الهندسة المدنية.
2. قادراً على تصميم وإجراء الاختبارات المتخصصة فى مجال الهندسة المدنية وتحليل بياناتها ونتائجها بصورة منهجية.
3. قادراً على تطبيق العلوم الهندسية المكتسبة وتطويعها لإدارة المشروعات فى مجال الهندسة المدنية.
4. قادراً على العمل بكفاءة وتكامل فى فريق متعدد التخصصات سواء كانوا فى نفس تخصصه أو فى تخصصات هندسية أو غير هندسية أخرى.
5. مقدراً للجوانب الاجتماعية المحيطة والتي تحكمه أحياناً فى تصميم وإدارة المشروعات والنظم الملائمة للمحيط والمجتمع الذى يعمل فيه فى إطار مجالات الهندسة المدنية المختلفة.
6. قادراً على استخدام التقنيات الهندسية الحديثة وعلوم الحاسوب والبرمجيات والتواصل شفهيّاً وكتابةً بمهنية مع المشاركين فى العمل.
7. مقدراً للتعليم والتطور المستمر واكتساب المهارات الجديدة ومواصلة الحصول على درجات علمية أعلى من مرحلة البكالوريوس (للطلبة المتفوقين المتميزين).
- وعلى المستوى المتخصص فى مجال هندسة وإدارة نظم النقل يكون:

8. قادراً على تخطيط وتصميم أنظمة النقل المختلفة ودراسة خصائصها المتشعبة والمتداخلة.
9. قادراً على تطبيق العلوم الهندسية المكتسبة لإدارة المشروعات فى مجال أنظمة النقل.
10. قادراً على حل المشاكل وتشغيل وصيانة أنظمة النقل القائمة واقتراح حلول ملائمة فنياً واقتصادياً.
11. قادراً على تطبيق مبادئ السلامة فى تصميم وتشغيل أنظمة النقل المختلفة.
- وسيكون الخريج من هذا التخصص مؤهلاً للعمل فى:

- شركات التطوير العقاري.
- المكاتب الاستشارية المحلية والعالمية العاملة فى مجال تخطيط وتصميم أنظمة النقل.
- المؤسسات المسؤولة عن تخطيط أنظمة النقل بأنواعها المختلفة (نقل بري - نقل بحري - نقل جوي).
- شركات المقاولات المسؤولة عن تنفيذ وإدارة مشروعات النقل العملاقة مثل شبكات الطرق والمترو والمطارات والموانئ.
- الشركات المسؤولة عن تشغيل وإدارة أنظمة النقل بأنواعها المختلفة (نقل بري - نقل بحري - نقل جوي).

وعلى المستوى المتخصص فى مجال هندسة وإدارة نظم المياه والصرف:

8. قادراً على تخطيط وتصميم شبكات ومحطات المياه ودراسة خصائصها المتشعبة والمتداخلة.
9. قادراً على تطبيق العلوم الهندسية المكتسبة لإدارة المشروعات فى مجال أنظمة المياه والصرف.
10. قادراً على حل المشاكل وتشغيل وصيانة أنظمة المياه والصرف واقتراح حلول ملائمة فنياً واقتصادياً.

11. ملماً بالمستجدات فى تكنولوجيا وأنظمة تنقية وتحلية المياه ومعالجة الصرف.
وسيكون الخريج من هذا التخصص مؤهلاً للعمل فى:

- شركات التطوير العقاري
 - المكاتب الاستشارية المحلية والعالمية العاملة في مجال تخطيط وتصميم مشاريع المياه والصرف.
 - شركات المقاولات المسؤولة عن تنفيذ وإدارة مشروعات المياه والصرف.
 - الشركات المسؤولة عن تشغيل وإدارة أنظمة المياه والصرف.
- وعلى المستوى المتخصص فى مجال هندسة وإدارة التشييد يكون:

8. قادراً على تحليل وتصميم وتنفيذ كافة المنشآت الخرسانية والمعدنية بشكل متكامل.
9. قادراً على إدارة مشروعات التشييد بشكل متكامل وحل المشاكل وإقتراح حلول ملائمة فنياً واقتصادياً.
10. يطبق مبادئ السلامة في تصميم وتنفيذ وإدارة مشروعات التشييد المختلفة.
11. ملماً بالمستجدات فى تكنولوجيا وأنظمة البنية التحتية المختلفة.
- وسيكون الخريج من هذا التخصص مؤهلاً للعمل فى:

- المكاتب الإستشارية المحلية والعالمية العاملة في مجال تحليل وتصميم المنشآت الخرسانية والمعدنية والإشراف على تنفيذها وإدارة التشييد والبناء.
- شركات المقاولات المسؤولة عن تنفيذ المشروعات الإنشائية بكافة أنواعها ومشروعات البنية التحتية.
- المؤسسات المسؤولة عن تخطيط المدن والمجتمعات العمرانية الجديدة وإدارة تنفيذ مشروعات الإسكان بأنواعها المختلفة.
- القسم الفني الخاص بشركات التطوير العقاري وشركات الغاز والبترو، إلخ...

مادة (5): المعايير الأكاديمية للبرنامج:

يلتزم البرنامج المقدم بالمعايير الأساسية المقترحة من قبل الهيئة القومية لضمان جودة التعليم والاعتماد كحد أدنى . والمعايير الأكاديمية لبرنامج هندسة وإدارة البنية التحتية المدنية يحدد المستوى والإمكانات والقدرات المتوقعة للخريج كالاتى:

الإمكانات المعرفية والفهم:

The graduates of the Civil and Infrastructure Engineering and Management program should be able to demonstrate the knowledge and understanding of:

12. Essential facts, concepts, principles and theories relevant to civil engineering.
13. Natural sciences, mathematical methods and principles of civil engineering sciences as applied to civil engineering systems.
14. Engineering principles in the fields of reinforced concrete and metallic structures' analysis and design, geotechnics and foundations, hydraulics and hydrology, water resources, environmental and sanitary engineering, roadways and traffic systems, surveying and photogrammetry.
15. Properties, behavior and fabrication of building materials

16. Up-to-date technology relevant to civil engineering disciplines
17. Projects and construction management including planning, finance, bidding and contracts.
18. Procedures and quality systems
19. Codes of practice in civil engineering disciplines and the regularity framework in design and practice.
20. Professional and ethical responsibilities that should be taken by civil engineer.
21. Broad education necessary to understand the impacts of civil engineering solutions on the environment

المهارات الفكرية:

The graduates of Civil and Infrastructure Engineering and Management should be able to:

1. Adopt, create and innovate thinking in solving problems, and in designing systems, components and processes.
2. Demonstrate a high level of competence in identifying, defining and solving civil engineering problems.
3. Adopt appropriate mathematical principles, natural sciences, technology, computing methods, design techniques and codes of practice in civil engineering disciplines, for modeling, analyzing and solving engineering problems
4. Apply appropriate structural analysis and codes of practice in designing reinforced concrete and metallic structures of all types
5. Apply appropriate geotechnical techniques and codes of practice to determine levels, types and design systems of building foundations, tunnels and excavations
6. Define, plan, conduct and report management techniques
7. Assess and evaluate different techniques and strategies for solving engineering problems
8. Apply engineering principles, theories and systems in solving environmental and socioeconomic problems
9. Solve engineering problems, on the basis of limited and possibly contradictory information
10. Maintain a sound theoretical approach in dealing with new and advancing technology
11. Select and apply appropriate IT tools to a variety of engineering problems
12. Assess and analyze risks, and take appropriate steps to manage them

المهارات العملية والفنية:

The graduates of Civil and Infrastructure Engineering and Management program should be able to:

1. Use laboratory and field equipment competently and safely

2. Observe, record and analyze data in laboratory and in the field
3. Demonstrate basic organizational and construction management skills
4. Use appropriate specialized computer software, computational tools and packages
5. Prepare technical drafts and detailed drawings both manually and using CAD
6. Prepare quantity surveying reports
7. Give technical presentations
8. Refer effectively to relevant literature

المهارات العامة:

The graduates of Civil and Infrastructure Engineering and Management program should be able to:

1. Collaborate effectively within multidisciplinary team.
2. Work in stressful environment and within constraints.
3. Communicate effectively.
4. Demonstrate efficient IT capabilities.
5. Lead and motivate individuals.
6. Effectively manage tasks, time, and resources.
7. Search for information and engage in life-long self learning discipline.
8. Acquire entrepreneurial skills.
9. Refer to relevant literatures.

مادة (6): تفاعل البرنامج مع احتياجات السوق:

من الأهداف الرئيسية للبرنامج المقترح هو التفاعل المستمر مع احتياجات سوق العمل حيث أن ذلك السوق هو ما يمثل المستهلك الحقيقي لنتاج البرنامج المقترح. وتماشياً مع نظام الجودة الشاملة فإن مخرجات البرنامج لابد وأن تتوافق مع متطلبات المستهلك وعليه فإن الجامعة ملتزمة بالتواصل مع المكاتب الاستشارية وشركات المقاولات وشركات التطوير العقاري والهيئات ذات الصلة بالدولة للتعرف على الاحتياجات الحقيقية للخريجين من البرنامج الجديد وكذلك لتشكيل قنوات مستمرة لتدريب الطلاب في تلك الجهات. وعليه فإن الجامعة ملتزمة باستضافة ممثلين عن تلك الجهات للتشاور في مستويات الطلاب المطلوبة وتطوير المقررات الدراسية طبقاً للمستجدات في سوق العمل.

وتحديداً فيما يخص أفرع البرنامج المقترح (هندسة وإدارة أنظمة النقل وهندسة وإدارة أنظمة المياه والصرف، وهندسة وإدارة التشييد) فقد تم اختيارهم كبداية لتخصصات البرنامج لما يشهده العالم بصفة عامة ومصر ومنطقة الشرق الأوسط بصفة خاصة من نمو مطرد في مشروعات الهندسة المدنية والبنية التحتية سواء كانت في صورة منشآت ومشروعات عمرانية جديدة وما تتطلبه من بنية تحتية في الدول التي تحتاج إلى تنمية وتطوير، أو إحلال وتجديد للمنشآت والبنية التحتية القائمة في الدول الأكثر تطوراً.

مادة (7): التشابه والتمايز عن البرامج المشابهة:

يقدم البرنامج الجديد نموذجاً للأسلوب المنهجي في التعليم الجامعي في تخصص هندسة وإدارة أنظمة النقل وأنظمة المياه والصرف وأنظمة التشييد والبناء حيث يستفيد البرنامج من الخبرات المتراكمة في البرامج المشابهة على المستوى المحلى والمستوى الدولى لتقديم منهج دراسى متكامل يعتمد على:

1. توفير الأساس النظرى المناسب للتخصص بما يواكب ما يتم تدريسه في الجامعات العريقة محلياً وعالمياً وللبرنامج مكونان أساسيان:
 - تقديم الأساس النظرى والذى يخدم فئة المهندسين المدنيين بصفة عامة لتكوين الأرضية الثابتة للتقدم في علوم التخصص.
 - تقديم المادة العلمية والعملية التى ترتفع بمستوى الطلاب إلى مستوى التخصص معتمداً على دراسة لما يتم تدريسه بالأقسام المماثلة في مصر وخارجها.
2. يتميز البرنامج بكونه يقدم للدارسين رؤية شاملة ومتكاملة في مجال البنية التحتية المدنية من خلال التركيز على الدورة الكاملة لأصول البنية التحتية تشمل التخطيط والتصميم والتنفيذ وإدارة المشروع والتشغيل والصيانة والادارة الشاملة للأصول.
3. يتميز البرنامج عن البرامج التقليدية للهندسة المدنية في الجامعات المصرية وبرامج هندسة التشييد كما هو موضح بالشكل التالي
4. توفير نظام الساعات المعتمدة –السائد في جامعة النيل- والذى يتيح للطلبة الاختيار من مجموعة من المقررات للتعمق في تخصص أكثر دقة من التخصص العام.
5. توفير معامل متكاملة للتطبيقات العملية المصاحبة للدراسة النظرية.
6. توفير خطة تدريب عملى داخل وخارج الجامعة لتتماشى مع متطلبات المقررات الدراسية والتطور المستمر في احتياجات سوق العمل.

		Civil Engineering Sectors		
		Transportation Systems (TSEM)	Water & Wastewater Systems (WWEM)	Construction & Management (CEM)
Asset Lifecycle Stages	Planning			
	Design	Focus of traditional Civil Engineering programs		
	Construction	Focus of traditional Construction Engineering programs		
	Operation & Maintenance	Civil Infrastructure Engineering & Management Program (CIEM)		
	Renewal & Rehabilitation	Focus of TSEM Track	Focus of WWEM Track	Focus of CEM Track

مادة (8): مخرجات البرنامج المستهدفة Program ILOs

لقد تم تصميم برنامج هندسة وإدارة البنية التحتية المدنية بكلية الهندسة والعلوم التطبيقية بجامعة النيل لى يتميز خريجو البرنامج بخصائص تمكنهم من التكامل بنجاح مع أقرانهم فى مجال العمل المهني والأكاديمي. وعليه فإنه كان من الضروري تحديد مخرجات البرنامج المستهدفة والتي تؤدي إلى

خريجي بمواصفات وقدرات كما تم توصيفها سابقاً. ويتم تقسيم مخرجات البرنامج المستهدفة إلى ثلاث شعب مختلفة (هندسة وإدارة أنظمة النقل وهندسة وإدارة أنظمة المياه والصرف وهندسة وإدارة التشييد) كما يلي:

الإمكانيات المعرفية والفهم (على مستوى البرنامج):

- A. متوقع ان يكون خريج برنامج هندسة وإدارة البنية التحتية المدنية بجامعة النيل ملم بالآتي:
- A.1. مبادئ وأسس تحليل المنشآت مع الأخذ في الاعتبار الأحمال، الركائز، حساب ردود الأفعال، القوى الداخلية، والأحمال المتحركة.
- A.2. مبادئ وأسس الرسم المدني الذي يشمل رسم الأتربة، رسم الحوائط الساندة، رسم المنشآت المعدنية، رسم منشآت الخرسانة المسلحة.
- A.3. مبادئ وأسس المساحة المستوية التي تشمل طرق الرفع وحساب المساحات وتقسيم الأراضي وتوقيع الأعمال الهندسية.
- A.4. مبادئ وأساليب إدارة وتخطيط مشروعات التشييد والتعرف على طرق ومعدات التشييد.
- A.5. مبادئ وأسس خواص المواد وتصميم الخلطة الخرسانية وأنواع الإضافات المستخدمة في الخلطة الخرسانية وإختبارات ضبط الجودة.
- A.6. مبادئ وأسس تصميم النظم الإنشائية، تصميم وتفاصيل التسليح، تصميم القطاعات المعرضة لقوى محورية وقوى لا مركزية - تصميم القواعد الخرسانية - التصميم بطريقة أحمال التشغيل، وإعداد رسومات التصميم.
- A.7. مبادئ وأسس تصميم المنشآت المعدنية وإعداد رسومات التصميم.
- A.8. مبادئ وأسس ميكانيكا التربة والتي تشمل الخواص الأساسية للتربة وإنتقال الإجهادات وقدرة تحمل التربة وهبوطها وإتزان الميول.
- A.9. مبادئ وأسس تصميم القواعد الضحلة، الأساسات الخازوقية، الحوائط الساندة، وإعداد رسومات التصميم.
- A.10. النظام البيئي وسياسات حماية البيئة، المسطحات المائية وإتزانها البيئي، أنواع التلوث ومصادره وأسس التحكم فيه، والمخلفات الصلبة والخطرة وإدارتها.
- A.11. أنواع العقود والإعتبارات القانونية، خطوات طرح العطاء، الشروط القياسية للعقود، ملف المشروع والمواصفات وسجلات المشروع.
- A.12. أطر إدارة أصول البنية التحتية، أسس التقييم المالي للأصول وطرق تمويل مشروعات البنية التحتية، معايير قياس مستوي الخدمة والاداء لخدمات البنية التحتية، ونماذج دعم إتخاذ القرار في إدارة أصول البنية التحتية.
- A.13. مبادئ وأسس تصميم الطرق وأنواع رصف الطرق.

الإمكانيات المعرفية والفهم (على مستوى شعبة هندسة وإدارة نظم النقل):

- A.14. مبادئ وأسس تخطيط النقل وهندسة المرور والتي تشمل تخطيط النقل داخل المدن، نماذج التنبؤ بالطلب على الانتقال، عمليات تنظيم وإدارة المرور وتحسينات النقل العام، دراسات خصائص المرور والسرعة، ووسائل التنظيم والتحكم في حركة المرور.
- A.15. مبادئ وأسس التخطيط الهندسي لخطوط السكك الحديدية، أنواع المقامات التي يتعرض لها القطار أثناء المسير، الأشكال المختلفة لأنواع التفريعات والتقاطعات، الأنواع المختلفة للإشارات المستخدمة بالسكك الحديدية.

- A.16 مبادئ وأسس تخطيط وتصميم الطرق والمطارات، أنواع رصف الطرق والمطارات، أنواع وخصائص مواد وخلطات الرصف، نظم إدارة وصيانة الطرق.
- A.17 الأساليب التحليلية المتقدمة للمساعدة في اتخاذ قرارات أفضل.
- A.18 تطبيقات الأنظمة الذكية في مجالات النقل المختلفة.
- A.19 أسس ومبادئ الشحن واللوجستيات لتنظيم شراء ونقل وتخزين وتوزيع وتشوين المواد والسلع تامة الصنع.
- A.20 أساسيات تخطيط وتصميم وسائل النقل البحري والجوي، تخطيط نظام المطارات، والقدرة الإستيعابية للمطارات والمجال الجوي، طرق وعمليات تخطيط وتصميم الموانئ وحركة السفن (نظام حركة السفن).
- A.21 أدوات تحليل النظم البيئية والتقييم الإستراتيجي البيئي متضمن تقييم الأثر البيئي، تقييم دورة الحياة، وتحليل تدفق المواد، وتحليل التكاليف والمنافع، وتقييم التكنولوجيا تقييم متكامل، وتحليل الموقف.
- A.22 أسس ومبادئ التخطيط المعماري وربطه بتخطيط البنية التحتية.

الإمكانيات المعرفية والفهم (على مستوى شعبة هندسة وإدارة نظم المياه والصرف):

- A.23 مبادئ وأسس تصميم وإنشاء شبكات توزيع المياه، الخزانات الأرضية والعلوية، ومحطات الرفع.
- A.24 مبادئ وأسس الهندسة الصحية والبيئية، هندسة إمداد المياه، الإحتياجات المائية، مصادر إمداد المياه، وطرق التجميع.
- A.25 مبادئ وأسس عمليات التنقية، الصرف الصحي، مصادر المخلفات السائلة، شبكات الصرف الصحي، أسس إدارة محطات التنقية والشبكات وطرق الترميم الخاصة بها.
- A.26 مبادئ وأسس التصميم الهيدروليكي للشبكات، ملحقات الشبكات، نظم عمليات المعالجة، أنواع وتصميم محطات الضخ.
- A.27 مصادر تلوث المياه السطحية والجوفية، تقنيات قياس التلوث وطرق تصريف مياه الصرف الصحي الصناعي والمنزلي، وطرق علاج تلوث المياه الجوفية.
- A.28 مبادئ وأسس العمليات الكيميائية والمعالجة البيولوجية لتنقية مياه الشرب ومياه الصرف.
- A.29 أدوات تحليل النظم البيئية، التقييم الاستراتيجي البيئي، تقييم الأثر البيئي، تقييم دورة الحياة، وتحليل تدفق المواد، وتحليل التكاليف والمنافع، وتقييم التكنولوجيا تقييم متكامل، وتحليل الموقف.
- A.30 مبادئ وأسس صيانة وتشغيل المباني القائمة والتكاليف المصاحبة لدورة حياة المنشأة.
- A.31 الأساليب التحليلية المتقدمة للمساعدة في اتخاذ قرارات أفضل.

الإمكانيات المعرفية والفهم (على مستوى شعبة هندسة وإدارة التشييد):

- A.32 تحليل المنشآت تحت تأثير الأحمال المختلفة بإستخدام طريقة الصلابة المباشرة للهياكل الإنشائية غير المحددة، طريقة العناصر المنتهية، وكذلك تحليل الجمالونات والإطارات بأنوعها المختلفة.

- A.33. أسس إدارة المشروعات الهندسية وإعداد دراسات الجدوى، العمليات والصيانة، وإدارة الموارد البشرية.
- A.34. استخدام وسائل المساحة المتقدمة التي تشمل نظام تحديد الموقع العالمي لرسم الخرائط، نظام المسح ثلاثي الأبعاد للمواقع والمنشآت، وتطبيق نظم المعلومات الجغرافية على الأعمال المساحية الخاصة بمشاريع التشييد والبنية التحتية.
- A.35. تصميم المنشآت الخرسانية الخاصة مثل الأبراج المرتفعة، الكباري الخرسانية، الخزانات الأرضية والمعلقة، حمامات السباحة والمنشآت المائية، القباب والبلاطات غير المستوية، وإعداد رسومات التصميم والورشة.
- A.36. تصميم المنشآت المعدنية بأنواعها مثل الأبراج المرتفعة، أبراج الإتصالات، المصانع، الكباري المعدنية، الصالات المغطاه، وإعداد رسومات التصميم والورشة.
- A.37. التصميم الجيوتقني للمنشآت الأرضية ومتطلبات البنية التحتية مثل الساتر اللوحية والحوائط الساندة بأنواعها، الجراجات الأرضية متعددة الطوابق، الأنفاق الضحلة والعميقة، محطات المترو، السدود الترابية، وإعداد رسومات التصميم والورشة.
- A.38. التخطيط الشامل لمشروعات التشييد والبنية التحتية بما في ذلك وضع الإستراتيجيات ودعم إتخاذ القرار والدعاية والتسويق للمشروعات.
- A.39. الأساليب التحليلية المتقدمة مثل التحليل العددي للمساعدة في تصميم المنشآت المتنوعة وكذلك الأساليب التحليلية المستخدمة في إدارة التشييد وإتخاذ قرارات أفضل.
- A.40. أسس ومبادئ التخطيط المعماري والعمارة الخضراء والإستدامة والحفاظ على البيئة، وربطهم بمشروعات التشييد والبنية التحتية وتخطيط المجتمعات العمرانية الجديدة.

المهارات الفكرية (شعبة هندسة وإدارة نظم النقل):

- B. متوقع أن يكون خريج برنامج هندسة وإدارة البنية التحتية المدنية بجامعة النيل قادر على الآتي:
- B.1. التعرف على مشكلات الطرق والمرور وتحليلها وتطوير أسلوب علاجي أمثل لها.
- B.2. الاختيار من عدد من الأساليب المحتملة لتجديد شبكات الطرق وأنظمة النقل المختلفة الموجودة حالياً.
- B.3. إستنباط حلول متكاملة لحل أزمة المرور بما يتماشى مع الإحتياجات المجتمعية.
- B.4. التعرف على القضايا الهندسية المعاصرة التي لها صلة ولو من بعيد بمجال التخصص ومحاولة ربطها علمياً وهندسياً بالخبرات المكتسبة في مجال التخصص لإيجاد أساليب محتملة للحل.

المهارات الفكرية (شعبة هندسة وإدارة نظم المياه والصرف):

- B.5. التعرف على مشكلات شبكات المياه والصرف الصحي وتحليلها وتطوير أسلوب علاجي أمثل لها.
- B.6. الاختيار من عدد من الأساليب المحتملة لتجديد شبكات المياه والصرف الصحي وخزانات المياه ومحطات المعالجة الموجودة حالياً.
- B.7. إستنباط حلول متكاملة لحل أزمة تلوث المياه وإمداد المياه الي المناطق خارج المدن.
- B.8. التعرف على القضايا الهندسية المعاصرة التي لها صلة ولو من بعيد بمجال التخصص ومحاولة ربطها علمياً وهندسياً بالخبرات المكتسبة في مجال التخصص لإيجاد أساليب محتملة للحل.

المهارات الفكرية (شعبة هندسة وإدارة التشييد):

- B.9. التعرف على المشكلات الإنشائية المختلفة وطرق ترميمها وعلاجها بأساليب هندسية آمنة وإقتصادية.
- B.10. الاختيار من بين الأساليب المحتملة لتحديث وتطوير البنية التحتية وأنظمة إدارة التشييد والبناء الموجودة حالياً.
- B.11. استنباط حلول متكاملة لحل أزمة التكدس السكاني والعشوائيات بما يتماشى مع الاحتياجات المجتمعية.
- B.12. التعرف على القضايا الهندسية المعاصرة ذات الصلة ولو من بعيد بمجال التخصص ومحاولة ربطها علمياً وهندسياً بالخبرات المكتسبة فى مجال التخصص لإيجاد أساليب محتملة للحل.

المهارات العملية والفنية (شعبة هندسة وإدارة نظم النقل):

- C. متوقع أن يكون خريج برنامج هندسة وإدارة البنية التحتية المدنية بجامعة النيل قادر على الآتى:
- C.1. إستخدام الحاسب الآلى وبرمجياته المتخصصة فى تحليل البيانات الخاصة بالطرق وتصميم البنية التحتية من طرق وكباري وأرصفة مطارات.
- C.2. تصميم وتنفيذ البنية التحتية من طرق وكباري وأرصفة مطارات وترميم البنية التحتية.
- C.3. عمل الدراسات الإقتصادية لإختيار التصميمات وطرق الترميم المناسبة.
- C.4. كتابة التقارير الفنية فى مجال هندسة وإدارة أنظمة النقل وما يتعلق بها من التخصصات الأخرى.

المهارات العملية والفنية (شعبة هندسة وإدارة نظم المياه والصرف):

- C.5. إستخدام البرمجيات فى تحليل البيانات الخاصة بشبكات المياه والصرف الصحى.
- C.6. التصميم الهيدرولى للشبكات وملحقاتها، نظم عمليات المعالجة، أنواع وتصميم محطات الضخ، وعمل الدراسات الاقتصادية لإختيار التصميمات وطرق الترميم.
- C.7. تحليل النظم البيئية وصنع القرار البيئى.
- C.8. كتابة التقارير الفنية فى مجال هندسة المياه والصرف.

المهارات العملية والفنية (شعبة هندسة وإدارة نظم المياه والصرف):

- C.9. استخدام الحاسب الآلى وبرمجياته فى تحليل البيانات الخاصة بالمنشآت والبنية التحتية من خطوط المياه، أنفاق، كباري، وطرق.
- C.10. تصميم وتنفيذ الأنواع المختلفة من المنشآت والمجمعات العمرانية الجديدة ومتطلبات البنية التحتية وطرق تشغيلها وصيانتها.
- C.11. وضع الإستراتيجيات وعمل الدراسات الاقتصادية لإدارة مشروعات التشييد.
- C.12. كتابة التقارير الفنية فى مجال الهندسة الإنشائية وإدارة التشييد وما يتعلق بها من التخصصات الأخرى.

المهارات العامة:

- D. متوقع أن يكون خريج برنامج هندسة وإدارة البنية التحتية المدنية بجامعة النيل قادر على الآتى:
- D.1. التعاون بفعالية ضمن فريق متعدد التخصصات.

- .D.2 العمل في بيئة مرهقة وضمن القيود.
- .D.3 التواصل بفاعلية مع الآخرين.
- .D.4 إثبات قدرات تكنولوجيا المعلومات الفعالة.
- .D.5 قيادة وتحفيز الأفراد.
- .D.6 إدارة المهام والوقت والموارد بشكل فعال.
- .D.7 البحث عن المعلومات والانخراط في منظومة التعلم مدى الحياة.
- .D.8 اكتساب مهارات تنظيم المشاريع.
- .D.9 الرجوع إلى الآداب ذات الصلة.

مادة (9): مقارنة مخرجات البرنامج المستهدفة مع المرجعيات المحلية والعالمية

الجدول المرفق يستعرض مقارنة بين مخرجات البرنامج المقترح المستهدفة مع متطلبات الهيئة القومية لضمان جودة التعليم والاعتماد (NARS) ومتطلبات (ABET).

CIEM courses/ILOS mapped to NARS and ABET Graduates Attributes

Attributes of program graduates as per ABET Criterion (3) for program outcomes and assessment	Attributes of program graduates as per NARS Requirements for engineering programs, in general	Corresponding ILO's in Current Program	Courses Covering such ILO's
a. Ability to apply knowledge of mathematics, science and engineering.	a. Ability to apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.	A1, A2, A3, A4, A5, A8, A11, A12, A14, A15, A22, A24, A28, A29, A30, A32, A34.	CIEM 201, CIEM 202, CIEM 211, CIEM 212, CIEM 221, CIEM 231, CIEM 301, CIEM 311, CIEM 312, CIEM 313, CIEM 314, CIEM 315, CIEM 316, CIEM 321, CIEM 331, CIEM 341, CIEM 351, CIEM 371, CIEM 372, CIEM 401, CIEM 411, CIEM 412, CIEM 432, CIEM 433, CIEM 435, CIEM 441, CIEM 451, CIEM 452, CIEM 453, CIEM 472, CIEM 475, CIEM 476, IENG 241,
a. Ability to design and conduct experiments, as well as to analyze and interpret data.	c. Ability to Design and conduct experiments as well as analyze and interpret data.	A3, A5, A8, A10, A16, A27, A28, A34.	CIEM 201, CIEM 221, CIEM 312, CIEM 313, CIEM 321, CIEM 341, CIEM 371, CIEM 401, CIEM 411, CIEM 441, CIEM 454, CIEM 456, CIEM 474, IENG 303.
b. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	b. Ability to Design a system; component and process to meet the required needs within realistic constraints.	A6, A7, A9, A13, A16, A20, A23, A26, A35, A36, A37, A39, C2, C6, C10.	CIEM 201, CIEM 202, CIEM 211, CIEM 212, CIEM 221, CIEM 321, CIEM 311, CIEM 312, CIEM 313, CIEM 314, CIEM 315, CIEM 316, CIEM 351, CIEM 371, CIEM 411, CIEM 412, CIEM 413, CIEM 414, CIEM 415, CIEM 416, CIEM 417, CIEM 437, CIEM 451, CIEM 452, CIEM 453, CIEM 454, CIEM 455, CIEM 456, CIEM 457, CIEM 458, CIEM 471, CIEM 472, CIEM 473, CIEM 474, CIEM 475, CIEM 391, CIEM 493, CIEM 494, NSCI 102, IENG 241, IENG 303,
c. Ability to function on multi-disciplinary teams	f. Work effectively within multi-disciplinary teams	D1	CIEM 391, CIEM 493, ENTR 301.

d. Ability to identify, formulate and solve engineering problems	d. Ability to Identify, formulate and solve fundamental engineering problems	A17, A18, A31, B1, B2, B3, B5, B6, B7, B9, B10, B11, C3, C7, C11.	CIEM 316, CIEM 351, CIEM 371, CIEM 372, CIEM 412, CIEM 413, CIEM 414, CIEM 415, CIEM 416, CIEM 417, CIEM 431, CIEM 434, CIEM 435, CIEM 436, CIEM 452, CIEM 453, CIEM 454, CIEM 455, CIEM 456, CIEM 457, CIEM 458, CIEM 471, CIEM 472, CIEM 473, CIEM 474, CIEM 475, CIEM 476, CIEM 493, CIEM 494, CIEM 391, NSCI 102, IENG 303,
e. Understanding of professional and ethical responsibility	j. Ability to Display professional and ethical responsibilities; and contextual understanding	D2, D5, D8	CIEM 391, ENTR 301.
f. Ability to communicate effectively	g. Ability to communicate effectively	C4, C8, C12, D3, D4	CIEM 202, CIEM 351, CIEM 391, CIEM 435, CIEM 436, CIEM 437, CIEM 452, CIEM 455, CIEM 457, CIEM 458, CIEM 475, , CIEM 493, CIEM 495, ENTR 301.
g. Having the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	h. Ability to Consider the impacts of engineering solutions on society & environment	A10, A21, A27, A29, A33, A38, A40, D6	CIEM 341, CIEM 372, CIEM 391, CIEM 431, CIEM 434, CIEM 435, CIEM 436, CIEM 441, CIEM 458, CIEM 472, CIEM 474, CIEM 475, IENG 202.
h. Recognition of the need for, and ability to engage in life-long learning	k. Ability to Engage in self- and life-long learning	D7, D9	CIEM 391, CIEM 495, ENTR 301.
i. Knowledge of contemporary issues	i. Ability to Demonstrate knowledge of contemporary engineering issues	B4, B8, B12	CIEM 435, CIEM 436, CIEM 391, CIEM 493, CIEM 494, NSCI 102.
j. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	e. Ability to Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management	C1, C5, C9	CIEM 316, CIEM 351, CIEM 401, CIEM 413, CIEM 414, CIEM 415, CIEM 416, CIEM 417, CIEM 437, CIEM 452, CIEM 453, CIEM 454, CIEM 455, CIEM 456, CIEM 457, CIEM 458, CIEM 472, CIEM 474, CIEM 475, CIEM 476, CIEM 391, CIEM 493, CIEM 494, NSCI 102, IENG 303.

مادة (10): مطابقة مخرجات البرنامج المستهدفة مع المعايير الأكاديمية طبقاً لمتطلبات (NARS)

الجدول المرفق يستعرض مدى تحقيق مخرجات البرنامج المستهدفة (Program ILOs) للمعايير الأكاديمية له طبقاً لمتطلبات (NARS):

مخرجات البرنامج المستهدفة المحققة للمعايير	المعايير الأكاديمية للبرنامج
	الامكانيات المعرفية والفهم
A1-A6, A15-A17	• Essential facts, concepts, principles and theories relevant to civil engineering.
C1-C3 & C6-C8	• Natural sciences, mathematical methods and principles of civil engineering sciences as applied to civil engineering systems.
A3, 6, 7, 9-13, 16, 19, 20-22, B2, 3, B7, 8, C4, 8	• Engineering principles in the fields of reinforced concrete and metallic structures' analysis and design, geotechnics and foundations, hydraulics and hydrology, water resources, environmental and sanitary engineering, roadways and traffic systems, surveying and photogrammetry.
B1-B10	• Properties, behavior and fabrication of building materials
A14, 26, B4, 9	• Up-to-date technology relevant to civil engineering disciplines
A14, 28	• Projects and construction management including planning, finance, bidding and contracts.
B10, D4	• Procedures and quality systems
D3	• Codes of practice in civil engineering disciplines and the regularity framework in design and practice.
B10, D1-D4	• Professional and ethical responsibilities that should be taken by civil engineer.
B10, D1-D4	• Broad education necessary to understand the impacts of civil engineering solutions on the environment
	المهارات الفكرية
B1, B2, B6, B7	• Adopt, create and innovate thinking in solving problems, and in designing systems, components and processes.
B2, 3, 4, 7, 8, 9	• Demonstrate a high level of competence in identifying, defining and solving civil engineering problems.
B2, 3, 7, 8	• Adopt appropriate mathematical principles, natural sciences, technology, computing methods, design techniques and codes of practice in civil engineering disciplines, for modeling, analyzing and solving engineering problems

B1-3, 6-8	Apply appropriate structural analysis and codes of practice in designing reinforced concrete and metallic structures of all types
B1-4, 6-9	Apply appropriate geotechnical techniques and codes of practice to determine levels, types and design systems of building foundations, tunnels and excavations
B1, 6	Define, plan, conduct and report management techniques
B1-3, B6-8	Assess and evaluate different techniques and strategies for solving engineering problems
B1-4, B6-9	Apply engineering principles, theories and systems in solving environmental and socioeconomic problems
B1-10	Solve engineering problems, on the basis of limited and possibly contradictory information
B1-10	Maintain a sound theoretical approach in dealing with new and advancing technology
C1, 5, 9	Select and apply appropriate IT tools to a variety of engineering problems
B1, 2	Asses and analyze risks, and take appropriate steps to manage them
المهارات العملية والفنية	
B1-9, C1-4, 6-8	Use laboratory and field equipment competently and safely
B1-9, C1-4, 6-8	Observe, record and analyze data in laboratory and in the field
B1-9, C1-4, 6-8	Demonstrate basic organizational and construction management skills
C1-9	Use appropriate specialized computer software, computational tools and packages
C2, 3, 7, 8	Prepare technical drafts and detailed drawings both manually and using CAD
C1-3, 6-8	Prepare quantity surveying reports
A4, 17, C1, 2, 6, 7	Give technical presentations
A14, 26	Refer effectively to relevant literature
المهارات العامة	
D1	Collaborate effectively within multidisciplinary team.
D2	Work in stressful environment and within constraints.
D3	Communicate effectively.
D4	Demonstrate efficient IT capabilities.
D5	Lead and motivate individuals.
D6	Effectively manage tasks, time, and resources.
D7	Search for information and engage in life-long self learning discipline.
D8	Acquire entrepreneurial skills.
D9	Refer to relevant literatures.

مادة (11): المقررات الدراسية ومدى ملاءمتها لمخرجات البرنامج المستهدفة:

CIEM University Core Requirements (10 courses = 16 CH)

Code No.	Course Title	No. of hours / week			CH	ECTS	SW L	ILOs
		Lec	Tut	Lab				
ENGL 001	Intensive English	0	0	0	0	0	0	
ENGL 101	English I	0	0	0	0	0	50	
ENGL 102	English II	0	0	0	0	0	50	
ENGL 201	Writing Skills	3.75	0	0	3	5	125	C4, C8, C12
ENGL 202	Communication and Presentation Skills	3.75	0	0	3	5	125	D1, D3, D5
HUMA 101	Introduction to Scientific & Critical Thinking	2.5	0	0	2	3	75	B2, B6, B10
HUMA 102	Introduction to Ethics	2.5	0	0	2	3	75	D2
HUMA 103	Selected Topics in Humanities & Arts	2.5	0	0	2	3	75	B4, B8, B12, D1, D9
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2.5	0	0	2	3	75	B4, B8, B12, D1, D9
SSCI 103	Selected Topics in Social Sciences	2.5	2.5	0	2	3	75	B4, B8, B12, D1, D9
Total Number	10	20	3	0	16	25	725	

CIEM Engineering Core Requirements (16 courses = 48 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	SW L	ILOs
		Lec	Tut	Lab				
CHEM 101	Chemical Principles	2.5	0	1.25	3	5	125	A5, A8, A28
CSCE 101	Computer & Information Skills	1.25	0	3.75	3	5	125	C1, C5, C9, D4
CSCE 201	Introduction to Programming	1.25	0	3.75	3	5	125	A17, A31, A39
ECEN 101	Electric Circuits	2.5	0	1.25	3	5	125	A33, A35, B4, B8, B12, D4
ENGR 101	Introduction to Engineering Disciplines	2.5	0	1.25	3	5	125	A2, A3, A6-A8
ENGR 102	Engineering Design	2.5	0	1.25	3	5	125	A2, A3, A6-A8
MATH 111	Analytical Geometry & Calculus I	2.5	1.25	0	3	5	125	A1, A5-A9
MATH 112	Calculus II	2.5	1.25	0	3	5	125	A1, A5-A9
MATH 202	Probability & Statistics for Engineers	2.5	1.25	0	3	5	125	A1, A3, A12
MATH 203	Differential Equations	2.5	1.25	0	3	5	125	A1, A5-A9
MATH 301	Linear Algebra	2.5	1.25	0	3	5	125	A1, A5-A9
MATH 303	Numerical Methods	2.5	1.25	0	3	5	125	A17, A31, A39
MENG 101	Engineering Mechanics I - Statics	2.5	0	0	2	4	100	A1, A5-A9
MENG 102	Engineering Mechanics II - Dynamics	2.5	0	0	2	4	100	A21, A30, A31, A39
PHYS 101	Physics I	2.5	1.25	1.25	4	7	175	A6-A8, A16, A26, A32
PHYS 102	Physics II	2.5	1.25	1.25	4	7	175	A6-A8, A16, A26, A32
Total Number	16	37.5	10	15	48	82	2050	

CIEM Major Core Requirements (19 courses = 57 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	SW L	ILOs
		Lec	Tut	Lab				
CIEM 201	Introduction to Surveying	1.25	1.25	2.50	3	5	125	A3,13, D1,2,6
CIEM 202	Civil Engineering Drafting	1.25	1.25	2.50	3	5	125	A2,6,7,9, B1, D4
CIEM 211	Structural Analysis-1	2.50	1.25	0	3	5	125	A1,6,7,9, D4
CIEM 212	Structural Analysis-2	2.50	0.625	0.625	3	5	125	A1,6,7,9, D4
CIEM 221	Engineering Materials-1	2.50	0.625	0.625	3	5	125	A1, 5-9
CIEM 311	Reinforced Concrete Design-1	2.50	1.25	0	3	5	125	A2,6, D7,9
CIEM 312	Soil Mechanics-1	2.50	0.625	0.625	3	5	125	A5,8,9, B4, D1,3
CIEM 313	Soil Mechanics-2	2.50	0.625	0.625	3	5	125	A6,8,9,13, D1,3
CIEM 314	Reinforced Concrete Design-2	2.50	0.625	0.625	3	5	125	A2,6, B8, D1,7,9
CIEM 315	Structural Steel Design	2.50	1.25	0	3	5	125	A2,5,7, D1,9
CIEM 321	Engineering Materials-2	2.50	0.625	0.625	3	5	125	A1, 5-9
CIEM 341	Fluid Mechanics	2.50	0.625	0.625	3	5	125	A2,5,8,10, D1
CIEM 391	Practical Training	0	0	0	3	6	150	C4,8,12, D1,2,5,6,8
CIEM 411	Design & Construction of Foundations	2.50	0.625	0.625	3	5	125	A2,6,8,9, D1,4
CIEM 441	Fundamentals of Hydraulic Engineering	2.50	0.625	0.625	3	5	125	A2,5,8,10,12
CIEM 493	Graduation Project I	2.5	0	0	3	6	180	B2,6,10, C2,6,10,12, D1
CIEM 495	Graduation Project II	2.5	0	0	3	6	180	B3,7,11, C1,5,9,7, D9
IENG 241	Engineering Economics	2.50	1.25	0	3	5	125	A4,11,12, C3,7,11
NSCI 102	Selected Topics in Environmental Science	2.50	1.25	0	3	5	125	
Total Number	19	42.5	14.375	10.625	57	98	2510	

CIEM Specialization (Track 1) (13 courses = 39 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Le c	Tut	Lab				
CIEM 231	Construction Project Management	2.50	1.25	0	3	5	125	A4,11,12, D4-6
CIEM 331	Construction Engineering & Methods	2.5	1.25	0	3	5	125	A4,6,9,12, D4,6
CIEM 351	Transportation Planning	2.50	1.25	0	3	5	125	A14, B1,3,C1,2,4
CIEM 432	Infrastructure Asset Management	2.50	1.25	0	3	5	125	A4,10,11,12, D5,6
CIEM 433	Contracts & Commercial Management	2.50	1.25	0	3	5	125	A4,11, D5,6,8
CIEM 451	Introduction to Transportation & Highway Engineering	2.50	0.625	0.625	3	5	125	A1,2,3,8,13, D1
CIEM 452	Traffic Engineering	2.50	1.25	0	3	5	125	A14, B1,3, C1,2,4
CIEM 453	Public Transit Planning & Operations	2.50	1.25	0	3	5	125	A14,15, B1,3, C2,3
CIEM 454	Highway Engineering	2.50	1.25	0	3	5	125	A5,16,B1,2, C1,3
CIEM 456	Maritime & Airport Transit	2.50	1.25	0	3	5	125	A16,20, B1, C1-3
CIEM xxx	Elective-1	2.5	1.25	—	3	5	150	(from list below)
CIEM xxx	Elective-2	2.5	1.25	—	3	5	150	(from list below)
ENTR 301	Selected Topics in Entrepreneurship	2.5	1.25	0	3	5	125	D1-3,5,6,8
Total Number	13	32.50	15.63	1	39	65	1675	

CIEM (Track 1) List of Electives

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	Tut	Lab				
CIEM 435	Urban Planning & Infrastructure Development	2.5	1.25	0.00	3	5	125	A22, B3,4, C3,4
CIEM 437	Freight and Logistics Management	2.5	1.25	0.00	3	5	125	A19, C1,2,4, D8
CIEM 455	Fundamentals of Intelligent Transportation Systems	2.5	1.25	0.00	3	5	125	A18, B2,3, C1,2,4
CIEM 457	Transportation Systems Safety	2.5	1.25	0.00	3	5	125	A17, B2,3, C1,2,4
CIEM 458	Design and Operations of Railway Systems	2.5	1.25	0.00	3	5	125	A7,18,21, C1,4, D7
CIEM 475	Environmental Assessments of Infrastructure Systems	2.5	1.25	0.00	3	5	125	A21, B2,3, C1,2,4
IENG 202	Operations research I	2.5	1.25	0.00	3	5	125	A18, B2, C3, D1,3,9

CIEM Specialization (Track 2) (13 courses = 39 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	Tut	Lab				
CIEM 231	Construction Project Management	2.50	1.25	0	3	5	125	A4,11,12, D4-6
CIEM 331	Construction Engineering & Methods	2.5	1.25	0	3	5	125	A4,6,9,12, D4,6
CIEM 371	Chemical and Biological Treatment Processes	2.50	0.625	0.625	3	5	125	A28, B5, C6,7, D1,4
CIEM 412	Design, Construction & Rehabilitation of Water Structures	2.50	1.25	0	3	5	125	A5,23, B6, D4,9
CIEM 432	Infrastructure Asset Management	2.50	1.25	0	3	5	125	A4,10,11,12, D5,6
CIEM 433	Contracts & Commercial Management	2.50	1.25	0	3	5	125	A4,11, D5,6
CIEM 451	Introduction to Transportation & Highway Engineering	2.50	0.625	0.625	3	5	125	A1-3,8,13, D1
CIEM 471	Design and Operations of Water & Wastewater Treatment Plants	2.50	1.25	0	3	5	125	A25, C6,7, D1,4,7
CIEM 472	Design, Construction & Operations of Water & Sewer Networks	2.50	1.25	0	3	5	125	A7,25,29 C5-7
CIEM 475	Environmental Assessments of Infrastructure Systems	2.50	1.25	0	3	5	125	A30, B5,6, C6-8
ENTR 301	Selected Topics in Entrepreneurship	2.5	1.25	0	3	5	125	D1-3,5,6,8
CIEM xxx	Elective-1	2.5	1.25	—	3	5	150	(from list below)
CIEM xxx	Elective-2	2.5	1.25	—	3	5	150	(from list below)
Total Number	13	32.50	15.00	1	39	65	1675	

CIEM (Track 2) List of Electives

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	Tut	Lab				
CIEM 372	Environmental Hydraulics	2.5	0.625	0.625	3	5	125	A24,29, B5, D1,3
CIEM 435	Urban Planning & Infrastructure Development	2.5	1.25	0	3	5	125	A31, B7,8, C7,8, D8
CIEM 473	Design & Operation of Electro Mechanical Systems	2.5	1.25	0	3	5	125	A26, C6,7, D1,3
CIEM 474	Field Measurement & Water Quality	2.5	0.625	0.625	3	5	125	A27, B5,6, C5,6,7
CIEM 476	Water Resources Engineering	2.5	1.25	0	3	5	125	A24,31, B5, C5,7
IENG 202	Operations research I	2.5	1.25	0	3	5	125	A18, B2, C3, D1,3,9

CIEM Specialization (Track 3) (13 courses = 39 CH)

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	Tut	Lab				
CIEM 231	Construction Project Management	2.50	1.25	0	3	5	125	A4,11,12, D4-6
CIEM 316	Structural Analysis-3	2.50	0.625	0.625	3	5	125	A32, A39, B9, C9
CIEM 331	Construction Engineering & Methods	2.5	1.25	0	3	5	125	A4,6,9,12, D4,6
CIEM 412	Design, Construction & Rehabilitation of Water Structures	2.50	1.25	0	3	5	125	A5,23, B6, D4,9
CIEM 414	Advanced Steel Design	2.50	1.25	0	3	5	125	A7,36, B9, C9, D4,9
CIEM 431	Principles of Management & Human Resources	2.50	1.25	0	3	5	125	A33, B10
CIEM 432	Infrastructure Asset Management	2.50	1.25	0	3	5	125	A4,10,11,12, D5,6
CIEM 433	Contracts & Commercial Management	2.50	1.25	0	3	5	125	A4,11, D5,6
CIEM 434	Strategic Management in Construction	2.50	1.25	0	3	5	125	A38, C11, D5-8
CIEM 451	Introduction to Transportation & Highway Engineering	2.50	0.625	0.625	3	5	125	A1-3,8,13, D1
ENTR 301	Selected Topics in Entrepreneurship	2.5	1.25	0	3	5	125	D1-3,5,6,8
CIEM xxx	Elective-1	2.5	---	---	3	5	150	(from list below)
CIEM xxx	Elective-2	2.5	---	---	3	5	150	(from list below)
Total Number	13	32.5	12.5	1.25	39	65	1675	

CIEM (Track 3) List of Electives

Code No.	Course Title	No. of hours / week			CH	EC TS	S W L	ILOs
		Lec	Tut	Lab				
CIEM 401	Advanced Surveying & GIS	1.25	1.25	2.5	3	5	125	A34, C9, D1,2,4
CIEM 413	Advanced Design of Foundations	2.5	1.25	0	3	5	125	A37, B9, C9, C10, D1,4
CIEM 415	Steel Bridges	2.5	1.25	0	3	5	125	A36, B9, C9,10, D1,4
CIEM 416	Dams & Tunnels	2.5	1.25	0	3	5	125	A37, B9, C9,10, D1,4
CIEM 417	Concrete Bridges	2.5	1.25	0	3	5	125	A35, B9, C9, C10
CIEM 435	Urban Planning & Infrastructure Development	2.5	1.25	0	3	5	125	A35, B9, C9,10, D1,4
CIEM 436	Sustainability & Built Environment	2.5	1.25	0	3	5	125	A40, B10,11,12, C12, D8
IENG 202	Operations research I	2.5	1.25	0	3	5	125	A18, B2, C3, D1,3,9

مادة (12): توزيع مقررات البرنامج على الفئات المقترحة في (NARS):

CIEM Course Mapping to Subject Categories (NARS)

Course Code	Course Title	Hum. & Social Sci.		Busine ss Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.		Eng. App. & Design		Project & PT		
		C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	
	University Requirements															
ENGL 001	Intensive English															
ENGL 101	English I	0	0													
ENGL 102	English II	0	0													
ENGL 201	Writing Skills	3	5													
ENGL 202	Communication and Presentation Skills	3	5													
HUMA 101	Introduction to Scientific & Critical Thinking	2	3													
HUMA 102	Introduction to Ethics	2	3													
HUMA 103	Selected Topics in Humanities & Arts	2	3													
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3													
SSCI 103	Selected Topics in Social Sciences	2	3													
	Total University Requirements	16	25	0	0	0	0	0	0	0	0	0	0	0	0	
	Engineering Requirements															
CHEM 101	Chemical Principles					3	5									
CSCE 101	Computer & Information Skills									3	5					
CSCE 201	Introduction to Programming									3	5					
ECEN 101	Electric Circuits									3	5					
ENGR 101	Introduction to Engineering Disciplines							3	5							
ENGR 102	Engineering Design									3	5					
MATH 111	Analytical Geometry & Calculus I					3	5									
MATH 112	Calculus II					3	5									
MATH 202	Probability & Statistics for Engineers					3	5									
MATH 203	Differential Equations					3	5									
MATH 301	Linear Algebra					3	5									
MATH 303	Numerical Methods					3	5									
MENG 101	Engineering Mechanics I - Statics									2	4					
MENG 102	Engineering Mechanics II - Dynamics									2	4					
PHYS 101	Physics I					4	7									
PHYS 102	Physics II					4	7									
	Total University Requirements	0	0	0	0	29	49	3	5	16	28	0	0	0	0	
	Program Requirements															
CIEM 201	Introduction to Surveying											3	5			
CIEM 202	Civil Engineering Drafting									3	5					
CIEM 211	Structural Analysis-1									3	5					
CIEM 212	Structural Analysis-2									3	5					
CIEM 221	Engineering Materials-1									3	5					
CIEM 311	Reinforced Concrete Design-1											3	5			
CIEM 312	Soil Mechanics-1									3	5					
CIEM 313	Soil Mechanics-2											3	5			
CIEM 314	Reinforced Concrete Design-2											3	5			
CIEM 315	Structural Steel Design											3	5			
CIEM 321	Engineering Materials-2											3	5			
CIEM 341	Fluid Mechanics									3	5					
CIEM 391	Practical Training													3	6	
CIEM 411	Design & Construction of Foundations											3	5			
CIEM 441	Fundamentals of Hydraulic Engineering									3	5					

Course Code	Course Title	Hum. & Social Sci.		Busine ss Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.		Eng. App. & Design		Project & PT	
		C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS
CIEM 493	Graduation Project I													3	6
CIEM 495	Graduation Project II													3	6
IENG 241	Engineering Economics			3	5										
NSCI 102	Selected Topics in Environmental Science							3	5						
Total Program Requirements		0	0	3	5	0	0	3	5	21	35	21	35	9	18
Track #1 - Transportation Systems Engineering & Management															
CIEM 231	Construction Project Management											3	5		
CIEM 331	Construction Engineering & Methods									3	5				
CIEM 351	Transportation Planning											3	5		
CIEM 432	Infrastructure Asset Management											3	5		
CIEM 433	Contracts & Commercial Management											3	5		
CIEM 451	Introduction to Transportation & Highway Engineering									3	5				
CIEM 452	Traffic Engineering											3	5		
CIEM 453	Public Transit Planning & Operations											3	5		
CIEM 454	Highway Engineering									3	5				
CIEM 456	Maritime & Airport Transit											3	5		
CIEM xxx	Elective (1)											3	5		
CIEM xxx	Elective (2)											3	5		
ENTR 301	Selected Topics in Entrepreneurship			3	5										
Total Track 1 Requirements		0	0	3	5	0	0	0	0	9	15	27	45	0	0
Total CIEM - Trans. Systems Engineering & Management		16	25	6	10	29	49	6	10	46	78	48	80	9	18
Track 1 Course Category %		10.0%		3.8%		18.1%		3.8%		28.8%		30.0%		5.6%	
Track #2 - Water & Wastewater Engineering & Management															
CIEM 231	Construction Project Management											3	5		
CIEM 331	Construction Engineering & Methods									3	5				
CIEM 371	Chemical and Biological Treatment Processes											3	5		
CIEM 412	Design, Construction & Rehabilitation of Water Structures									3	5				
CIEM 432	Infrastructure Asset Management											3	5		
CIEM 433	Contracts & Commercial Management											3	5		
CIEM 451	Introduction to Transportation & Highway Engineering									3	5				
CIEM 471	Design and Operations of Water & Wastewater Treatment Plants											3	5		
CIEM 472	Design, Construction & Operations of Water & Sewer Networks											3	5		
CIEM 475	Environmental Assessments of Infrastructure Systems											3	5		
CIEM xxx	Elective (1)											3	5		
CIEM xxx	Elective (2)											3	5		
ENTR 301	Selected Topics in Entrepreneurship			3	5										
Total Track 2 Requirements		0	0	3	5	0	0	0	0	9	15	27	45	0	0
Total CIEM - Water & Wastewater Eng. & Mgmt.		16	25	6	10	29	49	6	10	46	78	48	80	9	18
Track 2 Course Category %		10.0%		3.8%		18.1%		3.8%		28.8%		30.0%		5.6%	
Track #3 - Construction Engineering & Management															

Course Code	Course Title	Hum. & Social Sci.		Busine ss Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.		Eng. App. & Design		Project & PT	
		C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS
CIEM 231	Construction Project Management											3	5		
CIEM 316	Structural Analysis-3											3	5		
CIEM 331	Construction Engineering & Methods									3	5				
CIEM 412	Design, Construction & Rehabilitation of Water Structures									3	5				
CIEM 414	Advanced Steel Design											3	5		
CIEM 431	Principles of Management & Human Resources											3	5		
CIEM 432	Infrastructure Asset Management											3	5		
CIEM 433	Contracts & Commercial Management											3	5		
CIEM 434	Strategic Management in Construction											3	5		
CIEM 451	Introduction to Transportation & Highway Engineering									3	5				
CIEM xxx	Elective (1)											3	5		
CIEM xxx	Elective (2)											3	5		
ENTR 301	Selected Topics in Entrepreneurship			3	5										
Total Track 3 Requirements		0	0	3	5	0	0	0	0	9	15	27	45	0	0
Total CIEM - Construction Engineering & Management		16	25	6	10	29	49	6	10	46	78	48	80	9	18
Track 3 Course Category %		10.0%		3.8%		18.1%		3.8%		28.8%		30.0%		5.6%	
		C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS	C H	EC TS
		Hum. & Social Sci.		Busine ss Admin.		Math & Basic Sci.		Eng. Culture		Basic Eng. Sci.		Eng. App. & Design		Project & PT	

**مادة (13): مصفوفة مخرجات المقررات الدراسية ومدى ملائمتها للمخرجاتها
المستهدفة للبرنامج:**

CIEM Program Requirements Courses - ILOs matrix - Part1

Major Core Requirements		a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	a18	a19	a20	a21	a22	a23	a24	a25	a26	a27	a28	a29	a30	a31	a32	a33	a34	a35	a36	a37	a38	a39	a40				
		Program Requirements																																											
CIEM 201	Introduction to Surveying		x										x																																
CIEM 202	Civil Engineering Drafting		x				x	x		x																																			
CIEM 211	Structural Analysis-1		x				x	x		x																																			
CIEM 212	Structural Analysis-2		x				x	x		x																																			
CIEM 221	Engineering Materials-1		x				x	x	x	x	x																																		
CIEM 311	Reinforced Concrete Design-1		x				x	x	x	x	x																																		
CIEM 312	Soil Mechanics-1		x				x																																						
CIEM 313	Soil Mechanics-2		x				x																																						
CIEM 314	Reinforced Concrete Design-2						x			x	x																																		
CIEM 315	Structural Steel Design						x		x	x			x																																
CIEM 321	Engineering Materials-2		x				x		x	x																																			
CIEM 341	Fluid Mechanics		x				x		x																																				
CIEM 391	Practical Training		x				x			x	x																																		
CIEM 411	Design & Construction of Foundations		x				x			x	x	x		x																															
CIEM 441	Fundamentals of Hydraulic Engineering										x																																		
CIEM 493	Graduation Project I						x						x	x																															
CIEM 495	Graduation Project II																																												
IENG 241	Engineering Economics																																												
NSCI 102	Selected Topics in Environmental Science																																												

CIEM Program Requirements Courses - ILOs matrix - Part2

Major Core Requirements		b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	d1	d2	d3	d4	d5	d6	d7	d8	d9				
	Program Requirements																																					
CIEM 201	Introduction to Surveying																										x	x				x						
CIEM 202	Civil Engineering Drafting	x																												x								
CIEM 211	Structural Analysis-1																													x								
CIEM 212	Structural Analysis-2																													x								
CIEM 221	Engineering Materials-1																																					
CIEM 311	Reinforced Concrete Design-1																																					
CIEM 312	Soil Mechanics-1																										x						x		x			
CIEM 313	Soil Mechanics-2									x																	x						x		x			
CIEM 314	Reinforced Concrete Design-2			x																							x		x									
CIEM 315	Structural Steel Design																										x		x									
CIEM 321	Engineering Materials-2																										x			x								
CIEM 341	Fluid Mechanics																															x			x			
CIEM 391	Practical Training																										x											
CIEM 411	Design & Construction of Foundations																																					
CIEM 441	Fundamentals of Hydraulic Engineering				x		x	x				x							x																			
CIEM 493	Graduation Project I														x					x					x													
CIEM 495	Graduation Project II																x															x	x		x			
IENG 241	Engineering Economics		x			x				x				x					x				x		x	x					x	x						
NSCI 102	Selected Topics in Environmental Science		x				x				x		x					x				x										x			x			

CIEM (Track 1) Specialization Courses - ILOs matrix - Part1

Transportation Systems Engineering & Management (Track #1)		a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	a18	a19	a20	a21	a22	a23	a24	a25	a26	a27	a28	a29	a30	a31	a32	a33	a34	a35	a36	a37	a38	a39	a40						
CIEM 231	Construction Project Management													x																																	
CIEM 331	Construction Engineering & Methods	x	x	x				x					x																																		
CIEM 351	Transportation Planning													x																																	
CIEM 432	Infrastructure Asset Management													x	x																																
CIEM 433	Contracts & Commercial Management				x										x																																
CIEM 451	Introduction to Transportation & Highway Engineering														x							x																									
CIEM 452	Traffic Engineering			x								x	x																																		
CIEM 453	Public Transit Planning & Operations			x		x			x				x																																		
CIEM 454	Highway Engineering			x						x	x	x																																			
CIEM 456	Maritime & Airport Transit			x							x																																				
ENTR 301	Selected Topics in Entrepreneurship																																														
		Electives																																													
CIEM 435	Urban Planning & Infrastructure Development																																														
CIEM 437	Freight and Logistics Management																																														
CIEM 455	Fundamentals of Intelligent Transportation Systems																																														
CIEM 457	Transportation Systems Safety																																														
CIEM 458	Design and Operations of Railway Systems																																														
CIEM 475	Environmental Assessments of Infrastructure Systems																																														
IENG 202	Operations research I																																														
COUNT		5	8	2	5	7	10	7	8	9	4	4	5	3	3	1	2	1	3	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CIEM (Track 1) Specialization Courses - ILOs matrix - Part2

Transportation Systems Engineering & Management (Track #1)		b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	d1	d2	d3	d4	d5	d6	d7	d8	d9
CIEM 231	Construction Project Management	x		x										x	x		x																	
CIEM 331	Construction Engineering & Methods																									x								
CIEM 351	Transportation Planning	x		x										x	x		x																	
CIEM 432	Infrastructure Asset Management	x		x											x	x																		
CIEM 433	Contracts & Commercial Management	x	x											x		x																		
CIEM 451	Introduction to Transportation & Highway Engineering	x												x	x	x																		
CIEM 452	Traffic Engineering																												x	x	x			
CIEM 453	Public Transit Planning & Operations																												x		x			
CIEM 454	Highway Engineering																													x	x			
CIEM 456	Maritime & Airport Transit																													x	x		x	
ENTR 301	Selected Topics in Entrepreneurship																									x	x	x		x	x		x	
Electives																																		
CIEM 435	Urban Planning & Infrastructure Development		x	x										x	x		x																	
CIEM 437	Freight and Logistics Management		x	x										x	x		x																	
CIEM 455	Fundamentals of Intelligent Transportation Systems													x			x															x		
CIEM 457	Transportation Systems Safety			x	x											x	x																x	
CIEM 458	Design and Operations of Railway Systems													x	x		x									x							x	
CIEM 475	Environmental Assessments of Infrastructure Systems		x	x										x	x		x																	
IENG 202	Operations research I		x														x									x		x						x
COUNT		6	6	8	2	1	1	2	1	1	1	1	1	10	9	6	9	1	1	2	1	1	1	1	2	13	3	4	6	5	7	5	5	5

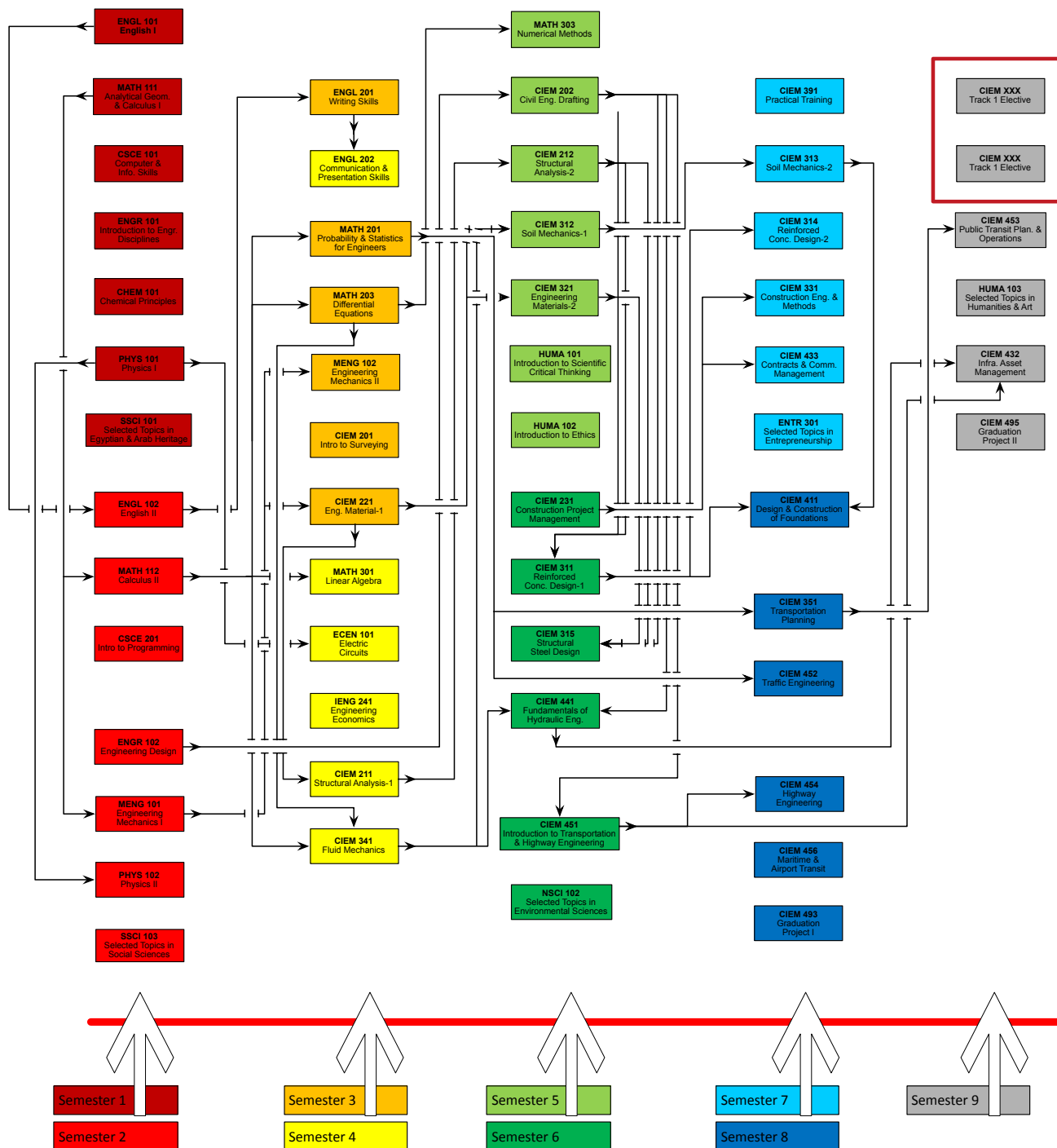
CIEM (Track 2) Specialization Courses - ILOs matrix - Part2

Water & Wastewater Engineering & Management (Track #2)		b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	d1	d2	d3	d4	d5	d6	d7	d8	d9	
CIEM 231	Construction Project Management					x																							x					x	
CIEM 331	Construction Engineering & Methods				x	x													x	x	x														
CIEM 371	Chemical and Biological Treatment Processes																x	x	x																
CIEM 412	Design, Construction & Rehabilitation of Water Structures				x														x	x						x			x						
CIEM 432	Infrastructure Asset Management																		x	x						x			x			x			
CIEM 433	Contracts & Commercial Management																									x									
CIEM 451	Introduction to Transportation & Highway Engineering																												x	x	x				
CIEM 471	Design and Operations of Water & Wastewater Treatment Plants																												x			x			
CIEM 472	Design, Construction & Operations of Water & Sewer Networks																													x	x				
CIEM 475	Environmental Assessments of Infrastructure Systems																													x	x			x	
ENTR 301	Selected Topics in Entrepreneurship																										x	x	x		x	x			x
		Electives																																	
CIEM 372	Environmental Hydraulics					x																					x		x						
CIEM 435	Urban Planning & Infrastructure Development																		x	x							x		x						
CIEM 473	Design & Operation of Electro Mechanical Systems					x	x											x	x	x															
CIEM 474	Field Measurement & Water Quality					x												x		x															
CIEM 476	Water Resources Engineering							x	x											x	x													x	
IENG 241	Engineering Economics						x														x						x		x						x
COUNT		1	1	1	1	6	5	3	2	1	1	1	1	1	1	1	1	4	7	11	3	1	1	1	2	16	3	6	9	5	7	5	4	6	

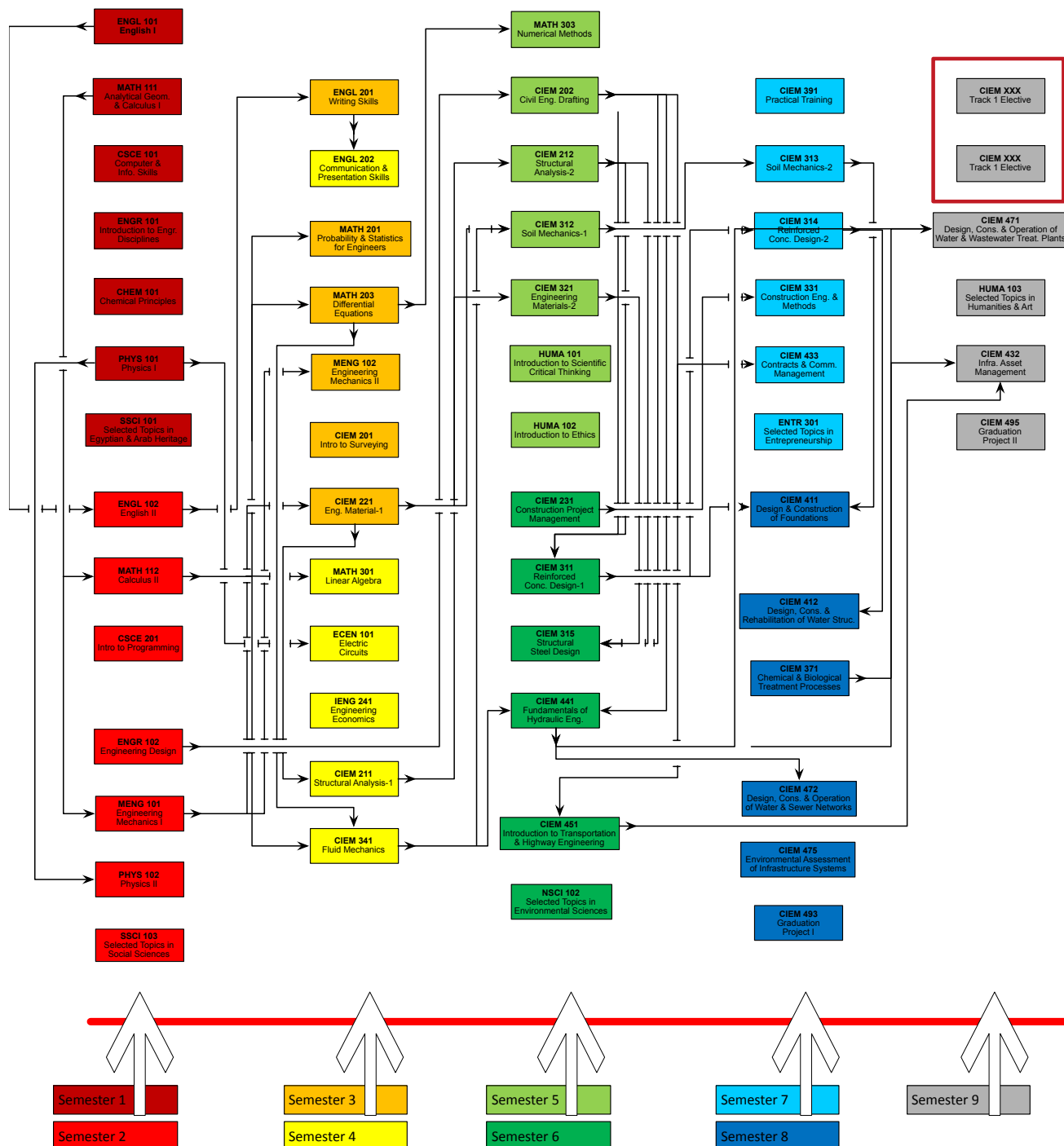
CIEM (Track 3) Specialization Courses - ILOs matrix - Part2

Construction Engineering & Management (Track #3)		b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	d1	d2	d3	d4	d5	d6	d7	d8	d9	
CIEM 231	Construction Project Management									x												x								x					
CIEM 316	Structural Analysis-3										x																			x					x
CIEM 331	Construction Engineering & Methods									x												x								x					x
CIEM 412	Design, Construction & Rehabilitation of Water Structures										x																				x	x		x	
CIEM 414	Advanced Steel Design																							x							x	x	x	x	
CIEM 431	Principles of Management & Human Resources																									x									
CIEM 432	Infrastructure Asset Management																													x	x	x			
CIEM 433	Contracts & Commercial Management																													x		x			
CIEM 434	Strategic Management in Construction																														x	x			
CIEM 451	Introduction to Transportation & Highway Engineering																														x	x			x
ENTR 301	Selected Topics in Entrepreneurship																										x	x	x		x	x			x
		Electives																																	
CIEM 401	Advanced Surveying & GIS																					x					x	x		x					
CIEM 413	Advanced Design of Foundations									x												x	x				x			x					
CIEM 415	Steel Bridges									x												x	x				x			x					
CIEM 416	Dams & Tunnels									x												x	x				x			x					
CIEM 417	Concrete Bridges									x												x	x				x			x					
CIEM 435	Urban Planning & Infrastructure Development										x	x	x												x									x	
CIEM 436	Sustainability & Built Environment											x	x											x	x									x	
IENG 241	Engineering Economics										x													x			x		x						x
COUNT		1	1	1	1	1	1	2	1	7	5	3	3	1	1	1	1	1	1	2	1	8	5	4	4	17	4	4	14	7	9	5	7	7	

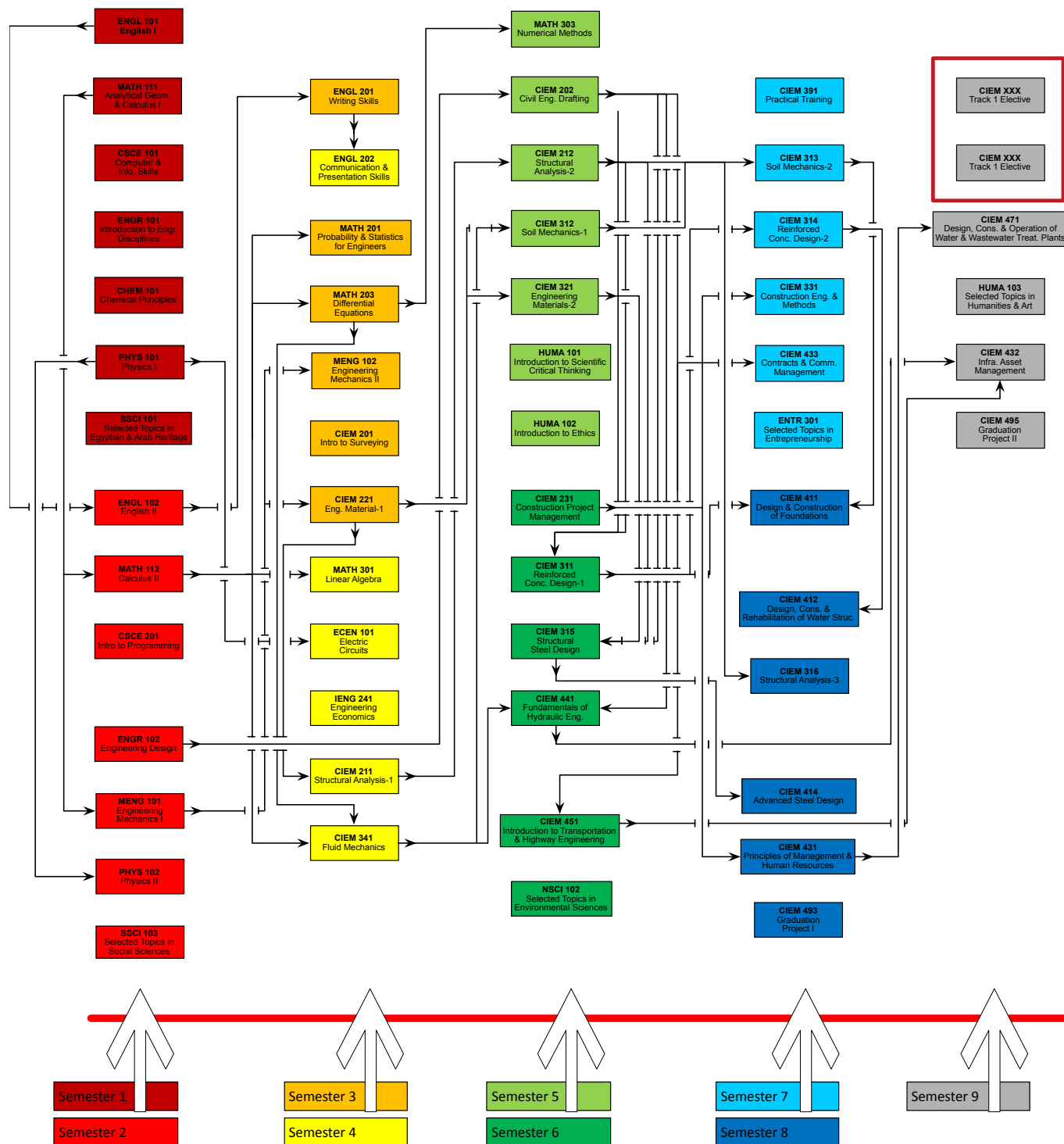
Course Dependency Flow Diagram (Track 1) - Transportation Systems Engineering & Management



Course Dependency Flow Diagram (Track 2) - Water & Wastewater Engineering & Management



Course Dependency Flow Diagram (Track 3) - Construction Engineering & Management



Sample Study Plans

(Track 1) - Transportation Systems Engineering & Management

CIEM (Track 1) Study Plan (Year 1)

Semester 1							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 101	English I	0	0	50	A minimum score of 500 on the TOEFL. Students will also be required to pass a written NU test (essay).		
MATH 111	Analytical Geometry & Calculus I	3	5	125	None		
CSCE 101	Computer & Information Skills	3	5	125	None		
ENGR 101	Introduction to Engineering Disciplines	3	5	125	None		
CHEM 101	Chemical Principles	3	5	125	None		
PHYS 101	Physics I	4	7	175	None		
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3	75	None		
TOTAL		18	30	800			
Semester 2							
ENGL 102	English II	0	0	50	ENGL 101 - English I		
MATH 112	Calculus II	3	5	125	MATH 111 - Analytical Geometry & Calculus I		
CSCE 201	Introduction to Programming	3	5	125	None		
ENGR 102	Engineering Design	3	5	125	ENGR 101 - Introduction to Engineering Disciplines		
MENG 101	Engineering Mechanics I - Statics	2	4	100	MATH 111 - Analytical Geometry & Calculus I		
PHYS 102	Physics II	4	7	175	PHYS 101 - Physics I		
SSCI 103	Selected Topics in Social Sciences	2	3	75	None		
TOTAL		17	29	775			

CIEM (Track 1) Study Plan (Year 2)

Semester 3						
Code	Title	CH	ECTS	SWL	Prerequisite	
ENGL 201	Writing Skills	3	5	125	ENGL 102 - English II - or IELTS 6.5 or equivalent	
MATH 202	Probability & Statistics for Engineers	3	5	125	MATH 112 - Calculus II	
MATH 203	Differential Equations	3	5	125	MATH 112 - Calculus II	

Semester 3							
MENG 102	Engineering Mechanics II - Dynamics	2	4	100	MENG 101 - Engineering Mechanics I - Statics		
CIEM 201	Introduction to Surveying	3	5	125	None		
CIEM 221	Engineering Materials-1	3	5	125	MENG 101 - Engineering Mechanics I - Statics		
TOTAL		17	29	725			
Semester 4							
ENGL 202	Communication and Presentation Skills	3	5	125	ENGL 201 - Writing Skills		
MATH 301	Linear Algebra	3	5	125	MATH 112 - Calculus II		
ECEN 101	Electric Circuits	3	5	125	PHYS 101 - Physics I		
IENG 241	Engineering Economics	3	5	125	None		
CIEM 211	Structural Analysis-1	3	5	125	CIEM 221 - Engineering Materials-1		
CIEM 341	Fluid Mechanics	3	5	125	MATH 112 - Calculus II	MATH 203 - Differential Equations	
TOTAL		18	30	750			

CIEM (Track 1) Study Plan (Year 3)

	Semester 5						
Code	Title	CH	ECTS	SWL	Prerequisite		
MATH 303	Numerical Methods	3	5	125	MATH 203 - Differential Equations		
CIEM 202	Civil Engineering Drafting	3	5	125	ENGR 102 - Engineering Design		
CIEM 212	Structural Analysis-2	3	5	125	CIEM 211 - Structural Analysis-1		
CIEM 312	Soil Mechanics-1	3	5	125	CIEM 221 - Engineering Materials-1	CIEM 341 - Fluid Mechanics	
CIEM 321	Engineering Materials-2	3	5	125	CIEM 221 - Engineering Materials-1		
HUMA 101	Introduction to Scientific & Critical Thinking	2	3	75	None		
HUMA 102	Introduction to Ethics	2	3	75	None		
TOTAL		19	31	775			
	Semester 6						
CIEM 231	Construction Project Management	3	5	125	None		
CIEM 311	Reinforced Concrete Design-1	3	5	125	CIEM 202 - Civil Engineering Drafting	CIEM 212 - Structural Analysis-2	
CIEM 315	Structural Steel Design	3	5	125	CIEM 202 - Civil Engineering Drafting	CIEM 212 - Structural Analysis-2	CIEM 321 - Engineering Materials-2
CIEM 441	Fundamentals of Hydraulic Engineering	3	5	125	CIEM 202 - Civil Engineering Drafting	CIEM 341 - Fluid Mechanics	
CIEM 451	Introduction to Transportation & Highway Engineering	3	5	125	CIEM 202 - Civil Engineering Drafting		
NSCI 102	Selected Topics in Environmental Science	3	5	125	None		
TOTAL		18	30	750			

CIEM (Track 1) Study Plan (Year 4)

	Semester 7						
Code	Title	CH	ECTS	SWL	Prerequisite		
CIEM 313	Soil Mechanics-2	3	5	125	CIEM 312 - Soil Mechanics-1		
CIEM 314	Reinforced Concrete Design-2	3	5	125	CIEM 311 - Reinforced Concrete Design-1		
CIEM 331	Construction Engineering & Methods	3	5	125	CIEM 231 - Construction Project Management		
CIEM 433	Contracts & Commercial Management	3	5	125	CIEM 231 - Construction Project Management		
CIEM 391	Practical Training	3	6	150	Completed 6 Semesters		
ENTR 301	Selected Topics in Entrepreneurship	3	5	125	None		
TOTAL		18	31	775			
	Semester 8						
CIEM 351	Transportation Planning	3	5	125	MATH 202 - Probability & Statistics for Engineers		
CIEM 411	Design & Construction of Foundations	3	5	125	CIEM 311 - Reinforced Concrete Design-1	CIEM 313 - Soil Mechanics-2	
CIEM 452	Traffic Engineering	3	5	125	MATH 202 - Probability & Statistics for Engineers		
CIEM 454	Highway Engineering	3	5	125	CIEM 451 - Introduction to Transportation & Highway Engineering		
CIEM 456	Maritime & Airport Transit	3	5	125	None		
CIEM 493	Graduation Project I	3	6	180	Senior Standing		
TOTAL		18	31	805			

CIEM (Track 1) Study Plan (Year 5)

Semester 9						
Code	Title	CH	ECTS	SWL	Prerequisite	
CIEM 432	Infrastructure Asset Management	3	5	125	CIEM 441 - Fundamentals of Hydraulic Engineering	CIEM 451 - Introduction to Transportation & Highway Engineering
CIEM 453	Public Transit Planning & Operations	3	5	125	CIEM 351 - Transportation Planning	
CIEM xxx		3	5	125		
CIEM xxx		3	5	125		
CIEM 495	Graduation Project II	3	6	180	CIEM 493 - Graduation Project I	
HUMA 103	Selected Topics in Humanities & Arts	2	3	75	None	
TOTAL		17	29	755		

CIEM (Track 1) Electives

Electives						
Code	Title	CH	ECTS	SWL	Prerequisite	
CIEM 435	Urban Planning & Infrastructure Development	3	5	125	None	
CIEM 437	Freight and Logistics Management	3	5	125	MATH 202 - Probability & Statistics for Engineers	
CIEM 455	Fundamentals of Intelligent Transportation Systems	3	5	125	MATH 202 - Probability & Statistics for Engineers	CIEM 452 - Traffic Engineering
CIEM 457	Transportation Systems Safety	3	5	125	CIEM 451 - Introduction to Transportation & Highway Engineering	CIEM 452 - Traffic Engineering
CIEM 458	Design and Operations of Railway Systems	3	5	125	CIEM 453 - Public Transit Planning & Operations	
CIEM 475	Environmental Assessments of Infrastructure Systems	3	5	125	None	
IENG 202	Operations research I	3	5	125	MATH 111 - Analytical Geometry & Calculus I	

(Track 2) - Water & Wastewater Engineering and Management

CIEM (Track 2) Study Plan (Year 1)

Semester 1							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 101	English I	0	0	50	A minimum score of 500 on the TOEFL. Students will also be required to pass a written NU test (essay).		
MATH 111	Analytical Geometry & Calculus I	3	5	125	None		
CSCE 101	Computer & Information Skills	3	5	125	None		
ENGR 101	Introduction to Engineering Disciplines	3	5	125	None		
CHEM 101	Chemical Principles	3	5	125	None		
PHYS 101	Physics I	4	7	175	None		
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3	75	None		
TOTAL		18	30	800			
Semester 2							
ENGL 102	English II	0	0	50	ENGL 101 - English I		
MATH 112	Calculus II	3	5	125	MATH 111 - Analytical Geometry & Calculus I		
CSCE 201	Introduction to Programming	3	5	125	None		
ENGR 102	Engineering Design	3	5	125	ENGR 101 - Introduction to Engineering Disciplines		
MENG 101	Engineering Mechanics I - Statics	2	4	100	MATH 111 - Analytical Geometry & Calculus I		
PHYS 102	Physics II	4	7	175	PHYS 101 - Physics I		
SSCI 103	Selected Topics in Social Sciences	2	3	75	None		
TOTAL		17	29	775			

CIEM (Track 2) Study Plan (Year 2)

Semester 3							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 201	Writing Skills	3	5	125	ENGL 102 - English II - or IELTS 6.5 or equivalent		
MATH 202	Probability & Statistics for Engineers	3	5	125	MATH 112 - Calculus II		
MATH 203	Differential Equations	3	5	125	MATH 112 - Calculus II		
MENG 102	Engineering Mechanics II - Dynamics	2	4	100	MENG 101 - Engineering Mechanics I - Statics		
CIEM 201	Introduction to Surveying	3	5	125	None		
CIEM 221	Engineering Materials-1	3	5	125	MENG 101 - Engineering Mechanics I - Statics		
TOTAL		17	29	725			
Semester 4							
ENGL 202	Communication and Presentation Skills	3	5	125	ENGL 201 - Writing Skills		
MATH 301	Linear Algebra	3	5	125	MATH 112 - Calculus II		
ECEN 101	Electric Circuits	3	5	125	PHYS 101 - Physics I		
IENG 241	Engineering Economics	3	5	125	None		
CIEM 211	Structural Analysis-1	3	5	125	CIEM 221 - Engineering Materials-1		
CIEM 341	Fluid Mechanics	3	5	125	MATH 112 - Calculus II	MATH 203 - Differential Equations	
TOTAL		18	30	750			

CIEM (Track 2) Study Plan (Year 3)

	Semester 5						
Code	Title	CH	ECTS	SWL	Prerequisite		
MATH 303	Numerical Methods	3	5	125	MATH 203 - Differential Equations		
CIEM 202	Civil Engineering Drafting	3	5	125	ENGR 102 - Engineering Design		
CIEM 212	Structural Analysis-2	3	5	125	CIEM 211 - Structural Analysis-1		
CIEM 312	Soil Mechanics-1	3	5	125	CIEM 221 - Engineering Materials-1	CIEM 341 - Fluid Mechanics	
CIEM 321	Engineering Materials-2	3	5	125	CIEM 221 - Engineering Materials-1		
HUMA 101	Introduction to Scientific & Critical Thinking	2	3	75	None		
HUMA 102	Introduction to Ethics	2	3	75	None		
TOTAL		19	31	775			
	Semester 6						
CIEM 231	Construction Project Management	3	5	125	None		
CIEM 311	Reinforced Concrete Design-1	3	5	125	CIEM 202 - Civil Engineering Drafting	CIEM 212 - Structural Analysis-2	
CIEM 315	Structural Steel Design	3	5	125	CIEM 202 - Civil Engineering Drafting	CIEM 212 - Structural Analysis-2	CIEM 321 - Engineering Materials-2
CIEM 441	Fundamentals of Hydraulic Engineering	3	5	125	CIEM 202 - Civil Engineering Drafting	CIEM 341 - Fluid Mechanics	
CIEM 451	Introduction to Transportation & Highway Engineering	3	5	125	CIEM 202 - Civil Engineering Drafting		
NSCI 102	Selected Topics in Environmental Science	3	5	125	None		
TOTAL		18	30	750			

CIEM (Track 2) Study Plan (Year 4)

	Semester 7						
Code	Title	CH	ECTS	SWL	Prerequisite		
CIEM 313	Soil Mechanics-2	3	5	125	CIEM 312 - Soil Mechanics-1		
CIEM 314	Reinforced Concrete Design-2	3	5	125	CIEM 311 - Reinforced Concrete Design-1		
CIEM 331	Construction Engineering & Methods	3	5	125	CIEM 231 - Construction Project Management		
CIEM 433	Contracts & Commercial Management	3	5	125	CIEM 231 - Construction Project Management		
CIEM 391	Practical Training	3	6	150	Completed 6 Semesters		
ENTR 301	Selected Topics in Entrepreneurship	3	5	125	None		
TOTAL		18	31	775			
	Semester 8						
CIEM 371	Chemical and Biological Treatment Processes	3	5	125	CHEM 101 - Chemical Principles		
CIEM 411	Design & Construction of Foundations	3	5	125	CIEM 311 - Reinforced Concrete Design-1	CIEM 313 - Soil Mechanics-2	
CIEM 412	Design, Construction & Rehabilitation of Water Structures	3	5	125	CIEM 314 - Reinforced Concrete Design-2		
CIEM 475	Environmental Assessments of Infrastructure Systems	3	5	125	None		
CIEM 472	Design, Construction & Operations of Water & Sewer Networks	3	5	125	CIEM 441 - Fundamentals of Hydraulic Engineering		
CIEM 493	Graduation Project I	3	6	180	Senior Standing		
TOTAL		18	31	805			

CIEM (Track 2) Study Plan (Year 5)

	Semester 9						
Code	Title	CH	ECTS	SWL	Prerequisite		
CIEM 432	Infrastructure Asset Management	3	5	125	CIEM 441 - Fundamentals of Hydraulic Engineering	CIEM 451 - Introduction to Transportation & Highway Engineering	
CIEM 471	Design and Operations of Water & Wastewater Treatment Plants	3	5	125	CIEM 371 - Chemical and Biological Treatment Processes	CIEM 441 - Fundamentals of Hydraulic Engineering	
CIEM xxx		3	5	125			
CIEM xxx		3	5	125			
CIEM 495	Graduation Project II	3	6	180	CIEM 493 - Graduation Project I		
HUMA 103	Selected Topics in Humanities & Arts	2	3	75	None		
TOTAL		17	29	755			

CIEM (Track 2) Electives

Electives							
Code	Title	CH	ECTS	SWL	Prerequisite		
CIEM 435	Urban Planning & Infrastructure Development	3	5	125	None		
CIEM 472	Design, Construction & Operations of Water & Sewer Networks	3	5	125	CIEM 441 - Fundamentals of Hydraulic Engineering		
CIEM 473	Design & Operation of Electro Mechanical Systems	3	3	125	CIEM 441 - Fundamentals of Hydraulic Engineering		
CIEM 474	Field Measurement & Water Quality	3	5	125	CIEM 372 - Environmental Hydraulics		
CIEM 476	Water Resources Engineering	3	5	125	None		
IENG 202	Operations research I	3	5	125	MATH 111 - Analytical Geometry & Calculus I		

(Track 3) - Construction Engineering & Management

CIEM (Track 3) Study Plan (Year 1)

Semester 1							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 101	English I	0	0	50	A minimum score of 500 on the TOEFL. Students will also be required to pass a written NU test (essay).		
MATH 111	Analytical Geometry & Calculus I	3	5	125	None		
CSCE 101	Computer & Information Skills	3	5	125	None		
ENGR 101	Introduction to Engineering Disciplines	3	5	125	None		
CHEM 101	Chemical Principles	3	5	125	None		
PHYS 101	Physics I	4	7	175	None		
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2	3	75	None		
TOTAL		18	30	800			
Semester 2							
ENGL 102	English II	0	0	50	ENGL 101 - English I		
MATH 112	Calculus II	3	5	125	MATH 111 - Analytical Geometry & Calculus I		
CSCE 201	Introduction to Programming	3	5	125	None		
ENGR 102	Engineering Design	3	5	125	ENGR 101 - Introduction to Engineering Disciplines		
MENG 101	Engineering Mechanics I - Statics	2	4	100	MATH 111 - Analytical Geometry & Calculus I		
PHYS 102	Physics II	4	7	175	PHYS 101 - Physics I		
SSCI 103	Selected Topics in Social Sciences	2	3	75	None		
TOTAL		17	29	775			

CIEM (Track 3) Study Plan (Year 2)

Semester 3							
Code	Title	CH	ECTS	SWL	Prerequisite		
ENGL 201	Writing Skills	3	5	125	ENGL 102 - English II - or IELTS 6.5 or equivalent		
MATH 202	Probability & Statistics for Engineers	3	5	125	MATH 112 - Calculus II		
MATH 203	Differential Equations	3	5	125	MATH 112 - Calculus II		
MENG 102	Engineering Mechanics II - Dynamics	2	4	100	MENG 101 - Engineering Mechanics I - Statics		
CIEM 201	Introduction to Surveying	3	5	125	None		
CIEM 221	Engineering Materials-1	3	5	125	MENG 101 - Engineering Mechanics I - Statics		
TOTAL		17	29	725			
Semester 4							
ENGL 202	Communication and Presentation Skills	3	5	125	ENGL 201 - Writing Skills		
MATH 301	Linear Algebra	3	5	125	MATH 112 - Calculus II		
ECEN 101	Electric Circuits	3	5	125	PHYS 101 - Physics I		
IENG 241	Engineering Economics	3	5	125	None		
CIEM 211	Structural Analysis-1	3	5	125	CIEM 221 - Engineering Materials-1		
CIEM 341	Fluid Mechanics	3	5	125	MATH 112 - Calculus II	MATH 203 - Differential Equations	
TOTAL		18	30	750			

CIEM (Track 3) Study Plan (Year 3)

	Semester 5						
Code	Title	CH	ECTS	SWL	Prerequisite		
MATH 303	Numerical Methods	3	5	125	MATH 203 - Differential Equations		
CIEM 202	Civil Engineering Drafting	3	5	125	ENGR 102 - Engineering Design		
CIEM 212	Structural Analysis-2	3	5	125	CIEM 211 - Structural Analysis-1		
CIEM 312	Soil Mechanics-1	3	5	125	CIEM 221 - Engineering Materials-1	CIEM 341 - Fluid Mechanics	
CIEM 321	Engineering Materials-2	3	5	125	CIEM 221 - Engineering Materials-1		
HUMA 101	Introduction to Scientific & Critical Thinking	2	3	75	None		
HUMA 102	Introduction to Ethics	2	3	75	None		
TOTAL		19	31	775			
	Semester 6						
CIEM 231	Construction Project Management	3	5	125	None		
CIEM 311	Reinforced Concrete Design-1	3	5	125	CIEM 202 - Civil Engineering Drafting	CIEM 212 - Structural Analysis-2	
CIEM 315	Structural Steel Design	3	5	125	CIEM 202 - Civil Engineering Drafting	CIEM 212 - Structural Analysis-2	CIEM 321 - Engineering Materials-2
CIEM 441	Fundamentals of Hydraulic Engineering	3	5	125	CIEM 202 - Civil Engineering Drafting	CIEM 341 - Fluid Mechanics	
CIEM 451	Introduction to Transportation & Highway Engineering	3	5	125	CIEM 202 - Civil Engineering Drafting		
NSCI 102	Selected Topics in Environmental Science	3	5	125	None		
TOTAL		18	30	750			

CIEM (Track 3) Study Plan (Year 4)

	Semester 7						
Code	Title	CH	ECTS	SWL	Prerequisite		
CIEM 313	Soil Mechanics-2	3	5	125	CIEM 312 - Soil Mechanics-1		
CIEM 314	Reinforced Concrete Design-2	3	5	125	CIEM 311 - Reinforced Concrete Design-1		
CIEM 331	Construction Engineering & Methods	3	5	125	CIEM 231 - Construction Project Management		
CIEM 433	Contracts & Commercial Management	3	5	125	CIEM 231 - Construction Project Management		
CIEM 391	Practical Training	3	6	150	Completed 6 Semesters		
ENTR 301	Selected Topics in Entrepreneurship	3	5	125	None		
TOTAL		18	31	775			
	Semester 8						
CIEM 316	Structural Analysis-3	3	5	125	CIEM 212 - Structural Analysis-2		
CIEM 411	Design & Construction of Foundations	3	5	125	CIEM 311 - Reinforced Concrete Design-1	CIEM 313 - Soil Mechanics-2	
CIEM 412	Design, Construction & Rehabilitation of Water Structures	3	5	125	CIEM 314 - Reinforced Concrete Design-2		
CIEM 414	Advanced Steel Design	3	5	125	CIEM 315 - Structural Steel Design		
CIEM 431	Principles of Management & Human Resources	3	5	125	CIEM 231 - Construction Project Management		
CIEM 493	Graduation Project I	3	6	180	Senior Standing		
TOTAL		18	31	805			

CIEM (Track 3) Study Plan (Year 5)

Semester 9						
Code	Title	CH	ECTS	SWL	Prerequisite	
CIEM 432	Infrastructure Asset Management	3	5	125	CIEM 441 - Fundamentals of Hydraulic Engineering	CIEM 451 - Introduction to Transportation & Highway Engineering
CIEM 434	Strategic Management in Construction	3	5	125	CIEM 431 - Principles of Management & Human Resources	
CIEM xxx		3	5	125		
CIEM xxx		3	5	125		
CIEM 495	Graduation Project II	3	6	180	CIEM 493 - Graduation Project I	
HUMA 103	Selected Topics in Humanities & Arts	2	3	75	None	
TOTAL		17	29	755		

CIEM (Track 3) Electives

Electives						
Code	Title	CH	ECTS	SWL	Prerequisite	
CIEM 401	Advanced Surveying & GIS	3	5	125	CIEM 201 - Introduction to Surveying	
CIEM 413	Advanced Design of Foundations	3	5	125	CIEM 411 - Design & Construction of Foundations	CIEM 412 - Design, Construction & Rehabilitation of Water Structures
CIEM 415	Steel Bridges	3	5	125	CIEM 312 - Soil Mechanics-1	CIEM 414 - Advanced Steel Design
CIEM 417	Concrete Bridges	3	5	125	CIEM 312 - Soil Mechanics-1	CIEM 314 - Reinforced Concrete Design-2
CIEM 435	Urban Planning & Infrastructure Development	3	5	125	None	
CIEM 436	Sustainability & Built Environment	3	5	125	None	
IENG 202	Operations research I	3	5	125	MATH 111 - Analytical Geometry & Calculus I	

توصيف مقررات برنامج هندسة وإدارة البنية التحتية المدنية

(CIEM) - CIEM 201

Course Title	Introduction to Surveying	
Course Code	CIEM 201	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	1.25
	Tutorials	1.25
	Labs	2.5
	TOTAL	5
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The aim of this course is to explore the topics related to principles of plane surveying; methods of measuring distances, angles and differences in heights (levels); traverse computations; setting out horizontal and vertical curves; earthwork computation; setting out engineering structures and construction projects. Introduction to principles of Geographic Information Systems (GIS) for civil engineering.		
Lab and Tutorials This is a practical course that depends on field and lab work where students use the surveying equipment such as total station, theodolite, and GPS for measurements.		
Literature Course Textbook: - Charles D Ghilani and Paul R Wolf, "Elementary Surveying: An Introduction to Geomatics", Prentice Hall, ISBN: 0-136-154310 (2008). Additional References: - Jack C. McCormack, "Surveying", John Wiley & Sons Inc., Hoboken, New Jersey, ISBN: 0-471-237582 (2004). - Barry F. Kavanagh, "Surveying: Principles and Applications", Prentice Hall, ISBN: 0-131-188623 (2006).		

(CIEM) - CIEM 202

Course Title	Civil Engineering Drafting

Course Code	CIEM 202	
Prerequisites	ENGR 102 - Engineering Design	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	1.25
	Tutorials	1.25
	Labs	2.5
	TOTAL	5
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The aim of this course is to utilize the CAD applications in drafting various civil and infrastructure systems including earthwork, irrigation structures, highways, railways, and reinforced concrete elements such as footing, columns, beams, and slabs; as well as steel elements such as beams, columns, frames, bracing, and connections.		
Lab and Tutorials This is a practical course that depends on computer lab where students use the computer facilities to produce basic civil engineering drawings using AutoCAD 2D.		
Literature Course Textbook: - Jan A. Van Der Westhuizen, "Drawing for Civil Engineering" Juta & Co. Ltd., ISBN 9780702152122 (2000). Additional References: - David A. Madsen, Terence M. Shumaker and David P. Madsen “Civil Drafting Technology, 7th ed.”, Prentice Hall, ISBN: 0135000688 (2010). - James Leach, "AutoCAD 2007 Instructor With Autodesk Inventor Software 07", McGraw Hill Education, ISBN: 0073319236 (2007),		

(CIEM) - CIEM 211

Course Title	Structural Analysis-1	
Course Code	CIEM 211	
Prerequisites	CIEM 221 - Engineering Materials-1	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The aim of this course is to explore the topics related to types of structures, loads, supports and reactions, internal forces, analysis of beams, plane frames and trusses, influence lines of statically determinate structures, and moving loads.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving.		
Literature Course Textbook: - Structural Analysis, Aslam Kassimali 5th Edition, ISBN-13: 978-1133943891 Additional References: - Structural Analysis, R. C. Hibbeler 9th edition, ISBN-13: 978-0133942842 - Fundamentals of Structural Analysis, Kenneth M. Leet et al. 5th edition, ISBN-13: 978-0073398006		

(CIEM) - CIEM 212

Course Title	Structural Analysis-2	
Course Code	CIEM 212	
Prerequisites	CIEM 211 - Structural Analysis-1	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The aim of this course is to explore the topics related to stresses and strains in composite sections, stress due to shear and torsion, combined shear and torsion, consistent deformations, three moment equation, moment distribution, deformation of elastic structures using differential equations and virtual work, sway, and buckling of columns.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving, and 50% computer lab to teach students the use of finite element programs for structural analysis such as SAP2000.		
Literature Course Textbook: R. C. Hibbeler, "Structural Analysis 8th Edition in SI Units", Pearson/ Prentice-Hall, ISBN 13: 9780132570534 (2011). Additional References: F. P. Beer, E. R. Johnston, Jr., J. T. Dewolf and D. F. Mazurek, “Mechanics of Materials”, McGraw Hill, ISBN: 978-007-128422-6 (2006). K. M. Leet, C-M. Uang and A. M. Gilbert, “Fundamentals of Structural Analysis”, McGraw Hill, ISBN: 978-007-125929-3 (2008).		

(CIEM) - CIEM 221

Course Title	Engineering Materials-1	
Course Code	CIEM 221	
Prerequisites	MENG 101 - Engineering Mechanics I - Statics	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The aim of this course is to explore the topics related to construction materials and properties such as concrete, masonry, stone, bricks, steel and timber. Concrete constituent materials including aggregate types and sources, gradation, selection, and testing. Properties of ordinary Portland cement, alternative cements, standard tests for cement, water for concrete mix and admixtures, reinforcement steel properties, grades, size and testing. An introduction to asphalt mix is also considered.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving and 50% lab in the materials lab to conduct tests on concrete and other materials.		
Literature Course Textbook: - Mamlouk and Zaniewski, "Materials for Civil & Construction Engineers", Pearson Prentice Hall, ISBN: 0131477145 (2006). Additional References: - Sidney Mindess, J Francis Young and David Darwin, "Concrete", Prentice Hall, ISBN: 0130646326 (2003). - Neville, A.M., "Properties of Concrete", J. Wiley, ISBN: 0-582-23070-5 (2000).		

(CIEM) - CIEM 231

Course Title	Construction Project Management	
Course Code	CIEM 231	
Prerequisites	None	
Classification within the curriculum	Compulsory (All Tracks)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to project management definition, project delivery methods, contracting strategies, basic management functions, construction scheduling, bar charts, AOA and AON networks, critical path method, construction resources, material management, labor productivity, construction equipment, design and analysis of construction operations, construction cost, cost estimating, direct and indirect costs, cash flow calculations, line of balance, schedule updating, project crashing, and time cost trade-off.		
Lab and Tutorials This is a theoretical course that includes tutorial for discussion on the topic.		
Literature Course Textbook: - Daniel W. Halpin, "Construction Management", John Wiley & Sons Inc., Hoboken, New Jersey, ISBN: 9780471661733 (2005). Additional References: - Frederick E. Gould, "Managing the Construction Process: Estimating, Scheduling, and Project Control", Prentice Hall, ISBN: 013113406X (2005). - John Buttelerwerth, "Computer Integrated Construction Project Scheduling", Prentice Hall, ISBN: 0131114654 (2005).		

(CIEM) - CIEM 311

Course Title	Reinforced Concrete Design-1	
Course Code	CIEM 311	
Prerequisites	CIEM 202 - Civil Engineering Drafting	CIEM 212 - Structural Analysis-2
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The aim of this course is to explore the topics related to strength, behavior, and design of reinforced concrete members subjected to moments, shear, and axial forces, emphasis on the influence of the material properties on behavior. Reinforcement details for beams, limit state design, serviceability limit state and deflection.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: R. MacGregor, "Reinforced Concrete, Mechanics and Design SI 4th Edition", Pearson Education, ISBN: 9780131976429 (2005) Additional References: - Egyptian Code of Practice for the Design of Concrete Structures (2001). - Structural Eurocodes, British Standards Institute BSI, PP (2007).		

(CIEM) - CIEM 312

Course Title	Soil Mechanics-1	
Course Code	CIEM 312	
Prerequisites	CIEM 221 - Engineering Materials-1	CIEM 341 - Fluid Mechanics
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The aim of this course is to explore the topics related to geology and rock structure, soil phases, soil classification and Atterburg limits, normal stresses, normal stress distribution in soil, Newmark chart, shear stress and Mohr’s circle, soil shear strength parameters, one-dimensional consolidation settlement, advanced consolidation and stress history, soil permeability using constant and falling head tests, and flow nets.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving and 50% in the soil mechanics lab for testing.		
Literature Course Textbook: - Donald P. Coduto, "Geotechnical Engineering: Principles and Practices", Prentice Hall, ISBN: 0-13-5763800 (1999). Additional References: - Cheng Liu and Jack Evett, "Soil Properties: Testing, Measurement, and Evaluation", Prentice Hall, ISBN: 0-13-0930059 (2003). - Michael E. Kalinski, "Soil Mechanics Lab Manual", John Wiley & Sons Inc., Hoboken, New Jersey, ISBN: 0-471-78830-9 (2006).		

(CIEM) - CIEM 313

Course Title	Soil Mechanics-2	
Course Code	CIEM 313	
Prerequisites	CIEM 312 - Soil Mechanics-1	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The aim of this course is to explore the topics related to soil compaction, proctor and sand cone testing, stability of slopes using limit equilibrium, site investigation and soil in-situ exploration, dewatering and ground improvement, measurement of soil shear strength parameters using direct shear, calculation of bearing pressure and soil bearing capacity, residual strength and advanced consolidation, soil long and short term settlement, and an introduction to shallow foundations.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving and 50% in the soil mechanics lab for testing.		
Literature Course Textbook: - Donald P. Coduto, "Geotechnical Engineering: Principles and Practices", Prentice Hall, ISBN: 0135763800 (1999). Additional References: - Cheng Liu and Jack Evett, "Soil Properties: Testing, Measurement, and Evaluation", Prentice Hall, ISBN: 0-13-0930059 (2003). - Michael E. Kalinski, "Soil Mechanics Lab Manual", John Wiley & Sons Inc., Hoboken, New Jersey, ISBN: 0471788309 (2006).		

(CIEM) - CIEM 314

Course Title	Reinforced Concrete Design-2	
Course Code	CIEM 314	
Prerequisites	CIEM 311 - Reinforced Concrete Design-1	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The aim of this course is to explore the topics related to strength, behavior, and design of indeterminate reinforced concrete structures, with primary emphasis on slab systems, emphasis on the strength of slabs and on the available methods of design of slabs spanning in two directions, with or without supporting beams, design of sections under axial forces, design of sections under eccentric forces, design and reinforcement details of concrete columns, development of design drawings for concrete structures.		
Lab and Tutorials This is a design course that includes tutorial for problem solving, and 50% computer lab to teach students the use of finite element programs for structural analysis such as SAP2000.		
Literature Course Textbook: R. MacGregor, "Reinforced Concrete, Mechanics and Design SI 4th Edition", Pearson Education, ISBN: 9780131976429 (2005) Additional References: - Egyptian Code of Practice for the Design of Concrete Structures (2001). - Structural Eurocodes, British Standards Institute BSI, PP (2007).		

(CIEM) - CIEM 315

Course Title	Structural Steel Design		
Course Code	CIEM 315		
Prerequisites	CIEM 202 - Civil Engineering Drafting	CIEM 212 - Structural Analysis-2	CIEM 321 - Engineering Materials-2
Classification within the curriculum	Compulsory		
Course Position in Study Plan	Spring		
Contact Hours (weekly)	Lectures	2.5	
	Tutorials	1.25	
	Labs	0	
	TOTAL	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL) / semester	125		
Topic Category	Engineering Applications		
Topic Level	Program Requirements		
Description The aim of this course is to explore the topics related to design of metal structures, behavior of members and their connections, theoretical, experimental, and practical bases for proportioning members and their connections, design of steel members under different load cases (ASD and LRFD), combined loads, connections, welded and bolted, and moment-resistant connections, and development of detailed design drawings for steel members and connections.			
Lab and Tutorials This is a design course that includes tutorial for problem solving.			
Literature Course Textbook: - Linden J. Morris and David R. Plum, "Structural Steelwork Design to BS 5950", Prentice Hall, ISBN: 0582230888 (1997). Additional References: - Jack C. McCormac "Structural Steel Design 4/E ", Pearson Education, ISBN: 0-13-221816-X (2008). - Charles G. Salmon, John E. Johnson and Faris A. Malhas "Steel Structures: Design and Behavior (5th Edition)", Prentice Hall, ISBN: 0-13-206119-8 (2009).			

(CIEM) - CIEM 316

Course Title	Structural Analysis-3	
Course Code	CIEM 316	
Prerequisites	CIEM 212 - Structural Analysis-2	
Classification within the curriculum	Compulsory (Track-3)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to basic concepts of superposition, flexibility, and work and strain energy, analysis of statically indeterminate structures such as trusses, beams, arches, and frames. Topics include determination of element stiffness matrix, transformation of coordinates, structure stiffness matrix and load vector, boundary conditions, and introduction to finite element method.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving and 50% in the computer lab for modeling.		
Literature Course Textbook: R. C. Hibbeler , "Structural Analysis 8th Edition in SI Units", Pearson/ Prentice-Hall, ISBN 13: 9780132570534 (2011) Additional References: J. C. McCormac, “Structural Analysis”, Wiley, ISBN:0-470-03608-7 (2007)		

(CIEM) - CIEM 321

Course Title	Engineering Materials-2	
Course Code	CIEM 321	
Prerequisites	CIEM 221 - Engineering Materials-1	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The aim of this course is to explore the topics related to concrete mix design, selection of constituent materials, design of special concrete mix, special additives and admixtures, chemical admixtures and mineral admixtures, cement replacement, fly ash, slag, silica fumes and other materials. This also includes air-entrained concrete, cold and hot weather concreting, durability of concrete, fresh concrete cracks, Sulphate attack, Alkali silica reaction, and fire resistance. Repairing the corrosion of steel reinforcement is also considered, and types of non-destructive tests for concrete.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving and 50% lab work in the materials lab to conduct tests on concrete and other materials.		
Literature Course Textbook: - Steven H. Kosmatka, Beatrix Kerkhoff, and William C. Panarese, “Design and Control of Concrete Mixture”, Portland Cement Association, 14th edition, 2003, ISBN 0-89312-217-3 Additional References: - Neville, A.M., "Properties of Concrete", J. Wiley, ISBN: 0-582-23070-5 (2000) P. Kumar Mehta, and Paulo J. M. Monteiro, “Concrete Microstructure Properties and Materials”, Third Edition, McGraw-Hill, 659 pages,, 2006, ISBN 0-07-158919-8.		

(CIEM) - CIEM 331

Course Title	Construction Engineering & Methods	
Course Code	CIEM 331	
Prerequisites	CIEM 231 - Construction Project Management	
Classification within the curriculum	Compulsory (All Tracks)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to building construction systems, concrete and steel systems, slip forming, precast concrete construction, cofferdams, retaining and diaphragm walls construction, construction of wells and dewatering systems, construction methods for roads, pipelines, dams and tunnels, evaluation and selection of appropriate construction technology, construction site layout planning, introduction to types and sizes of equipment, equipment selection factors, and economic principles.		
Lab and Tutorials This is a theoretical course that includes tutorial for discussion on the topic.		
Literature Course Textbook: - William F. Smith, "Principles of Materials Science and Engineering", McGraw-Hill, ISBN: 0070591695 (1990). Additional References: - William D. Callister, “Materials Science and Engineering: An Introduction”, Wiley, ISBN: 0471736961, (2007). W. Bolton, "Engineering Materials Technology", Butterworth-Heinemann, ISBN: 0750639172 (1998).		

(CIEM) - CIEM 341

Course Title	Fluid Mechanics	
Course Code	CIEM 341	
Prerequisites	MATH 112 - Calculus II	MATH 203 - Differential Equations
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The aim of this course is to explore the topics related to fluid statics, conservation of mass, momentum, and energy in fixed and moving control volumes, steady and unsteady Bernoulli's equation, differential analysis of fluid flow, dimensional analysis and similitude, laminar and turbulent flow, boundary layers, lift and drag, applications in civil, infrastructure, and environmental systems.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving and 50% in the hydraulics lab for demonstration.		
Literature Course Textbook: - Frank White, “Fluid Mechanics with Student DVD”, McGraw Hill Education, ISBN 9780077422417 (2010). Additional References: - Douglas J.F., Gasiorek J.M., Swaffield J.A. and Jack L., "Fluid Mechanics", Prentice Hall, ISBN: 0131292935 (2006). - Robert L. Mott, “Applied Fluid Mechanics, 6/E”, Pearson Education, ISBN-10: 0131146807 (2006).		

(CIEM) - CIEM 351

Course Title	Transportation Planning	
Course Code	CIEM 351	
Prerequisites	MATH 202 - Probability & Statistics for Engineers	
Classification within the curriculum	Compulsory (Track-1)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to executing an urban transportation planning study, travel demand modelling, analysis of environmental impacts, modelling transportation-land use interactions and transportation project evaluation, current transportation planning issues and policies, overall process of transportation planning and its role within the wider context of transportation decision-making, planning, and design of urban areas.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: - Juan de Dios Ortuzar & Luis G. Willumsen, "Modeling Transport, 3rd Edition", John Wiley & Sons Inc., ISBN: 9780471861102 (2001). Additional References: M. G. H. Bell & Yasunori Iida, "Transportation Network Analysis", John Wiley & Sons Inc., ISBN: 9780471964933 (1997). - Jeffrey Tumlin, “Sustainable Transportation Planning”, John Wiley and Sons, (2011).		

(CIEM) - CIEM 371

Course Title	Chemical and Biological Treatment Processes	
Course Code	CIEM 371	
Prerequisites	CHEM 101 - Chemical Principles	
Classification within the curriculum	Compulsory (Track-2)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to theory and application of physical and chemical operations and processes for the treatment of water and wastewater, sedimentation, coagulation, filtration, and disinfection, and reactor theory. Topics include theory and application of biological processes for water and waste treatment and the microbiological fundamentals, activated sludge process, biological nutrient removal processes, and anaerobic processes for waste treatment and energy recovery with a focus on design and control of these processes.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving and 50% in the environmental lab for testing.		
Literature Course Textbook: - Udo Wiesmann, In Su Choi, Eva-Maria Dombrowski, “Fundamentals of Biological Wastewater Treatment” Wiley, ISBN: 978-3- 527-31219-1 (2006). Additional References: - Henze, M., Harremoës, P., Arvin, E., LaCour, J, “Wastewater Treatment: Biological and Chemical Processes”. Springer-Verlag Berlin Heidelberg. DOI 10.1007/978-3-662-22605-6 (1997).		

(CIEM) - CIEM 372

Course Title	Environmental Hydraulics	
Course Code	CIEM 372	
Prerequisites	CIEM 341 - Fluid Mechanics	
Classification within the curriculum	Elective (Track-2)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to sources of pollution of surface and ground waters, types and properties of pollutants, evaluation of hazardous effects of pollutants, spread and movement of pollutants in surface and ground waters, motion and mass balance equations, pollution measurement techniques. Topics include environmental impact of hydraulic structures, hydraulic methods of industrial and domestic sewage discharge into water bodies, groundwater pollution and treatment, and water quality control for surface and ground waters.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving and 50% in the environmental lab for testing.		
Literature Course Textbook: - Gilbert M. Masters, "Introduction to Environmental Engineering and Science: International Edition, 2/E", Prentice Hall, ISBN: 0138965498 (1998). Additional References: - Other articles related to topic.		

(CIEM) - CIEM 391

Course Title	Practical Training	
Course Code	CIEM 391	
Prerequisites	Completed 6 Semesters	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	0.0
	Tutorials	0
	Labs	0
	TOTAL	0
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL) / semester	150	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description The aim of this training is to provide on-the-job opportunity to students that help them gain experience in their field, develop an interest in a particular career, and create a network of contacts. Service-learning enriches learning by engaging students in meaningful service to their communities. Students apply academic skills to solving real-world problems and linking their learning with genuine needs.		
Lab and Tutorials This is a practical training where students must spend a full month of non-lecture time (without tutorial or lab) on their internship/service learning activity, then conduct a formal presentation and submit a technical report.		
Literature Course Textbook: - Relevant Health & Safety Executive (HSE) publications. Additional References: - Relevant Occupational Safety & Health Administration (OSHA) publications.		

(CIEM) - CIEM 401

Course Title	Advanced Surveying & GIS	
Course Code	CIEM 401	
Prerequisites	CIEM 201 - Introduction to Surveying	
Classification within the curriculum	Elective (Track-3)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	1.25
	Tutorials	1.25
	Labs	2.50
	TOTAL	5.00
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to GNSS, GPS mapping and survey control, sources and types of errors in measurements, error propagation, survey standards and specifications, acquisition and management of geospatial and thermal data, plane and geodetic coordinate systems and transformations, least square adjustment, and geographic information system (GIS) application in civil engineering.		
Lab and Tutorials This is a practical course that includes field and lab work using GPS, GIS, and other surveying tools.		
Literature Course Textbook: - Barry F. Kavanagh, "Geomatics", Prentice Hall, ISBN: 0-130-322890 (2002) Additional References: - Charles D Ghilani and Paul R Wolf, "Elementary Surveying: An Introduction to Geomatics", Prentice Hall, ISBN: 0-136-154310 (2008) - Jan Van Sickle, “GPS for Land Surveyors” CRC Press, ISBN: 0-575-040751 (2001)		

(CIEM) - CIEM 411

Course Title	Design & Construction of Foundations	
Course Code	CIEM 411	
Prerequisites	CIEM 311 - Reinforced Concrete Design-1	CIEM 313 - Soil Mechanics-2
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Applications	
Topic Level	Program Requirements	
Description The aim of this course is to explore the topics related to design of shallow foundations including isolated and combined footings, strip footings, strap beams, raft foundations, and settlement calculation methods under shallow foundations. Design of deep foundations is also included for small and large diameter bored piles, CFA piles, Micropiles, driven piles using dynamic formulas, and settlement of pile caps and piled rafts. The course also includes an introduction to retaining walls.		
Lab and Tutorials This is a design course that includes tutorial for problem solving and 50% in the computer lab to apply design concepts using finite element programs such as Plaxis 2D.		
Literature Course Textbook: - MJ Tomlinson, "Foundation Design and Construction, 7/E", Prentice Hall, ISBN: 0130311804 (2001). Additional References: - Donald P. Coduto, "Foundation Design: Principles and Practices: International Edition, 2/E", Prentice Hall, (2001). - Cheng Liu, "Soils and Foundations SI, 6/E", Prentice Hall, ISBN: 0131973088 (2005).		

(CIEM) - CIEM 412

Course Title	Design, Construction & Rehabilitation of Water Structures	
Course Code	CIEM 412	
Prerequisites	CIEM 314 - Reinforced Concrete Design-2	
Classification within the curriculum	Compulsory (Track-2 and Track-3)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to RC cracking limits, design of water tight sections, pipe sections, design of water structures, underground circular and rectangular tanks and swimming pools, elevated circular and rectangular deep and shallow tanks, design of RC water and wastewater treatment facilities, construction considerations and quality assurance for water retaining structures, rehabilitation methods and technologies applicable to water retaining structures, and development of design drawings.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: R. MacGregor, "Reinforced Concrete, Mechanics and Design SI 4th Edition", Pearson Education, ISBN: 0131976427 (2005) Additional References: - Egyptian Code for the Design of Concrete Structures (ECCS)", Ministry of Housing, Utilities and Urban Communities, Cairo, Egypt., (2001)		

(CIEM) - CIEM 413

Course Title	Advanced Design of Foundations	
Course Code	CIEM 413	
Prerequisites	CIEM 411 - Design & Construction of Foundations	CIEM 412 - Design, Construction & Rehabilitation of Water Structures
Classification within the curriculum	Elective (Track-3)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to lateral earth pressure, design of cantilever retaining walls, strutted walls, sheet pile walls, diaphragm walls with single and multi-anchors. Types of deep foundations, static and dynamic design of driven piles, design of bored piles, pile settlement calculation, pile static load test, piles raft, working stress and ultimate limit state design of deep foundations, and development of design drawings for retaining walls and foundations.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: - MJ Tomlinson, "Foundation Design and Construction, 7/E", Prentice Hall, ISBN: 0130311804 (2001). Additional References: - Donald P. Coduto, "Foundation Design: Principles and Practices: International Edition, 2/E", Prentice Hall, (2001). - Cheng Liu, "Soils and Foundations SI, 6/E", Prentice Hall, ISBN: 0131973088 (2005).		

(CIEM) - CIEM 414

Course Title	Advanced Steel Design	
Course Code	CIEM 414	
Prerequisites	CIEM 315 - Structural Steel Design	
Classification within the curriculum	Compulsory (Track-3)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to the analysis and design of multi-story steel systems, composite sections, beam-column members, bracing systems, failure modes of steel connections, detailing of steel connections, seismic activity and dynamic behavior of structures, earthquake resistant design philosophy, design of earthquakes resistant steel structures, high-rise buildings, and develop of design drawings and details.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: - Linden J. Morris and David R. Plum, "Structural Steelwork Design to BS 5950", Prentice Hall, ISBN: 0582230888 (1997). Additional References: - Jack C. McCormac and James K. Nelson, Jr., "Structural Steel Design: LRFD Method: International Edition", Pearson Education, ISBN: 0131286080 (2003).		

(CIEM) - CIEM 415

Course Title	Steel Bridges	
Course Code	CIEM 415	
Prerequisites	CIEM 312 - Soil Mechanics-1	CIEM 414 - Advanced Steel Design
Classification within the curriculum	Elective (Track-3)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to steel bridge systems, truck and lane loadings, load application, steel bridge decks, steel floor systems, main supporting steel elements, bracing systems, and elastomeric bridge bearing. Topics include earthquake resistant steel joints and connection, construction considerations and method of statement.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: - Linden J. Morris and David R. Plum, "Structural Steelwork Design to BS 5950", Prentice Hall, ISBN: 0582230888 (1997) Additional References: - Richard M. Barker & Jay A. Puckett, "Design of Highway Bridges: An LRFD Approach, 2nd Edition", John Wiley & Sons Inc., Hoboken, New Jersey, ISBN: 9780471697589 (2007)		

(CIEM) - CIEM 416

Course Title	Dams & Tunnels	
Course Code	CIEM 416	
Prerequisites	CIEM 411 - Design & Construction of Foundations	CIEM 412 - Design, Construction & Rehabilitation of Water Structures
Classification within the curriculum	Elective (Track-3)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to earth and concrete dams, water seepage under dams, design of earth dams, concrete dams, sheet pile dams, types of shallow and deep tunnels, design of cut and cover tunnels, uses of geosynthetics for shallow tunnel backfill, deep tunnel boring machine (TBM) method, design of deep tunnels, construction considerations and method of statement.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: - Technical Manual for Design and Construction of Road Tunnels-Civil Elements, AASHTO, ISBN: 9781560514572 (2010). Additional References: - Alfred R. Golzé, “Handbook of dam engineering”, Van Nostrand Reinhold Co., ISBN: 9780442227524 (1977).		

(CIEM) - CIEM 417

Course Title	Concrete Bridges	
Course Code	CIEM 417	
Prerequisites	CIEM 312 - Soil Mechanics-1	CIEM 314 - Reinforced Concrete Design-2
Classification within the curriculum	Elective (Track-3)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to RC bridge systems, truck and lane loadings, load application, types of pre-stressing, materials, pre-stress losses, shear and torsion, deflection consideration, end zone anchoring, post-tensioned slabs, RC bridge decks (rigid and semi-rigid), RC floor systems, bridge main supporting elements, and elastomeric bridge bearing.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: - Robert S. MacGregor, "Reinforced Concrete: Mechanics and Design SI", Prentice Hall, ISBN: 0131976427 (2006) Additional References: - Helmut Eggert & Wolfgang Kauschke, "Structural Bearings", John Wiley & Sons Inc., Hoboken, New Jersey, ISBN: 9783433012383 (2002)		

(CIEM) - CIEM 431

Course Title	Principles of Management & Human Resources	
Course Code	CIEM 431	
Prerequisites	CIEM 231 - Construction Project Management	
Classification within the curriculum	Compulsory (Track-3)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to nature and evolution of management, managerial environments, problem solving and decision making, organizational structure, design and planning. Topics include managing change, staffing, and human resources management, understanding teams, motivation and rewarding employees, leadership productivity, and TQM with particular emphasis on the construction industry.		
Lab and Tutorials This is a theoretical course that includes tutorial for discussion on the topic.		
Literature Course Textbook: - Loosemore, M., “Human Resource Management in Construction Projects: Strategic and Operational Approaches”, Taylor & Francis; 1 edition, ISBN-10: 0415261635 (2003). Additional References: - Freeman-Bell, G. and Balkwill, J., “Management in Engineering, Principles and Practice” 2nd Ed. London: Prentice hall international Ltd. (1996).		

(CIEM) - CIEM 432

Course Title	Infrastructure Asset Management	
Course Code	CIEM 432	
Prerequisites	CIEM 441 - Fundamentals of Hydraulic Engineering	CIEM 451 - Introduction to Transportation & Highway Engineering
Classification within the curriculum	Compulsory (All Tracks)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to infrastructure asset management frameworks, asset inventory models, condition assessment and rehabilitation of roads, water structures and buildings, infrastructure deterioration modeling, asset valuation, asset risk management, performance measures and level of service models for infrastructure.		
Lab and Tutorials This is a theoretical course that includes tutorial for discussion on the topic.		
Literature Course Textbook: - Daniel W. Halpin, "Construction Management", John Wiley & Sons Inc., Hoboken, New Jersey, ISBN: 9780471661733 (2005). Additional References: - Frederick E. Gould, "Managing the Construction Process: Estimating, Scheduling, and Project Control", Prentice Hall, ISBN: 013113406X (2005). - John Buttelerwerth, "Computer Integrated Construction Project Scheduling", Prentice Hall, ISBN: 0131114654 (2005).		

(CIEM) - CIEM 433

Course Title	Contracts & Commercial Management	
Course Code	CIEM 433	
Prerequisites	CIEM 231 - Construction Project Management	
Classification within the curriculum	Compulsory (All Tracks)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to legal aspects of construction processes and potential liability, post-construction processes, participants in a construction contract, types of contracts, formation principles of a contract, performance or breach of contractual obligations, analysis and comparison of the different kinds of construction contracts, dispute resolution mechanisms, different types of specifications, different forms of contracts utilized in construction, estimation techniques and procedures including approximate estimating, quantity surveying, and detailed estimating procedure.		
Lab and Tutorials This is a theoretical course that includes tutorial for discussion on the topic.		
Literature Course Textbook: - Allan Ashworth, "Contractual Procedures in the Construction Industry", Prentice Hall, ISBN: 0131298275 (2006). Additional References: - Stuart H. Bartholomew, "Construction Contracting: Business and Legal Principles, 2/E", Prentice Hall, ISBN: 0130910554 (2002). - Dennis F. Turner & Alan Turner, "Building Contract Claims and Disputes, 2/E", Longman, ISBN: 0582285119 (2002).		

(CIEM) - CIEM 434

Course Title	Strategic Management in Construction	
Course Code	CIEM 434	
Prerequisites	CIEM 431 - Principles of Management & Human Resources	
Classification within the curriculum	Compulsory (Track-3)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to strategic role of actors in the construction process, client, constructor, competencies, national and international firms, strategic management process, theoretical and practical aspects of strategy formulation. Topics include overview of value management (VM) in construction, risk management (RM) in construction, types of risk and uncertainty, value and risk management, decision making, and marketing/promotional strategies in construction.		
Lab and Tutorials This is a theoretical course that includes tutorial for discussion on the topic.		
Literature Course Textbook: - Langford D., and Male S, “Strategic Management in Construction”. 2nd Ed., Oxford, Blackwell Science: ISBN 0632049995 (2001). Additional References: - Preece C., Moodley K., and Smith P., “Construction Business Development”. London, Elsevier: ISBN 0750651091 (2003).		

(CIEM) - CIEM 435

Course Title	Urban Planning & Infrastructure Development	
Course Code	CIEM 435	
Prerequisites	None	
Classification within the curriculum	Elective (All Tracks)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to types of urban plans and its relationship with infrastructure planning, integrated urban and infrastructure planning approaches, urban form, environmental management considerations in urban planning, mitigating natural hazards in urban planning, types of urban development, building types, planning laws and standards, real estate development processes and considerations, market analysis in real estate development, financial considerations in real estate development.		
Lab and Tutorials This is a theoretical course that includes tutorial for discussion on the topic.		
Literature Course Textbook: - Thwaites, K., “Urban Sustainability through Environmental Design”, Taylor & Francis, ISBN-10: 041539547X (2008). Additional References: - Birkeland, Janis. “Design for Sustainability: A Sourcebook of Integrated, Ecological Solutions” Earthscan, ISBN: 9781849770958 (2002).		

(CIEM) - CIEM 436

Course Title	Sustainability & Built Environment	
Course Code	CIEM 436	
Prerequisites	None	
Classification within the curriculum	Elective (Track-3)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to environmental crisis and built environment, sustainability definition and its components and indicators (social, environmental, economic and institutional), green building principles (green technology, processes and solutions), sustainable design certificate program (LEED). Topics include ecological design practices, passive and mechanical comfort modification, sustainable building materials and practices, low carbon buildings, urban ecology, economy of resources and life cycle design, renewable energy systems, recycling and reuse in construction.		
Lab and Tutorials This is a theoretical course that includes tutorial for discussion on the topic.		
Literature Course Textbook: - Birkeland, Janis. “Design for Sustainability: A Sourcebook of Integrated, Ecological Solutions” Earthscan, ISBN: 9781849770958 (2002). Additional References: - Thwaites, K., “Urban Sustainability through Environmental Design”, Taylor & Francis, ISBN-10: 041539547X (2008).		

(CIEM) - CIEM 437

Course Title	Freight and Logistics Management	
Course Code	CIEM 437	
Prerequisites	MATH 202 - Probability & Statistics for Engineers	
Classification within the curriculum	Elective (Track-1)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to the structure of the freight industry and relates it to business logistics and planning of supply chains. Planning of freight services at the strategic, tactical, and operational levels, models of international, inter-city, and urban freight movements, and shipper behavior related to mode choice, carrier selection, and adoption of 3-PL and information technology options. Topics include introduction to the role of advanced technologies (ITS) in improving freight operations, and the implications of e-commerce on planning of freight services.		
Lab and Tutorials This is a theoretical course that includes tutorial for discussion on the topic.		
Literature Course Textbook: - Lun, Yuen Ha, Lai, Kee Hung, Cheng, TCE, “Shipping and Logistics Management”. Springer-Verlag London. 978-1-84882-996-1 (2010). Additional References: - Oz, E., “Management Information Systems” (6th Edition), Course Technology, ISBN-10: 1423901789 (2008).		

(CIEM) - CIEM 441

Course Title	Fundamentals of Hydraulic Engineering	
Course Code	CIEM 441	
Prerequisites	CIEM 202 - Civil Engineering Drafting	CIEM 341 - Fluid Mechanics
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Basic Engineering Sciences	
Topic Level	Program Requirements	
Description The aim of this course is to explore the topics related to water, wastewater and storm water systems, open channel hydraulics, syphons, culverts, basics of hydrology and ground water flow, roadway drainage systems, and overview of other hydraulic structures. The course also includes an introduction to irrigation systems.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving and 50% in the hydraulics lab for demonstration.		
Literature Course Textbook: - Warren Viessman, Jr. & Gary L. Lewis, "Introduction to Hydrology, 5/E", Prentice Hall, ISBN: 067399337X (2003) Additional References: - Richard H. McCuen , "Hydrologic Analysis and Design, 3/E", Prentice Hall, ISBN: 0131424246 (2005) - David A. Chin, "Water-Resources Engineering, 2/E ", Prentice Hall, ISBN: 0131481924 (2007)		

(CIEM) - CIEM 451

Course Title	Introduction to Transportation & Highway Engineering	
Course Code	CIEM 451	
Prerequisites	CIEM 202 - Civil Engineering Drafting	
Classification within the curriculum	Compulsory (All Tracks)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to transportation system characteristics, functional classification of road network, criteria of geometric design, design of roadway horizontal and vertical alignments, cross section elements, type of road pavement, and design of highway flexible/rigid pavements.		
Lab and Tutorials This is a design course that includes tutorial for problem solving and 50% in the transportation lab to test asphalt samples.		
Literature Course Textbook: A. S. Narasimha Murthy, Henry R. Mohle, “Transportation Engineering Basics”, ASCE Publications, (2001). Additional References: - Yang H. Huang, "Pavement Analysis and Design", Prentice Hall, ISBN: 0131424734 (2004). - T.F. Fwa, “The Handbook of Highway Engineering”, CRC Press, (2005).		

(CIEM) - CIEM 452

Course Title	Traffic Engineering	
Course Code	CIEM 452	
Prerequisites	MATH 202 - Probability & Statistics for Engineers	
Classification within the curriculum	Compulsory (Track-1)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related traffic flow theory and modeling, queuing theory, design of traffic control devices, traffic signs and markings, traffic data collection methodologies, as well as design and implementation of traffic studies.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: M. G. H. Bell & Yasunori Iida, "Transportation Network Analysis", John Wiley & Sons Inc., ISBN: 9780471964933 (1997). Additional References: - Vukan R. Vuchic, "Urban Transit Systems and Technology", John Wiley & Sons Inc., Hoboken, New Jersey, ISBN: 9780471758235 (2007).		

(CIEM) - CIEM 453

Course Title	Public Transit Planning & Operations	
Course Code	CIEM 453	
Prerequisites	CIEM 351 - Transportation Planning	
Classification within the curriculum	Compulsory (Track-1)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to urban transit operations and planning, with special emphasis on best-practice strategies of modern transit systems. Topics include transit system strategic planning, transit ridership, transit system operations design, transit system performance evaluation, transit system operational challenges and mitigation plans, and the operations of rail-based transit system.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving.		
Literature Course Textbook: - Juan de Dios Ortuzar & Luis G. Willumsen, "Modeling Transport, 3rd Edition", John Wiley & Sons Inc., ISBN: 9780471861102 (2001). Additional References: M. G. H. Bell & Yasunori Iida, "Transportation Network Analysis", John Wiley & Sons Inc., ISBN: 9780471964933 (1997). - Jeffrey Tumlin, “Sustainable Transportation Planning”, John Wiley and Sons, (2011).		

(CIEM) - CIEM 454

Course Title	Highway Engineering	
Course Code	CIEM 454	
Prerequisites	CIEM 451 - Introduction to Transportation & Highway Engineering	
Classification within the curriculum	Compulsory (Track-1)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related highways geometric design guides, speeds and sight distances, alignment and three dimensional coordination, design consistency, highways drainage, Bituminous materials, quality control, pavement condition assessment, and development of detailed design drawings for highways.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: A. S. Narasimha Murthy, Henry R. Mohle, “Transportation Engineering Basics”, ASCE Publications, (2001). Additional References: - Yang H. Huang, "Pavement Analysis and Design", Prentice Hall, ISBN: 0131424734 (2004). - T.F. Fwa, “The Handbook of Highway Engineering”, CRC Press, (2005).		

(CIEM) - CIEM 455

Course Title	Fundamentals of Intelligent Transportation Systems	
Course Code	CIEM 455	
Prerequisites	MATH 202 - Probability & Statistics for Engineers	CIEM 452 - Traffic Engineering
Classification within the curriculum	Elective (Track-1)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to emerging concepts and elements of Intelligent Transportation Systems (ITS) with a focus on Advanced Traffic Management and Information Systems (ATMIS). Topics include ITS system architecture and user services, ITS enabling technologies, traffic flow theory for ITS, static and dynamic network modeling, freeway management and control, adaptive signal control, incident management, traveler information systems and route guidance, corridor management, and ITS simulation, ITS communication technology, and time permitting.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving.		
Literature Course Textbook: M. G. H. Bell & Yasunori Iida, "Transportation Network Analysis", John Wiley & Sons Inc., ISBN: 9780471964933 (1997). Additional References: - Vukan R. Vuchic, "Urban Transit Systems and Technology", John Wiley & Sons Inc., Hoboken, New Jersey, ISBN: 9780471758235 (2007).		

(CIEM) - CIEM 456

Course Title	Maritime & Airport Transit	
Course Code	CIEM 456	
Prerequisites	None	
Classification within the curriculum	Compulsory (Track-1)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to characterization of port system, geographical location of ports and related planning and operational issues, methods and processes for port planning and design, inland connectivity, port’s linkage to transport infrastructure, intermodal connections, marine operations in ports, traffic management, vessel traffic system (VTS), pilotage and tugs, port navigational system, cargo handling, terminal operations, facilities, equipment, and port security.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: - Mo Y. Shahin, “Pavement Management for Airports, Roads, and Parking Lots”, Springer Science & Business Media, (2005). Additional References: - Paul H. Wright & Karen Dixon, "Highway Engineering, 7th Edition", John Wiley & Sons Inc., Hoboken, New Jersey, ISBN: 9780471264613 (2003). G. Macpherson, "Highway and Transportation Engineering and Planning", Longman, ISBN: 0582097983 (1993).		

(CIEM) - CIEM 457

Course Title	Transportation Systems Safety	
Course Code	CIEM 457	
Prerequisites	CIEM 451 - Introduction to Transportation & Highway Engineering	CIEM 452 - Traffic Engineering
Classification within the curriculum	Elective (Track-1)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to fundamentals of safety analysis for different transport systems including roadway, railway, and maritime transport. Topics include safety audits, safety performance functions and models, safety enhancements and counter measures.		
Lab and Tutorials This is a theoretical course that includes tutorial for discussion on the topic.		
Literature Course Textbook: - Evans, Leonard, “Traffic Safety”. Bloomfield Hills, Michigan: Science Serving Society. ISBN 0-9754871-0-8 (2004). Additional References: - Evans, Leonard, “Traffic Safety and the Driver”. New York: Van Nostrand Reinhold. ISBN 0-442-00163-0 (1991).		

(CIEM) - CIEM 458

Course Title	Design and Operations of Railway Systems	
Course Code	CIEM 458	
Prerequisites	CIEM 453 - Public Transit Planning & Operations	
Classification within the curriculum	Elective (Track-1)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to railway systems, track component and system design, construction, evaluation, maintenance, load distribution, and wheel/rail interaction. Topics also include lifecycle of modern rail systems, rolling stock, railway signaling and control, railway safety assurance, and basics of high speed rail systems.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: - Clifford F. Bonnett, “Practical Railway Engineering”, 2nd Edition, Imperial Collage Press. ISBN-13: 978-1860945151 (2005). Additional References: - Mundrey, “Railway Track Engineering”. McGraw-Hill Education, ISBN: 9780074637241 (2000).		

(CIEM) - CIEM 471

Course Title	Design and Operations of Water & Wastewater Treatment Plants		
Course Code	CIEM 471		
Prerequisites	CIEM 371 - Chemical and Biological Treatment Processes	CIEM 441 - Fundamentals of Hydraulic Engineering	
Classification within the curriculum	Compulsory (Track-2)		
Course Position in Study Plan	Fall		
Contact Hours (weekly)	Lectures	2.50	
	Tutorials	1.25	
	Labs	0	
	TOTAL	3.75	
EG Credit Hours	3		
ECTS	5		
Student Workload (SWL) / semester	125		
Topics Category	Engineering Applications		
Topics Level	Specialization Requirements		
Description The aim of this course is to explore the topics related to design of water and wastewater treatment plants. This includes introduction to wastewater treatment plant design, design flow rates, design mass loadings, process selection, elements of conceptual process design, physical unit operations, flow measurement, flow equalization, design of physical treatment units, communities and grit chambers. Topics include design of physical treatment units, primary sedimentation tanks and dissolved air flotation, design of biological treatment units, activated sludge processes, design of aeration systems, design of sludge disposal/treatment facilities, solids and sludge sources, characteristics, and quantities, regulations, thickening, and dewatering.			
Lab and Tutorials This is a design course that includes tutorial for problem solving.			
Literature Course Textbook: - Mark J. Hammer, "Water and Wastewater Technology SI, 5/E", Prentice Hall, ISBN: 013197307X (2005). Additional References: - Gilbert M. Masters, "Introduction to Environmental Engineering and Science: International Edition, 2/E", Prentice Hall, ISBN: 0138965498 (1998).			

(CIEM) - CIEM 472

Course Title	Design, Construction & Operations of Water & Sewer Networks	
Course Code	CIEM 472	
Prerequisites	CIEM 441 - Fundamentals of Hydraulic Engineering	
Classification within the curriculum	Compulsory (Track-2)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to hydraulic network modeling of pressurized and gravity systems, modeling considerations and assumptions, use of state of the art software in modeling flows in pressurized and gravity systems, sewer networks construction methods, considerations and quality assurance for pipeline systems, condition assessment technologies and rehabilitation methods, and the use of GIS for pipeline management.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: - Warren Viessman, Jr. & Mark J. Hammer, "Water Supply and Pollution Control, 7/E", Longman, ISBN: 0131409700 (2005). Additional References: - Mark J. Hammer, " Water and Wastewater Technology, 4/E", Prentice Hall, 533 pp, (2008) - Mackenzie L Davis, “Principles of Environmental Engineering and Science”, McGraw-Hill Education, 864 pages, (2013).		

(CIEM) - CIEM 473

Course Title	Design & Operation of Electro Mechanical Systems	
Course Code	CIEM 473	
Prerequisites	CIEM 441 - Fundamentals of Hydraulic Engineering	
Classification within the curriculum	Elective (Track-2)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to types of electrical and mechanical units in pump stations and treatment plants, design and operational considerations, pump-pipeline systems, pump characteristic curves, system curves, pipe material, fittings and accessories, control valve sizing and selection of air valve design. Operational considerations, condition monitoring, and replacement practices for electromechanical systems.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: - Enrique Cabrera, “Pumps, Electromechanical Devices and Systems Applied to Urban Water Management” Vol. 2, Taylor & Francis, ISBN 9058095606 (2003). Additional References: - Other articles related to topic.		

(CIEM) - CIEM 474

Course Title	Field Measurement & Water Quality	
Course Code	CIEM 474	
Prerequisites	CIEM 372 - Environmental Hydraulics	
Classification within the curriculum	Elective (Track-2)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	0.625
	Labs	0.625
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to fundamentals of competence with instruments, field techniques and basic statistical sampling and data summarization techniques commonly applied in hydrology. Topics cover measuring surface and groundwater parameters, stream flow, identifying channel cross section, and measuring climatic parameters.		
Lab and Tutorials This is an analytical course that includes tutorial for problem solving and 50% in the environmental lab to conduct tests on water samples.		
Literature Course Textbook: - T.H.Y. Tebbutt, “Principles of Water Quality control, 5th Edition”, Butterworth, ISBN 9780080539683. Additional References: - Nigel W.T. Quinn, “International views on water quality management and control pollutants”, Intech, ISBN 978-953-51-0999-0.		

(CIEM) - CIEM 475

Course Title	Environmental Assessments of Infrastructure Systems	
Course Code	CIEM 475	
Prerequisites	None	
Classification within the curriculum	Compulsory (Track-2) and Elective (Track-1)	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to EIA definition, history, EIA procedures, base line environment, screening, scoping, impact assessment, mitigation measure, environmental management plan, EIA screen in Egypt, and environmental impacts on surface water, ground water, air, noise impact, health impact, culture impact. Topics include the impact assessment methods, check list, simple matrix, stepped matrix, loops, networks, and the development of an environmental management plan.		
Lab and Tutorials This is a theoretical course that includes tutorial for discussion on the topic.		
Literature Course Textbook: - Andrew Allan, “Infrastructure Sustainability and Design, Construction Management and Economics”. DOI: 10.1080/01446193.2012.727009 (2012). Additional References: - Yacov Y. Haimes, “Risk Modeling, Assessment, and Management”. John Wiley & Sons ISBN: 9781119017981 (2015).		

(CIEM) - CIEM 476

Course Title	Water Resources Engineering	
Course Code	CIEM 476	
Prerequisites	None	
Classification within the curriculum	Elective (Track-2)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Engineering Applications	
Topics Level	Specialization Requirements	
Description The aim of this course is to explore the topics related to quantitative aspects of water in the earth's environment and its engineering implications, including design and analysis of systems directly concerned with use and control of water; quantitative introduction to hydrology, hydraulic engineering, and water resources planning. Topics include non-traditional water resources, water reuse, desalination, and grey water systems.		
Lab and Tutorials This is a design course that includes tutorial for problem solving.		
Literature Course Textbook: - David A. Chin, "Water-Resources Engineering, 2/E", Prentice Hall, ISBN: 0131481924 (2007). Additional References: - Metcalf & Eddy, Inc. "Wastewater Engineering: Treatment, Disposal, and Reuse", Fourth edition, McGraw-Hill Companies, Inc., New York, NY, (2003).		

(CIEM) - CIEM 493

Course Title	Graduation Project I	
Course Code	CIEM 493	
Prerequisites	Senior Standing	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0
	Labs	0
	TOTAL	2.5
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL) / semester	180	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description The aim of this application-oriented project is to show competence in the major academic area, where an independent design project is conducted under the guidance of a faculty member in the CIEM program. The design project should contribute to the advancement of knowledge in the field by utilizing computer software such as finite element packages for structural analysis. Professional drawings, calculation sheets, written report, and formal presentation are required.		
Lab and Tutorials This is a design project that does not include lectures, labs or tutorials.		
Literature Course Textbook: - Design codes relevant to project area. Additional References: - Project statement prepared by supervisor.		

(CIEM) - CIEM 495

Course Title	Graduation Project II	
Course Code	CIEM 495	
Prerequisites	CIEM 493 - Graduation Project I	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	0
	Labs	0
	TOTAL	2.5
EG Credit Hours	3	
ECTS	6	
Student Workload (SWL) / semester	180	
Topic Category	Projects and Practical Training	
Topic Level	Program Requirements	
Description The aim of this research-oriented project is to develop the state-of-the-art outcomes in the major academic area and contribute to the existing knowledge, where an independent research project is conducted under the supervision of a faculty member in the CIEM program. The research project should include experimental and analytical works using the laboratories and computer facilities of the program. Finding from this research project can be used in the design project CIEM 493. Writing a technical paper and formal presentation are required.		
Lab and Tutorials This is a research project that includes lab work comprise experimental testing and/or numerical modeling depending on the project nature.		
Literature Course Textbook: - Literature and publications relevant to project area. Additional References: - Project statement prepared by supervisor.		

(CIEM) - ENTR 301

Course Title	Selected Topics in Entrepreneurship	
Course Code	ENTR 301	
Prerequisites	None	
Classification within the curriculum	Compulsory (All Tracks)	
Course Position in Study Plan	Fall	
Contact Hours (weekly)	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topics Category	Business	
Topics Level	Specialization Requirements	
Description In this course, students get an overview about the definition of entrepreneurship, examples of successful innovations, and the prospects of starting a company. The course covers idea generation and identifying opportunities, business model canvas, and an overview of some business fundamentals such as types of businesses and business functions, in addition to communication and presentation skills.		

(CIEM) - IENG 202

Course Title	Operations research I	
Course Code	IENG 202	
Prerequisites	MATH 111 - Analytical Geometry & Calculus I	
Classification within the curriculum	Elective (All Tracks)	
Course Position in Study Plan	Fall (Semester 9)	
Contact Hours	Lectures	2.5
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL)	125	
Topics Category	Basic Engineering Sciences	
Topics Level	Specialization	
Description		
The aim of this course is to introduce the decision making process criteria to students and differentiate between different decision making environments. Students are given the knowledge and experience of problem solving techniques through using different operations research modeling and solution techniques. Through practical applications, assignments and the final projects students learn how to utilize suitable tools at different problem solving situations.		
Lab and Tutorials		
The course requires practice and problem solving training during tutorials, in addition to training on software to solve general OR problems.		
Literature-		
- Barry Render, Ralph M. Stair, JR, and Michael E. Hanna, “Quantitative Analysis for Management”, 10th Edition, Pearson Prentice Hall, 2009. - Frederick S. Hillier and Gerald J. Lieberman, Introduction to Operations Research (8th ed.), McGraw Hill, New York (2005). - Hamdy A. Taha, Operations Research: An Introduction (6th ed.),		

(CIEM) - IENG 241

Course Title	Engineering Economics	
Course Code	IENG 241	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Business	
Topic Level	Program Requirements	
Description The main aim of this course is make the students acquainted with rational meaningful approaches to evaluating economically different (alternatives) investment opportunities while accomplishing given objectives. The course will also provide the students with the required tools and techniques to consider economic and non-economic factors in evaluating a wide range of industrial and business applications.		
Lab and Tutorials The course requires practice and problem solving training during tutorials		
Literature - Fraser, N. M., Jewkes, E. M., Bernhardt I. & Tajima, M., Global Engineering Economics: Financial Decision Making for Engineers, 4th Edition, Pearson Education, 2009. - Chan S. Park, Fundamentals of Engineering Economics, 3rd Edition, Pearson Education, ISBN 13:978-0273772910		

(CIEM) - NSCI 102

Course Title	Selected Topics in Environmental Science	
Course Code	NSCI 102	
Prerequisites	None	
Classification within the curriculum	Compulsory	
Course Position in Study Plan	Spring	
Contact Hours (weekly)	Lectures	2.50
	Tutorials	1.25
	Labs	0
	TOTAL	3.75
EG Credit Hours	3	
ECTS	5	
Student Workload (SWL) / semester	125	
Topic Category	Engineering Culture	
Topic Level	Program Requirements	
Description		
A course in any of the fields of environmental sciences related to the discipline it is offered to.		