كلية التكنولوجيا الحيوية

اللائحة الداخلية

لمرحلة البكالوريوس

برامج الكلية والدرجات العلمية

مادة (1): الدرجات العلمية

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

1. درجة البكالوريوس في التكنولوجيا الحيوية.
2. درجة ماجستير العلوم في التكنولوجيا الحيوية

مادة (2): البرامج الأكاديمية بالكلية

تتكون كلية التكنولوجيا الحيوية من البرامج الآتية:

مرحلة البكالوريوس

برنامج التكنولوجيا الحيوية

- شعبة التكنولوجيا الحيوية التطبيقية
- شعبة المعلوماتية الحيوية

مادة (3): 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 الشئون الأكاديمية (كلٌ في مجاله وتخصصه) ويشترك أعضاء هيئة التدريس بالبرامج الأكاديمية المختلفة في الوحدات البحثية في إجراء البحوث وتنفيذ المشاريع البحثية.

مادة (4): الإشراف على مقررات (متطلبات الجامعة)

تشترك كية التكنولوجيا الحيوية مع باقي كليات جامعة النيل في عدد 10 من المقررات (10 ساعة معتمدة) والتي تمثل متطلبات الجامعة. وتعهد الكلية إلى قسم متطلبات الجامعة لتدريس هذه المقررات.

مادة (5): الساعات المعتمدة لبرامج الكلية

يختص برنامج التكنولوجيا الحيوية بعدد من المقررات يكافئ 136 ساعة معتمدة مقسمة بين متطلبات البرنامج ومتطلبات التخصص كما سيرد تفصيلاً لاحقاً.

درجة البكالوريوس

مادة (6): درجات البكالوريوس

تمنح جامعة النيل الأهلية بناءً على طلب مجلس كلية التكنولوجيا الحيوية درجة البكالوريوس في التكنولوجيا الحيوية

- التكنولوجيا الحيوية التطبيقية
- شعبة المعلوماتية الحيوية

مادة (7): مدة الدراسة

مدة الدراسة هو ٨ فصول دراسية رئيسية ٤ سنوات.

مادة (8): شروط القيد

1. يسمح بالقيد للحاصلين على شهادة الثانوية العامة شعبة رياضيات أو علوم، أو ما يعادلها، ممن تم قبولهم طبقا 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 (9): نظام الدراسة

1. تحتسب الدراسة بنظام الساعات المعتمدة على النحو التالي:
   - تعادل ساعة محاضرة أسبوعياً لمدة 14 أسبوع (غير مشتملة فترة الامتحانات) أو
   - تعادل 2-3 ساعة تمارين أو معمل أسبوعياً لمدة 14 أسبوع (غير مشتملة فترة الامتحانات).
2. الدراسة باللغة الإنجليزية، ويتم عقد امتحان لتحديد مستوى الطالب وتحديد المقررات التأهيلية التي يحتاجها في اللغة.

مادة (10): مواعيد الدراسة والقيد

تقسم السنة الدراسية إلى ثلاثة فصول دراسية على النحو التالي:

1. الفصل الأول: لمدة 17 أسبوع (شاملة فترة التسجيل و الامتحانات)
2. الفصل الثاني: لمدة 17 أسبوع (شاملة فترة التسجيل و الامتحانات)
3. الفصل الصيفي: لمدة 8 أسابيع (شاملة فترة التسجيل و الامتحانات)

يتم القيد لأي مرحلة خلال أسبوعين قبل بدء أي فصل دراسي بعد استيفاء شروط القيد ودفع الرسوم المقررة.

مادة (11): رسوم الدراسة

1. يتم تحديد رسوم الخدمة التعليمية المقررة، لكل ساعة معتمدة، بمعرفة الجامعة بناء على اقتراح مجلس الكلية سنويا.

2. يوقع الطلبة على تعهد بالالتزام بدفع رسوم الخدمة التي تقترحها الكلية، وتوافق عليها الجامعة، مع الالتزام بنفس الرسوم للطالب 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 فصليا. 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 (12): شروط التسجيل

1. يمكن للطالب التسجيل في الفصل الأول أو الثاني في مقررات تصل ساعاتها المعتمدة الى 18 ساعة. ويمكن للطالب التسجيل في الفصل الصيفي في مقررات لا تزيد ساعاتها المعتمدة عن 8 ساعات، وبحيث يستوفي شروط التسجيل في كل مقرر، وبعد استشارة المرشد الأكاديمي، وفي المواعيد المحددة بتوقيتات التسجيل وقواعده التي تصدرها الكلية سنويا وتنشر في دليل الطالب ، ولا يعتبر التسجيل نهائيا إلا بعد دفع رسوم الخدمة التعليمية المقررة كل فصل دراسى.
2. يجوز السماح للطالب وبموافقة المرشد الأكاديمي التسجيل في ساعات معتمدة إضافية بحد أقصى 21 ساعة معتمدة بشرط أن يكون المعدل التراكمي للطالب أعلى من 3.00 وألا يكون ذلك خلال السنة الأولى.
3. الطالب الذي يقل معدله 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 للطالب 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 (13): 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 IBT TOEFL .
- درجة 500 أو أكثر في ITP TOEFL .
- 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 وENGL 102 أو بمراكز تعليم اللغة الإنجليزية الأخرى.

مادة (14): متطلبات الدراسة

تم تصميم مقررات برامج كلية التكنولوجيا الحيوية بما يتناسب مع NARS وما تحتويه من نسب لفئات المقررات المختلفة من حيث المعارف والمهارات المطلوبة للخريج على مستوى

- (متطلبات الجامعة): مقررات ثقافية وعلمية عامة بواقع 10 ساعات معتمدة يختارها الطالب من المقررات المطروحة من قبل الجامعة والكلية منها أربعة ساعات إجبارية
- (متطلبات الكلية): مقررات علوم أساسية مساعدة أو مساندة لفهم التخصص: 28 ساعة إجباريه تشارك فى تقديمها كل أقسام الكلية
- (متطلبات التخصص): 88 ساعة معتمدة، توزع بين مقررات إجبارية(لا غنى عنها لاستيفاء مواصفات الخريج) ومقررات اختيارية من قائمة المقررات النظرية والعملية والتطبيقية

مادة (15): متطلبات الحصول على درجة البكالوريوس

1. للحصول على درجة البكالوريوس في التكنولوجيا الحيوية، لابد أن يجتاز الطالب عدد (136 ساعة معتمدة CH)، طبقا للمتطلبات التي تعرضها هذه اللائحة، وبمتوسط نقاط لا يقل عن 2.0
2. يطلب من الطالب تقديم مشروع للتخرج، كما هو موضح في هذه اللائحة، ولا يتخرج الطالب إلا بعد أن يستوفي شروط النجاح في المشروع.
3. يؤدى الطالب تدريبا عمليا تحت إشراف الكلية.

مادة (١6): 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 في اختيار المقررات كل فصل دراسي، وأن يطلب وضع الطالب تحت الملاحظة لفصلين دراسيين، مع خفض عدد الساعات المسجل فيها وبحد أدنى 12 ساعة معتمدة وذلك في حالة حصول الطالب على معدل تراكمي أقل من 2.0.

مادة (١7): شروط الحذف و الاضافه 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 في الانسحاب من فصل دراسي، لظروف المرض أو بعذر تقبله الكلية، عليه التقدم بطلب لشئون الطلاب، ويحصل على موافقة على الانسحاب ولا تدخل له هذه المقررات في حساب المتوسط العام، على أن يقوم بإعادة المقررات التي سجل فيها في فصل دراسي لاحق.
5. يحق للطالب إعادة التسجيل في أي مقرر رسب فيه، ويعيد المقرر دراسة وامتحانا، بعد دفع رسوم الخدمة التعليمية المقررة

مادة (١8): 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
4.5-5.00	A+	95% إلى أقل من 100%
4.00-4.4	A	90% إلى أقل من 95%
3.50-3.9	-A	85% إلى أقل من 90%
3.00-3.4	+B	80% - إلى أقل من 85%
2.5-2.9	B	75% إلى أقل من 80%
2.00-2.4	+C	70% إلى أقل من 75%
1.5-1.9	C	65% إلى أقل من 70%
1.00-1.4	D	60% إلى أقل من 65%
0.00	F	أقل من 60%

ملحوظة: التقدير A+ يحتسب بعدد نقاط 4.0 مماثل للتقدير A ويعتبر هذا التقدير تكريماً للطالب المتميز تميزاً غير اعتيادياً.

مادة (١9): حساب متوسط النقاط

1. لا يعتبر الطالب ناجحا 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 2.0 على الأقل.
4. يحسب مجموع النقاط التي حصل عليها الطالب في أي فصل دراسي، على أنها مجموع نقاط كل المقررات التي درسها في هذا الفصل الدراسي.
5. يحسب متوسط نقاط أي فصل دراسي، على أنه ناتج قسمة مجموع النقاط التي حصل عليها الطالب في هذا الفصل، مقسوما على مجموع الساعات المعتمدة لهذه المقررات.

$$\textbf{المعدل الفصلى} = \frac{\text{مجموع حاصل ضرب نقاط كل مقرر فصلى } \mathcal{X} \text{ عدد ساعاته المعتمده}}{\text{حاصل جمع الساعات المعتمده لهذه المقررات فى الفصل}}$$

6. المقرر الذى 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 وإذا استهلك الطالب الحد الأقصى المسموح للإعادة وحصل على (C)، فيحق له الإعادة مرة أخرى ولكن في هذه الحالة تدخل درجتى الإعادة في حساب متوسط مجموع الدرجات وتظهر الاثنتان في الشهادة.
8. يحق للطالب الراسب بسبب الغش إعادة المادة ولكن تظهر الدرجتان في شهادته حتى إذا لم يستهلك 12 ساعة معتمدة من المواد المعادة.
9. 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.

$$\textbf{المعدل التراكمى العام} = \frac{\text{مجموع حاصل ضرب نقاط كل مقرر تم دراسته } \boldsymbol{x} \text{ عدد ساعاته المعتمدة}}{\text{حاصل جمع الساعات المعتمدة لهذه المقررات التى تم دراستها}}$$

مادة (20): 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 .

مادة (21): تعريف حالة الطالب

كلما أكمل الطالب 20% من المعدل التراكمى 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 يلى:

Student Academic Levels

المستوى الدراسي	تعريف موقع الطالب بنظام الدراسة	نسبة الساعات المعتمدة التي اجتازها الطالب بنجاح	
		من	إلى
0	Freshman	0 CH	35 CH
1	Sophomore	36 CH	70 CH
2	Junior	71 CH	105 CH
3	Senior	106 CH	136 CH

مادة (22): أسلوب تقييم الطالب

- (أ) يتم تقييم كل مقرر من (100) مائة درجة و يتم تقييم الطالب فى المقررات النظرية و العملية بناءا علي العناصر الواردة فى الجدول التالى :-

نوع الامتحان	المقرر نظرى و عملى	المقرر نظرى فقط	المقرر عملى فقط
إمتحان نظرى نهائى	%40	%50	-
إمتحان عملى نهائى	%20		%40
إمتحان شفوى نهائى	%10	%10	%10
إمتحان فصلى نظرى (منتصف الفصل)	%10	%20	%20
إختبارات دورية و تمارين و واجبات و تطبيقات ،،، الخ	%20	%20	%30
مجموع درجات الإمتحانات	**100**	**100**	**100**

- (ب) بالنسبة للمقال المرجعى أو مشروع التخرج بالمستوى الأخير و المخصص له 3 ساعات معتمدة توزع درجاته بواقع 60% على جودة المقال أو تقرير المشروع ، و 20% للمناقشة الشفهية و 20% للمتابعة الدورية .
- (ت) تتم الإمتحانات الشفهية و التحريرية بواسطة لجنة من اثنين أو ثلاثة من أعضاء هيئة التدريس من بينهم القائم على تدريس المقرر ، و يعتبر الطالب الغائب فى الإمتحان العملى النهائى أو الإمتحان التحريرى النهائى غائباً فى المقرر ، و يعتبر الطالب الذى يحصل على درجة أقل من 40% من درجة الإمتحان النهائى راسباً فى المقرر.

مادة (23): مراتب الشرف ومنح التفوق

تمنح مرتبة الشرف للطالب الذى ينهى دراسته بالكلية فى غضون المدة الإعتيادية للتخرج و التى لا تزيد عن 8 فصول دراسية بتقدير ممتاز و بحد أدنى 85% من المجموع الكلى بما يحقق معدل تراكمى من النقاط قدره 3.5 أو أكثر من مكافئ رقمى أقصاه 5 و بشرط ألا يقل التراكمى فى أى فصل دراسى عن 2.5 (75% من مجموع الدرجات) و ألا يكون قد رسب فى أى مقرر دراسى خلال دراسته فى الكلية أو فى الكلية المحول منها اذا كان قد قضى مدة دراسية لا تزيد عن عامين فى كلية أخرى .

مادة (24): التحويل من جامعات أخرى

- لتحويل الساعات المعتمدة لمادة من جامعة أخرى، يجب على الطالب أن يكون حاصلا على الأقل على 2.0 في المادة. ويقرر القسم المختص عدد الساعات الدراسية المحتسبة للتحويل. ويعود قرار قبول الطالب في نفس التخصص إلى رئيس القسم.
- إذا كان الطالب محولا من جامعة لا تستخدم نظام الساعات الدراسية المعتمدة، يتم حساب درجاته في المواد المحولة وفقا للجدول التالي:

Conversion from Semester-based Systems

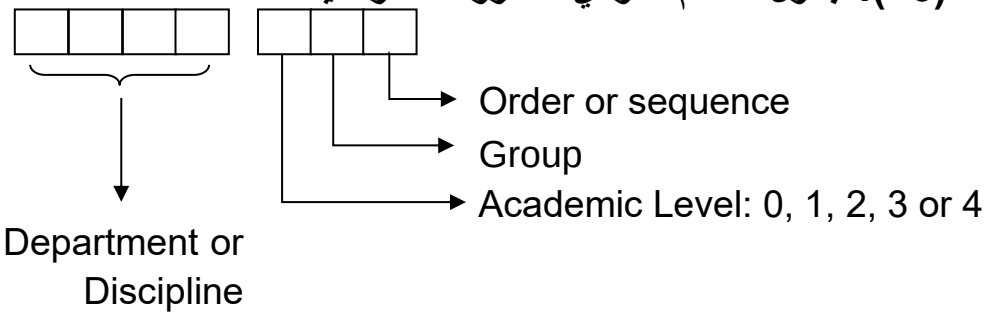
نظام الفصلين الدراسيين	نظام الساعات المعتمدة	
النسبة المئوية	عدد النقاط	التقدير
95% إلى أقل من 100%	4.50-5.00	A+
90% إلى أقل من 95%	4.00-4.4	A
85% إلى أقل من 90%	3.5-3.9	-A
80% إلى أقل من 85%	3.00-3.4	+B
75% إلى أقل من 80%	2.5-2.9	B
70% إلى أقل من 75%	2.00-2.4	+C
65% إلى أقل من 70%	1.5-1.9	C
60% إلى أقل من 65%	1.00-1.4	D

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

مادة (٢5): تشكيل لجان الممتحنين:

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

مادة (٢6): جدول النظام الكودي للمقررات الدراسية



متطلبات الجامعة

يحتوي الجدول التالي على بيان بمقررات متطلبات الجامعة موضحاً فيه ساعات المقررات بنظام الساعات المعتمدة الأمريكية

University General Education Requirements		
Course #	Course Name	#hrs.
ENGL 100	Intensive English	0
ENGL 101	English 101	0
ENGL 102	English 102	0
ENGL 201	Writing Skills	3
ENGL 202	Communication & Presentation Skills	3
HUMA 101	Introduction to Scientific & Critical Thinking	2
HUMA 102	Introduction to Ethics	2
HUMA 103	Selected Topics in Humanities & Arts	2
SSCI 101	Selected Topics in Egyptian & Arab Heritage	2
SSCI 103	Selected Topics in Social Sciences	2
Total # of Credits		**10**

توصيف مقررات متطلبات الجامعة ومتطلبات الكلية

Humanities and Social Sciences (University Requirements)

ENGL201: Writing Skills (3 Cr. Hrs)
PR: IELTS 6.5 or Equivalent. The goals of the course include: Locating materials for a research topic, using library and internet resources, summarizing articles and books, using quotation and source citation for professional papers, using inductive and deductive reasoning, developing the skills of scientific argumentation, persuasion, evaluation and criticism needed for a research paper.

ENGL202: Communication and Presentation Skills (3 Cr. Hrs)
PR: ENGL 201 Writing Skills. This course helps students learn and practice the skills of interpersonal and professional communication. Psychological, social, cultural and linguistic aspects of communication are considered. Attention is given to human perceptions, interpersonal dynamics, patterns of inference, the arts of listening and convincing, as well as to the value of verbal and visual symbols. The course also helps students improve their skills in oratory, argumentation and public presentation.

HUMA 101: Introduction to Logic, Critical Thinking (2 Cr. Hrs)
The course is a study of the processes by which the intellect conceptualizes, applies, analyzes, synthesizes, and evaluates the information it gathers from observation, experience, reflection, reasoning and communication. The course also examines the elements of thought implicit in reasoning, such as assumptions; concepts, conclusions, implications, consequences and frame of reference. Problems of moral philosophy and moral judgments, such as cultural relativism and subjectivism are also addressed. Theoretical approaches for answering questions about right and wrong are considered.

HUMA 102: Introduction to Ethics (2 Cr. Hrs)
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.

HUMA 103: Selected Topics in Humanities and Arts (2 Cr. Hrs)
A course in any of the fields of Literature, Philosophy, Art, Music, or Sports.

> **(Understanding Art)**: An investigation into the nature of the visual arts with an emphasis on the issues and ideas that artists explore through their work and how these ideas translate into the artwork. Attention will be given to the interpretation or reading of the artwork and how it may relate to society.
>
> **(Understanding Music)**: An introduction to the appreciation of music, its elements and basic forms of music, with particular emphasis on the composer's creative process and the listener's participation. Methods of analytical and aesthetic appreciation will be applied to musical examples, with corollaries in literature, history, theater, and the visual arts.
>
> **(Introduction to Humanities)**: An introduction to the humanities through the study of some of the major developments in human culture, trying to analyze the assumptions about the way societies are formed and how they express their ideas through art, literature,

architecture, music, and philosophy, developing conceptual tools to understand cultural phenomena.

SSCI 101: Selected Topics in Egyptian and Arab Heritage (2 Cr. Hrs)
A course highlighting aspect of the extraordinarily rich Ancient Egyptian, Coptic and Islamic heritage of Egypt.

SSCI 103: Selected Topics in Social Sciences (2 Cr. Hrs)
A course in any of the fields of sociology, economics, education, history, anthropology, psychology, or geography as outlined below:

(Introduction to Psychology): This is a Critical Thinking Approach to Psychology. Students learn about the key issues in Psychology and the methods that Psychologists use to research these issues and interpret the results. Students also look at Psychology in the News and learn to evaluate empirical results from 'Psychobabble.

(World Civilizations): This is a critical thinking course about the emerging market countries of India, China, and Brazil. By exploring the accomplishments of the past for these great countries, we can better understand their way of thinking; identify commonalities of experience; and develop tools for thinking about the future. In this way, we will be better prepared for partnerships in the globalized economy.

(ABBR-306): Biosecurity and Research Bioethics (2 Cr. Hrs)
A course highlighting aspect of the demonstrative of the ability to apply decisions in ethics -acquire the skills of literature surveying - analyzing information, interpreting, suggesting solutions-Introduce and expand understanding of essential concepts in applying ethics in new sciences - Fully understand biohazard accompanying wrong use of biotechnological science.

(IBRA-203): Introduction to Biosafety and Risk Assessment of GMOs (1 Cr. Hrs)
guidelines and regulation of biosafety – Biosafety levels 1, 2, 3 and 4 - the techniques used in biotechnology to perform microbiological risk assessment - Industrial Biosafety and Effluent Handling – Bioterrorism - Give some information about the safety of Genetically Modified Organisms(GMOs) - Know about introducing concept of copy genes patenting- Study the biosafety policies and procedures associated and use of biotechnological sciences. Appraise the role of biotechnology science to avoid environmental risks.

Management, Marketing and IPR in Biotechnology
Enable to gain an understanding of the major decisions faced by managers in their efforts to balance the organization's objectives against the needs and opportunities in the global marketplace. Relate theory to practice using an individual or group project throughout the course where students perform a market analysis of a particular Biotechnology product and promotion. Give an understanding of the critical issues in marketing and to equip them with concepts and models relevant to these issues. Acquire an understanding of basic marketing concepts which is essential for all areas of business, especially such relevant issues as product innovation, product launch, and the marketing mix.

توصيف مقررات البرنامج

Biotechnology Fundamental Courses

CHEMISTRY COURSES

(CHM-101): General Chemistry (4 Cr. Hrs.)
Theoretical Part:
In this course the key features of the general, physical and instrumental chemistry are explained including types of chemical bonds, atomic theory, stoichiometry, chemical equilibrium, chromatography, spectroscopy, mass spectrometry, infrared absorption, nuclear chemistry, provide the fundamentals of the physical phenomena driving chemical reactions
and chemical bonds, the concepts of thermodynamics, transfer phenomena, electrochemistry, surface phenomena, light interaction with chemical compounds, the molecular orbital theory and the crystal field theory

Practical Part:
The practical section is focused on qualitative/quantitative techniques of molecules' identification, along with the techniques and skills of chromatography and different spectroscopy types.

(CHM-102): Organic Chemistry (3 Cr. Hrs)
Theoretical Part:
This course is oriented mainly to examining all the essential organic molecules, their nomenclature, and principle reactions. It will introduce also the concepts of stereochemistry and the chemistry in 3d space uncovering the driving forces of the organic reactions. In addition, the nature of covalent bond will be detailly clarified.

Practical Part:
The practical course is a laboratory application of all the famous and fundamental reactions in organic chemistry as well as qualitatively identifying the organic compounds and synthesis of isomers.

(BCHM-204): Biochemistry (4 Cr. Hrs)
Theoretical Part:
This course is mainly addressing the biological molecules of all kinds, their biosynthesis and their biodegradation. Taking into consideration also the bioprocesses they are involved in with their regulation mechanisms. All molecules shall be introduced, then an overview of bioenergetics in the molecule folding process, after that each molecule type (proteins, carbohydrates, lipids, nucleic acids) shall be studied in detail to explain its synthesis and degradation. At the end two vital energy producing/storing bioprocesses shall be tackled which are the respiration and photosynthesis.

Practical Part:
This practical course is concerned with the qualitative and quantitative determination of different types of biomolecules, the separation of those molecules, as well as the biological reaction monitoring

BIOLOGY COURSES

(BIO-101): Introductory Biology (3 Cr. Hrs)
Introduction to Biological systems of plants and animals – Living organisms: Nutrition, Transport, Respiration, Excretion, Sensory Systems, Skeletal systems, Signaling system, Reproduction, Immune functions – Introduction to genetics – Gene Expression.

(BIO-102): Biology (General Cell & Developmental Biology) (4 Cr. Hrs)
Theoretical Part:
Living organisms - cell compartments, organelles and functions - cellular processes, transport, membranes, signaling, cytoskeleton, cell motility - organization of chromosomes and genes, meiosis, mitosis and cell cycle - gene expressions, gene regulation - developmental biology, embryogenesis - introduction to Darwinian evolution and phylogenic trees.

Practical Part:
Microscopy parts and handling techniques – animal vs plant cell – staining – animal, plant organelles – mitosis and cell cycle – meiosis and gametogenesis – samples and evolution (eubacteria, archaebacterial, Protista, fungi, plantae, animalia)

(MICR-203): Microbiology (3 Cr. Hrs)
Theoretical Part:
Introduction to microbial taxonomy, biodiversity and evolution – prokaryotic/eukaryotic microorganisms (Bacteria , Fungi & Actinomycetes)– microbial metabolism, growth, – contribution to nutrients cycles – microorganisms in agriculture, in health – disease initiation – antibiotics –– special biomolecular structures and uses - Microorganisms as Tools for Molecular Biotechnology.

Practical Part:
Sterilization techniques: heat, radiation, filtration, solvent - Microbial sampling (air, water, soil, surfaces) - Culture media preparation – microbial, yeast and mould – counting techniques – gram staining - Measuring efficacy of antimicrobial agents - Metabolites extraction from microbes RNA/DNA, Proteins - .

(GENI-203): Genetics-I (Classical & Advanced) (3 Cr. Hrs)
Theoretical Part:
This course will be concerned with the concepts of mendelian genetics, genetic analysis, chromosome theory, as well as all the basic chromosomal phenomena. Finally, it will introduce the different genetics of bacteria and viruses.

Practical Part:
This practical course will be concerned with establishing culture of different organisms and observe their genetic variance thus apply gene analysis techniques on observational data, perform breeding, sex determination and control, explain the transgenic organisms as well as polyploidy, mastering Mendelian randomization techniques, finally human cancer genetics will be introduced with some of the related diseases.

(MCPH-203): Microbial Physiology (3 Cr. Hrs)

Theoretical part

Introduce the structure/function relationship in the microbial cell and its constituents. Explore the basics of microbial physiology, and the major cycles for growth and energy production. Illustrate the use of microorganism in producing beneficial goods and services and the role of microorganisms in recycling and in degrading harmful pollutants.

Practical part

Provide the basic knowledge about various types of microorganisms. Provide knowledge about the structure, morphology, components of the microbial cell. Explore how microorganism maintain itself in a balanced state in the biosphere.

(HIST-203): Histology (3 Cr. Hrs)

Theoretical part

Morphology of animal tissues -Morphology of plant tissues - Plant systems: support, circulatory, respiratory, nutrition, reproductive, sensations - Animal systems: skeletal, cardiovascular, respiratory, digestive, excretory, reproductive, nervous.

Practical part

Histological identification of tissues - Anatomy of animal body - Paraffin blocks/ slide preparation - Monitoring body functions - Plant anatomy, histology.

(BIOT-204): Introduction to Biotechnology (2 Cr. Hrs)

This course will introduce at first the colors of biotechnology, then with explain every branch of biotechnology in more details, then new tools helping the evolution of biotechnology, such as data bases and automation, will be considered, finally the mutual impact of the biotechnology on the society and vice versa will be studied, starting from ethics, products, media coverage and reaching the technology transfer.

(MBIO-204): Molecular Biology (4 Cr. Hrs)

Theoretical Part

Acquire a good basic grounding in the molecular structure, organization, and function of the genetic material in different organisms. Distinguish between different types of molecular markers. Critically appraise the different methods used in molecular mapping. Study the applications of genetic analysis in different organisms. Provide a focus on eukaryotic gene structure, expression, regulation, and analysis. Emphasize on current understanding of gene expression and methods used to study gene expression.

Practical Part

Characterization of the genetic material, direct and indirect evidence that DNA is the genetic material in prokaryotes and eukaryotes, distinguish between different techniques used in gene isolation.

PHYSICS COURSES

(BPHY-102): Biophysics (4 Cr. Hrs)
Theoretical Part:
PR: This course is concerned with the study of physics laws manifested in biology, how physics properties are measured and how they are used to study, with more depth, the biological phenomena.

Practical Part:
Testing biophysical methods and techniques. Carrying out experiments with safety factors; using virtual labs are presented to dangerous experiments apart from its real contamination.

(PHY-101): Physics (4 Cr. Hrs)
Theoretical Part:
Displays a broad spectrum of different theories and concepts of physics from classical physics, Newtonian mechanics- electromagnetism- fluids mechanics - optics, to quantum mechanics, as well as a brief introduction to the relativity principle.

Practical Part:
This course will put into practice the experiments related to the basic concepts of physics such as the laws of motion, energy transfer, special relativity, time dilation, fluid mechanics, fluid dynamics, thermodynamics, circuits, semiconductors, statistical physics, magnetism, electromagnetism, and mechanical waves.

MATH COURSES

(BIPD-305): Advanced Programming and Data (3 Cr. Hrs)
This course explains in depth different concepts of object-oriented programming (OOP) using Python. In addition, other important programming aspects including data structures and algorithms will be covered. The main goal of this course is to prepare students to reach advanced level in programming. The course explains some of the key algorithms used in the analysis of biological data. The course covers different algorithms used in preprocessing of raw sequencing data, alignment, mapping of short DNA and RNA-Seq reads, querying biological databases, phylogenetic tree construction and other algorithms for RNA secondary structure prediction and protein molecular docking. This course aims to facilitate deep understanding of algorithms behind bioinformatic software, which will help in fine tuning its parameters, that in return will lead to meaningful biological insights from raw data.

(PSTA-102): Introduction to Probability and Statistics (3 Cr. Hrs)
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 (Mean, Median, Mode, …) of raw data and grouped data– Measures of dispersion (Range, Variance and standard deviation, Interquartile Range) of raw data and grouped data– 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, Hypergeometric distribution and Normal distribution).

(BSDA-204): Biostatistics and Data Analysis (3 Cr. Hrs)
This course is an introductory course inferential statistic and their applications in Biology field. The course focuses initially on point and interval estimating for population parameters based on sample parameters, and test of hypotheses, analysis of variance one & two way and regression analysis.

(BIDV-305): Data Analysis and Visualization (3 Cr. Hrs)
The main goal of this course is to teach students how to take data - that at first glance - has little meaning, process and manipulate it in a form of useful knowledge. Various techniques have been developed for presenting data visually. However, in this course, we will be using several data visualization libraries in Python, namely Matplotlib and Seaborn.

(BIMO-305): Discrete Mathematics and Optimization (3 Cr. Hrs)
A course designed to prepare math, computer science and engineering majors for a background in abstraction, notation and critical thinking for the mathematics most directly related to computer science. Topics include logic, proof techniques, mathematical induction, recursion, recurrence relations, matrices, basic set theory, relations, functions, Trees, and graph theory.

(FDB-102): Fundamentals of Databases (3 Cr. Hrs)
The aim of the course is to acquaint the student with the fundamentals of databases. The greater part of the course is devoted to the relational database model which is a dominant database model on the field of software. During the classes in the laboratory students get the practical knowledge and gain the skills which enable them to design and to create correct schemas of relational databases. Further, the students create and use various queries in MS-SQL language to modify data stored in MS-SQL databases.

(ICS-101): Introduction to Computer Science / Computer and Information Skills (3 Cr. Hrs)
This course introduces general computer and information technology concepts, presents topical issues related to the digital society, and introduces students to computational thinking though introductory computer programming.

(PROG-203): Introduction to Programming (3 Cr. Hrs)
This course introduces computer programming using the Python programming language. Emphasis is placed on procedural programming, algorithm design, and language constructs common to most high-level languages. A brief introduction to Python classes and object-oriented design is included. Upon completion, students should be able to design, code, test, and debug Python language programs.

(PCAL-101): Pre-Calculus (3 Cr. Hrs)
This course is an introduction to Calculus of single variable where the students will discuss the properties of polynomial functions, rational functions, trigonometric functions, and their domains. The students learn the concepts of inverse and composite functions Followed by the concept of limits and the evaluation techniques. Then, the fundamentals of differentiation, rules, and applications. Last part of this course will investigate the basic definitions of indefinite and definite integrals with their techniques as well as some related applications.

(BMAT-102): Basic Mathematics (Calculus & Algebra) (3 Cr. Hrs)
The first aim of this course is to discuss the Calculus of multi-variables including the concepts, fundamentals, and applications. The course starts with partial derivatives, divergence theory, and related applications. Then, the double and triple integrals with their applications (area between two curves, volume, and the surface area). The last part focuses on the Ordinary Differential Equations and applications. This will cover the types of ODEs, and different ways of analytical solutions in addition to the applications.

(MatA-203): Mathematical Analysis (Differential & Integral Calculus) (3 Cr. Hrs)
This course focuses on the linear algebra, fundamentals, and some related applications. The course starts with the basics of matrices and determinants, solution of any linear system of equations by

different techniques. The concept of eigenvalues and eigenvectors will be discussed in detail with several examples. Various applications related to linear matrix form and the physical interpretation of the solutions set will be investigated through the course related to the biotechnology fields.

(BINA-407): Numerical Analysis (3 Cr. Hrs)

The aim of the course is intended to introduce students to those areas of applied mathematics that are most relevant for solving practical problems. A course in elementary calculus is the sole prerequisite.

In this course, the students will know the basic definitions in Numerical analysis, methods of finding roots of nonlinear equation and nonlinear systems of equations. Followed by the understand characteristics of large systems of linear equation. Then deploy methods of approximation as interpolation and least square. The concepts of Numerical differentiation and integration will be discussed in detail with several methods. The last part focuses on the Ordinary Differential Equations (ODEs) and Partial Differential Equations (PDEs). This will cover the types of PDEs, and different ways of approximation solutions in addition to the applications.

(INANO-204): Introduction of Nanotechnology

Basic concepts of nanotechnology - History of nanotechnology -Natural nanomaterials Classification of synthetic nanomaterials - Synthesis of metallic nanoparticles by physical, chemical and biological methods - Synthesis of polymeric nanoparticles - Microscopic techniques for characterization techniques of nanomaterials- Non-microscopic techniques for characterization techniques of nanomaterials - Environmental applications of nanotechnology -Pharmaceutical, Medical ,Agriculture and Industrial applications of nanotechnology.

Specialization #1: Applied Biotechnology

(ABBP-306): Bioproducts and Bioprocessing (3 Cr. Hrs)
Bioreactors: Types, Designs, Operations, Sterilization, Energy Management - Fermentation Process, Upstream Process – Micro-organismal Growth – Microbial Cultures – Downstream Process

(ABGEI-305): Genetic Engineering-I (3 Cr. Hrs)
Chromosome Engineering: Mammalian, Plant – Replication, Transcription, Translation, Transposition – Epigenetic Regulation – Gene Mutation and Repair – RNA Functions, Types, Regulation, Editing – DNA Technology

(ABGEII-306): Genetic Engineering-II (3 Cr. Hrs)
RNA Editing Techniques - Genetic Engineering: Plants, Animals – Molecular Pharming – Gene Therapy – Regenerative Medicine – Genome Engineering

(GenII-305): Genetics-II (molecular cytogenetics and phylogenetics) (3 Cr. Hrs)
Chromosomal Organization Molecular Mechanism – Gene Mapping – Chromosomal Anomalies: Animal, Plant – Cytogenetic Techniques –Phylogenetics: Introduction, Molecular Characteristics, Trees.

(ABIV-305): Immunology & Virology (3 Cr. Hrs.)
Theoretical Part
Immunity: Organs, Cells, Molecules – Innate Immunity vs Adaptive Immunity – Vaccine Technology – Immunology of Neonates – Synthetic Immunology – immunodiagnostic methods including immunoblotting techniques, viral replication -disease initiation - viruses, molecular mechanisms and viral genetics.

Practical part
Practical experience of the production of monoclonal antibodies, production and characterization of antibodies and enzyme-labelled antibodies, blood immunoproteins and their fixation, immunofluorescence techniques, Introduction to viral culture, Viral genomes are contained in metastable particles, Genomes encode gene products that promote an infectious cycle (mechanisms for genomes to enter cells, replicate, and exit in particles). Infection patterns range from benign to lethal; infections can overcome or co-exist with host defenses.

(OmicI-306): Omics-I (Genomics & Transcriptomics) (3 Cr. Hrs.)
Genes Expression Profiling - Model Organisms - Animal and Plant Genome: Evolution, Sequencing, analysis, Assembly - Modelling of Gene Structure – Gene Interactions, Gene Function – Diagnostic Tools of Genomics, Disease Genomics.

(OmicII-407): Omics-II (Metabolomics: proteomics, Lipidomic, glycemic) (3 Cr. Hrs.)
Introduction – Protein Arrays, Chips, Interaction Mapping, Structure, Function – Disease Proteomics – Lipid Profiling, Types – Glycans, Glycoproteins, Glycobioinformatics' Tools.

(ABAS-407): Animal Tissue Culture and Stem cell technology (3 Cr. Hrs.)
Embryology: Animal, Human, Stem Cells – Nuclear and Somatic Cell Genetic Reprogramming – Stem Cells Epigenetics, Therapeutics, Bone Tissue Regeneration, Tissue Scaffolds, Growth Regulation – Mechano-transduction in Stem Cells. organ transportation in animals – stem cells and artificial organs- animal cloning.

(MCBI-305): Molecular and Cellular Biology (3 Cr. Hrs)
Cell Cycle and Molecular Regulation - Prokaryotes and Eukaryotes Cell Cycles – Cell Growth – Development of a Tissue – Plasma Membrane and Cell Adhesion, Transport - Cell Communication and Signaling Pathways – Cell Aging, Death and Culture.

(ABPT-305): Plant tissue culture (3 Cr. Hrs)
Introduce the concepts of cell and tissue culture. Teach the basic knowledge and skills essential to the successful cultivation of plant cells and tissues, micropropagation of plants Expose the student, using primary cell lines, to sterile technique, media preparation and sterilization. Familiarize the students with cryopreservation. Explore development phenomena in tissue culture cells. Provide information about equipment, procedures and terminology of aseptic culture.

(ABNB-407) Nano-biotechnology & Bio-Nanotechnology (2 Cr. Hrs)
In this course, the students will know the definition of nano-biotechnology, difference between Nano-biotechnology &Bio-nanotechnology, application of bio-nanotechnology" gene therapy, cell culture, embryo culture system (sperm and oocyte isolation), stem cell technology, cellular imaging and biosensors. Application of Bio-nanomachine for biomolecular structure determination as X-ray crystallography provides atomic structure of proteins and Atomic force microscopy probes the surface of biomolecules, Nanotoxicity.

(MCIN-407): Industrial Microbiology (3 Cr. Hrs)
The relation between structure and function in the microbial cell and its constituents, Introduction to Fermenter, Industrial sterilization, Scale up fermentations, Types of fermenters, , Industrial production of penicillin, Industrial production of enzymes, introduction; general aspects, production of amylases & proteases, production of single cell proteins, production of yeast/ mushrooms, production of fermented foods, production of microbial insecticides, production of Biopolymers, Biofuels, biogas, production of Bioplastics, Biosurfactants, and Biofertilizers.

(PABT-407): Practical Applied Biotechnology (3 Cr. Hrs)
This is a practical course in the seventh semester, aims to provide students to the principles and practices of several biotechnology techniques Real Time PCR, Genome analysis, sequencing big project, Southern ,Northern and Western blotting where students should be able to apply all of what they have learned in previous semesters to reproduce results of one of the state-of-art journal publications.

(BITR-407): Training (3 Cr. Hrs)
The aim of the course is to obtain practical skills through visits to biotechnological factories or farms and research laboratories in different faculties or research centers, this will facilitate and start relationships between students and stakeholders, honors and work managers who will stand on students capabilities and skills which will in turn enable the graduates of being employed in the future.

(ABBP-408): Applied Biotechnology Bachelor Project (3 Cr. Hrs)
Students spend the last semester conducting experiments and writing their thesis. Topics are related to modification or analyzing biological data with the aim of finding biological interesting insights.

Specialization #2: Bioinformatics

(IBBD-305): Introduction to Bioinformatics and Biological Databases (2 Cr. Hrs)
This course covers the basic concepts required for students to retrieve, manipulate and analyze biological data available on public online repositories. It provides a useful introductory guide required for furthers high throughput NGS biological data analysis.

(SBMB-407): Systems Biology and Modeling of Biological Networks (3 Cr. Hrs)
Theoretical Part
Introduction, Mechanistic and Modular Approaches, Mathematical Modeling, Graph Classifying Techniques – Properties of Biological Networks – Computational Tools – Metabolic Flux, Networks – Systems Biology for Infectious Disease, Brain Functions and Cancer.

Practical Part
The course covers different methodologies for understanding and analyzing biological systems, link the gap between cell functions with the state of the disease and how people respond to drugs and how biological systems can be represented mathematically, types and topologies of biological networks and using differential equations to model biological networks.

(CADD-407): Computer Aided Drug Discovery (3 Cr. Hrs)
This course covers different recent techniques and methods used in computer-aided drug design. The course describes pipelines for drug development and its associated computational chemistry. Additionally, informatics approaches for the prediction of chemical properties, description of lead candidates and datasets are explained. Different software for protein-ligand docking, de-novo design, and virtual screening will be addressed.

(BIDM-306): Data Mining and Machine Learning (3 Cr. Hrs)
This course covers the basic concepts of machine learning and data mining providing a fundamental knowledge about different algorithms used in machine learning and statistical data analysis, key data mining techniques, data mining algorithms over tabular data and application of algorithms over textual data.

(NGSA-306): Next Generation Sequencing Analysis (3 Cr. Hrs)
This course covers basic Linux OS introduction starting from installation and command line interface to the knowledge required for dealing with the Next Generation Sequencing (NGS) data and numerous analysis software. This course also will introduce different sequencing technologies, various software for data analysis, and online repositories for next generation sequencing (NGS) data.

(BIBS-306): Algorithmic Bioinformatics and Sequence analysis (3 Cr. Hrs)
The course explains some of the key algorithms used in the analysis of biological data. The course covers different algorithms used in preprocessing of raw sequencing data, alignment, mapping of short DNA and RNA-Seq reads, querying biological databases, phylogenetic tree construction and other algorithms for RNA secondary structure prediction and protein molecular docking. This course aims to facilitate deep understanding of algorithms behind bioinformatic software, which will help in fine tuning its parameters, that in return will lead to meaningful biological insights from raw data.

(BICB-306): High Performance Computing and Big Data for Bioinformatics (3 Cr. Hrs)
This course provides students in the bioinformatics track an accelerated introduction to the basics of high-performance computing of big data, focusing on biological data as an emerging example of big data. The course covers different trends in big data computing, handling and processing of big data, solutions for big data computing and recent applications of big data in bioinformatics.

(BINP-407): Computation Nanotechnology & High-Performance computing (2 Cr. Hrs.)
This course provides students a possibility to simulate models of different nanostructures, nanostructure materials and processes at the nano-level. Fast, efficient and intelligent algorithms applicable for solving problems ranging from quantum to microphysics are readily available for usage by scientists and SME's representatives. The computations of large-scale systems provide realistic explanations of phenomena in complex systems.

(PABI-407): Practical Bioinformatics (3 Cr. Hrs)
This is a practical course in the seventh semester, where students should be able to apply all of what they have learned in previous semesters to reproduce results of one of the state-of-art journal publications. By being engaged in a complete research, students should be ready to start their graduation project after completing this practical course smoothly.

(BITR-407): Training (3 Cr. Hrs)
The aim of the course is to obtain practical skills through visits to factories or research laboratories in different faculties or research centers, this will facilitate and start relationships between students and stakeholders, honors and work managers who will stand on students capabilities and skills which will in turn enable the graduates of being employed in the future.

(BIBP-408): Bioinformatics Bachelor Project (3 Cr. Hrs)
Students spend the last semester conducting experiments and writing their thesis. Topics are related to either software development/modification or analyzing biological data with the aim of finding biological interesting insights.

Program Curriculum الخطة الدراسية

First Level (Year) / First Semester (Fall)

Subject	Status	Course Code	Course Title	Credit Hour			Total Cr. Hrs	Prerequisites
				Lecture	Tutorial	Lab		
Writing Skills	UR	ENGL-201	Writing Skills	3	0	0	3	———
Communication & Presentation Skills	UR	ENGL-202	Communication & Presentation Skills	3	0	0	3	———
Chemistry	Core	Chm-101	General Chemistry	2	2	2	4	———
Physics	Core	Phy-101	Physics	2	2	2	4	———
Biology (Core for Math major students)	Core	Bio-101	Introductory Biology	2	0	2	3	———
OR								
Mathematics (Core for science major students)	Core	PCal-101	Pre-Calculus	2	2	0	3	———
Computer Science	Core	ICS-101	Introduction to computer science	2	2	0	3	———
Total Credit Hour				**15**	**10**	**6**	**20**	

First Level (Year) / Second Semester (Spring)

Subject	Status	Course Code	Course Title	Credit Hour			Total Cr. Hrs	Prerequisites
				Lecture	Tutorial	Lab		
Chemistry	Core	CHM-102	Organic Chemistry	2	0	2	3	CHM-101
Physics	Core	BPHY-102	Biophysics	2	2	2	4	PHY-101
Biology	Core	BIO-102	Biology	2	0	4	4	BIO-101
Mathematics	Core (BI) Elective (AB)	PSTA-102	Introduction to Probability & Statistics	2	2	0	3	———
Mathematics	Core	BMat-102	Basic Mathematics (Calculus & Algebra)	2	2	0	3	———
Computer Science	Core	FDB-102	Fundamental of Databases	2	0	2	3	———
Total Credit Hour				**13**	**4**	**10**	**20**	

Second Level (Year) / First Semester (Fall)

Subject	Status	Course Code	Course Title	Credit Hour			Total Cr. Hrs	Prerequisites
				Lecture	Tutorial	Lab		
Second Language	UR		French-I /German-I /Spanish-I **(A1)**	1	0	0	1	———
Biology	Core	GENI-203	Genetics-I	2	0	2	3	CHM-101, BIO-101, BIO-102
Microbiology	Core (AB)	MICR-203	Microbiology	2	0	2	3	BIO-101, BIO-102
Biology	Core	MCPH-203	Microbial Physiology	2	0	2	3	BIO-101, BIO-102
Biology	Core (AB) Elective (BI)	HIST-203	Histology	2	0	2	3	BIO-101, BIO-102
Mathematics	Elective	MATA-203	Mathematical Analysis	2	2	0	3	BMAT-101
Computer Science	Core	PROG-203	Introduction to Programming	2	0	2	3	ICS-101
Biosafety	FR	IBRA-203	Introduction to Biosafety & Risk Assessment of GMOs.	1	0	0	1	———
Total Credit Hour				**13**	**2**	**10**	**20**	

Second Level (Year) / Second Semester (Spring)

Subject	Status	Course Code	Course Title	Credit Hour			Total Cr. Hrs	Prerequisites
				Lecture	Tutorial	Lab		
Second Language	UR		French-II /German-II /Spanish-II **(A2)**	1	0	0	1	———
Heritage	UR	SSCI-101	Selected topics in EG & Arab Heritage	2	0	0	2	———
Chemistry	Core	BCHM-204	Biochemistry	2	0	4	4	CHM-101, CHM-102
Mathematics	Core	BSDA-204	Biostatistics & Data Analysis	2	2	0	3	PSTA-203, BMAT-101
Biology	Core	MBIO-204	Molecular Biology	2	0	4	4	GENI-203, CHM-101, Bio-101, BIO-102
Biotechnology	Core	BIOT-204	Introduction to Biotechnology	2	0	0	2	———
Nanotechnology	Elective	INANO-204	Introduction to Nanotechnology	2	0	0	2	———
Humanities & Social Science	UR	HUMA-101	Scientific & Critical Thinking	2	0	0	2	
Total Credit Hour				**15**	**2**	**8**	**20**	

Curriculum for "Applied Biotechnology" Specialization

Third Level (Year) / First Semester (Fall)

Subject	Status	Course Code	Course Title	Credit Hour			Total Cr. Hrs	Prerequisites
				Lecture	Tutorial	Lab		
Second Language	UR		French-III /German-III /Spanish-III **(BI)**	1	0	0	1	———
Humanities & Social Science	UR	HUMA-103	Selected topics in Humanities & Arts	2	0	0	2	———
Biology	Core	GENII-305	Genetics-II	2	0	2	3	GENI-203, BIO-101, BIO-102, CHM-101, CHM-102, BCHM-204
Biology	Core	MCBI-305	Molecular & Cellular Biology	2	0	2	3	GENI-203, BIO-101, BIO-102, CHM-101
Bioinformatics	Core	IBBD-305	Introduction to Bioinformatics	2	0	0	2	PSTA-203, MATA-102, BMAT-101, ICS-101, FDB-102, PROG-203
Biotechnology	Core	ABGEI-305	Genetic Engineering-I	2	0	2	3	GENI-203, BIO-101, BIO-102, CHM-101, CHM-102, BCHM-204, MIVI-203, MCPH-203
Biology	Core	ABIV -305	Immunology & Virology	2	0	2	3	BCHM-204, MIVI-203, BIO-101, BIO-102, MBIO-204, GENI-203, CHM-101, CHM-102
Biotechnology	Core	ABPT-305	Plant Tissue Culture	2	0	2	3	PHHI-203, BIO-101, BIO-102, BCHM-204
Total Credit Hour				**15**	**0**	**10**	**20**	

Third Level (Year) / Second Semester (Spring)

Subject	Status	Course Code	Course Title	Credit Hour			Total Cr. Hrs	Prerequisites
				Lecture	Tutorial	Lab		
Second Language	UR		French-IV /German-IV /Spanish-IV **(BI+)**	1	0	0	1	———
Humanities & Social Science	UR	HUMA-103	Selected topics in Humanities & Arts	2	0	0	2	———
Bioinformatics	Core	OMICI-306	Omics-I	2	0	4	4	MCBI-305, GENI-203, GENII-305, BIO-101, BIO-102, CHM-101, CHM-102, BCHM-204
Computer Science	Elective	NGSA-306	Next Generation Sequencing Analysis	2	0	2	3	PROG-203, ICS-101, MATA-102, BMAT-101
Biotechnology	Core	ABBP-306	Bioproducts & Bioprocessing	2	0	2	3	MCBI-305, GENI-203, GENII-305, ABGEI-305, BIO-101, BIO-102, CHM-101, CHM-102, MIVI-203, BCHM-204, PHHI-203
Biotechnology	Core	ABGEII-306	Genetic Engineering-II	2	0	2	3	ABGEI-305, GENI-203, GENII-305, BIO-101, BIO-102, CHM-101, CHM-102, BCHM-204, MIVI-203, PHHI-203
Biosecurity & Research Bioethics	FR	ABBR-306	Biosecurity & Research Bioethics	2	0	0	2	
Humanities & Social Science	UR	SSCI-103	Selected topics in Social Science	2	0	0	2	
Total Credit Hour				**15**	**0**	**8**	**20**	

Fourth Level (Year) / First Semester (Fall)

Subject	Status	Course Code	Course Title	Credit Hour			Total Cr. Hrs	Prerequisites
				Lecture	Tutorial	Lab		
Second Language	UR		French-IV /German-IV /Spanish-IV **(B2)**	1	0	0	1	———
Bioinformatics	Core	OMICII-407	Omics-II	2	0	2	3	OMICI-306, MCBI-305, GENI-203, GENII-305, BIO-101, BIO-102, CHM-101, CHM-102, BCHM-204
Bioinformatics	Core	SBMB-407	System Biology & Modeling of Biological Networks	2	0	2	3	MCBI-305, GENI-203, BIO-101 BIO-102, CHM-101
Microbiology	Core	MCIN-407	Industrial Microbiology	2	0	2	3	BIO-101, BIO-102, BCHM-204, MICR-203
Bioinformatics	Elective	CADD-407	Computer Aided Drug Discovery	2	0	2	3	ICS-101, IBBD-305, PSTA-203, MATA-102, BMAT-101, PROG-203
Biotechnology	Core	ABAS-407	Animal Tissue culture & Stem cell technology	2	0	2	3	MCPH-203, BIO-101, BIO-102, BCHM-204
Nanotechnology	Elective	ABNB-407	Nanobiotechnology & BioNanotechnology	2	0	0	2	INANO-204, BIO-101, BIO-102, BCHM-204
Biotechnology	Elective	PABT-407 OR ABTR-407	Practical Biotechnology OR Training	0	0	6	3	———
Total Credit Hour				**11**	**0**	**16**	**21**	

Fourth Level (Year) / Second Semester (Spring)

Subject	Status	Course Code	Course Title	Credit Hour
Biotechnology		ABBP-408	Applied Biotechnology Bachelor Project	12
+3 Electives				6
Total Credit Hour				**18**

Curriculum for "Bioinformatics" Specialization

Third Level (Year) / First Semester (Fall)

Subject	Status	Course Code	Course Title	Credit Hour			Total Cr. Hrs	Prerequisites
				Lecture	Tutorial	Lab		
Second Language	UR		French-III /German-III /Spanish-III **(BI)**	1	0	0	1	———
Humanities & Social Science	UR	HUMA-103	Selected topics in Humanities & Arts	2	0	0	2	———
Biology	Core	GENII-305	Genetics-II	2	0	2	3	GENI-203, BIO-101, BIO-102, CHM-101, CHM-102, BCHM-204
Biology	Elective	MCBI-305	Molecular & Cellular Biology	2	0	2	3	GENI-203, BIO-101, BIO-102, CHM-101
Bioinformatics	Core	IBBD305	Introduction to Bioinformatics	2	0	0	2	PSTA-203, MATA-102, BMAT-101, ICS-101, FDB-102, PROG-203
Mathematics	Core	BIMO-305	Discrete Mathematics & Optimization	2	2	0	3	BSDA-204, PSTA-203, BMAT-101, MATA-102
Bioinformatics	Core	BIDV-305	Data Analysis & Visualization	2	2	0	3	BSDA-204, PSTA-203, BMAT-101, MATA-102
Bioinformatics	Core	BIPD-305	Advanced Programming & Data	2	2	0	3	PROG-203, ICS-101, FDB-102
Total Credit Hour				**15**	**6**	**4**	**20**	

Third Level (Year) / Second Semester (Spring)

Subject	Status	Course Code	Course Title	Credit Hour			Total Cr. Hrs	Prerequisites
				Lecture	Tutorial	Lab		
Second Language	UR		French-IV /German-IV /Spanish-IV **(BI+)**	1	0	0	1	———
Humanities & Social Science	UR	HUMA-102	Introduction to Ethics	2	0	0	2	———
Bioinformatics	Core	OMICI-306	Omics-I	2	0	4	4	MCBI-305, GENI-203, GENII-305, BIO-101, BIO-102, CHM-101, CHM-102, BCHM-204
Computer Science	Elective	NGSA-306	Next Generation Sequencing Analysis	2	0	2	3	PROG-203, ICS-101, MATA-102, BMAT-101
Bioinformatics	Core	BICB-306	High-Performance computing & Big Data for Bioinformatics	2	2	0	3	FDB-102, IBBD-305, PSTA-203, MATA-102, BMAT-101, ICS-101, PROG-203
Bioinformatics	Elective	BIBS-306	Algorithmic Bioinformatics & Sequence analysis	2	2	0	3	BMAT-101, MATA-102, ICS-101
Bioinformatics	Core	BIDM-306	Data Mining & Machine Learning	2	0	2	3	BSDA-204, PSTA-203, BMAT-101, MATA-102, FDB-102
Humanities & Social Science	UR	SSCI-103	Selected topics in Social Science	2	0	0	2	
Total Credit Hour				**15**	**4**	**8**	**20**	

Fourth Level (Year) / First Semester (Fall)

Subject	Status	Course Code	Course Title	Credit Hour			Total Cr. Hrs	Prerequisites
				Lecture	Tutorial	Lab		
Second Language	UR		French-IV /German-IV /Spanish-IV **(B2)**	1	0	0	1	———
Bioinformatics	Core	OMICII-407	Omics-II	2	0	2	3	OMICI-306, MCBI-305, GENI-203, GENII-305, BIO-101, BIO-102, CHM-101, CHM-102, BCHM-204
Bioinformatics	Core	SBMB-407	System Biology & Modeling of Biological Networks	2	0	2	3	MCBI-305, GENI-203, BIO-101, BIO-102, CHM-101
Bioinformatics	Elective	CADD-407	Computer Aided Drug Discovery	2	0	2	3	ICS-101, IBBD-305, PSTA-203, MATA-102, BMAT-101, PROG-203
Mathematics	Core	BINA-407	Numerical Analysis	2	2	0	3	OMICI-306, MCBI-305, GENI-203, GENII-305, BIO-101, BIO-102, CHM-101, CHM-102, BCHM-204, BMAT-101, MATA-102
Nanotechnology	Elective	BINP-407	Computation Nanotechnology & High- Performance Computing	2	0	0	2	INANO-204, BICB-306, FDB-102, IBBD-305, PSTA-203, MATA-102, BMAT-101, ICS-101, PROG-203
Bioinformatics	Elective	BIPB-407 OR BITR-407	Practical Bioinformatics OR Training	0	0	6	3	———
Total Credit Hour				**11**	**2**	**14**	**19**	

Fourth Level (Year) / Second Semester (Spring)

Subject	Status	Course Code	Course Title	Credit Hour
Bioinformatics		BIBP-408	Bioinformatics Bachelor Project	12
+3 Electives				6
Total Credit Hour				**18**

Faculty Recruitment Vision for the Biotechnology School

Since it is the first experience of Nile University to establish a life science school, the majority of Biotechnology faculty members will be freshly joining NU for the first time to contribute in teaching, and establishment of different research centers.

Staff members will be selected after passing through personal and professional interviews for the interested candidates, who will submit quality proposals proved to enhance development both as teachers and as innovators.

The following recruitment plan is accordingly planned

Year	Number of equivalent full-time faculty	Number of students	Percentage
Year 1	4	132 (intake 1)	1:33
Year 2	9	132+165 (intake 2)	1:33
Year 3	15	132+165+ 198 (intake 3)	1:33
Year 4	23	132+165+198+ 250 (intake 4)	1:33
Year 5	27	165+198+250+250 (intake 5)	1:33
Year 6	29	198+250+250+250 (intake 6)	1:33
Year 7	30	250+250+250+250 (intake 7)	1:33

It should be noted that, the above calculated numbers might vary according to;

1- The rate of students' intake every year.
2- The school requirements of certain unique specializations at specific courses of the specialized tracks.
3- The involvement of Biotech instructors at extra courses offered at other different programs in NU.

Until the newly established school is capable of building up its own academic capacities, faculty members are planned to be recruited based on either full time or part time positions. Those faculty members will be attracted from;

1) Governmental universities, especially the partner universities.
2) PhD holders, Associated Professors & Professors appointed at research centers, but are qualified for serving at educational institutions.
3) Non-academic PhD holders from the industry. This category is crucial for fulfilling the school vision at exposing the students to the job market requirements.
4) Candidates already enrolled at PhD scholarship programs outside Egypt, and are obliged to return back home referring to their scholarships regulations, though are not affiliated to any academic institution at home.

Since NU has recently signed a partnership agreement with the University of Oviedo (UNIOVI) - Spain, faculty members from UNIOVI will be also contributing both at teaching and implementing research activities at the Biotech program in NU.

Proposal of Required Labs for the Biotechnology School

Labs Distribution & Required Phases

Type of Lab	Time Line
Basic Labs	2019 -2020
Biology Chemistry (Instrumental) Physics Computer Science	
Chemistry (Organic) Microbiology	2020-2021
Advanced Labs	2021-2022
Mammalian Cell Culture Plant Cell Culture + *Green House - extension of plant cell culture* Molecular Biology Lab (A, B & C) Histology & Immunohistochemistry Bioinformatics Metabolomics (Advanced Analytical Chem.)	
Central Labs	2021-2022
Microscopic Facility, Cooling & Freezing Facility, Cold Room Animal housing, breeding, operation & exp. Bio-Nanotechnology facility, Sterilization facility	

***Beside the above laboratories, lab spaces for research groups of academic staff and research assistants shall be allocated.**

Equipment Required for Establishment of Laboratory Facilities for the Biotechnology School (Nile University)

Basic Labs

I. Biology

- Lab capacity sufficient for 20 -25 students
- Normal light microscopes of the same number
- Normal dissection microscopes

II. Chemistry

- Instrumental analysis (Spectrophotometers)
- Organic chemistry (Fume Hoods)
- Lab capacity sufficient for 20 -25 students
- Required equipment will be precisely listed by the specialized Chemistry instructors

III. Physics

- Lab capacity sufficient for 20 -25 students
- Required equipment will be precisely listed by the specialized Physics instructors

IV. Microbiology;

- Vertical Laminar Air flow
- Incubator
- Ice making machine
- Sources of gas & water

V. Computer Science:

- Core i7, 16GB RAM, 500 GB HD

Advanced Labs

I. Mammalian Cell Culture Facility

- Laminar air flow (S2) - (HERA SAFE KS15)
- Fluorescent inverted microscope - with camera (Leica)
- C02 Incubator & Cylinders
- Centrifuge (15 ml)
- Elisa reader & washer
- Water Bath
- Micro centrifuge - Eppifuge (Sigma)
- Vortex
- Thermo mixer

II. Plant Cell Culture Lab

- Laminar Air flow

- Incubator
- Refrigerator
- Water bath
- Stands for organ / callus cultures
- Green house facility is required outdoors as an extension

III. Molecular Biology Lab

A] Nucleic acids extraction

- Cooling micro-centrifuge (Eppendorf)
- Bench top cooling centrifuge (fixed angle & swing head) - (Sigma)
- Bio photometer (Eppendorf)
- Freezer (-20)
- Refrigerator
- Shaker Water bath
- Oven
- Heating block
- Heating magnetic stirrer
- Homogenizer
- Vortex
- Ice making machine

B] PCR Cocktail preparation, amplification & sequencing

- PCR Cabinet
- Thermal cycler (conventional PCR
- ABI real time PCR (StepOne Plus)
- Sequencer (Ion torrent S5 or illumine MiSeq / Ion proton or illumine HiSeq)
- PC for data analysis core i7, 32 GB RAM, 4TB HD + high speed internet 20 MB

C] Harvesting

- Vertical electrophoresis
- Horizontal electrophoresis
- Blotter for polyacrylamide
- Gel documentation system

IV. Histology & Immunohistochemistry Lab

- Water bath
- Microtome (Leica)
- Cryostat (Leica)
- Refrigerator
- Oven (0-120 °C)
- Hot plate

V. Metabolomics (Advanced Analytical Chem.) Lab

- Mass spectrometry (MS)
- High performance liquid chromatography (HPLC)
- Liquid Chromatography (LC)
- Spectrophotometers (Single beam + Double beam)
- Fluorimeter

VI. Bioinformatics

- Core i7, 16 GB RAM, 1TB HD

Central Laboratory Facilities

I. Central Microscopic Facility

- Inverted fluorescent microscope (3 filters) - *Leica*
- Dissection scope (Bright filed & Fluorescent) - *Leica*
- Confocal laser microscope - *Leica*

Each with video camera and image processing soft ware

- Cirrus HD-OCT Optical Coherent Tomography - *Zeiss*
- Ultra-Fast Scanner (digital pathology slide scanner
- Eagle eye platinum digital IVUS catheter - *Philips*
- Atomic force microscope (AF)

II. Central Cooling & Freezing Facility:

- Freezer vertical 2 x -80 C
- Freezers 2 x -20 °C
- Dry ice storage
- Liquid nitrogen facility

III. Cold Room

Refrigerated room for solutions and stocks of liquid chemicals + Some experiments If not available at the building, I can provide the specification.

IV. Animal housing - breeding & experimental Facilities:

- A number of 3-4 rooms animal facility (1. operation, 2. cleaning, 3.&4. Mice & Rats housing and breeding)
- Refrigerator
- Normal light dissection scope
- Cages for animals
- Available water and food source for mice, rats, rabbits, guinea pigs.
- Permanent personnel for animal breeding - care + Veterinarian for weekly follow up.

V. Nanotechnology Facility

- Zeta Seizer
- X-ray diffraction (XRD)
- Spectrophotometer
- Fluorimeter
- Balance
- Vortex
- Spinner
- Sonicator
- High speed centrifuge
- Water bath
- Oven
- Dissector
- 13 - Homogenizer
- Magnetic stirrer
- Rotary evaporator

VI. Central Sterilization Facility

- Autoclaving equipment (3 pieces - for clean lab wares + for wastes + for animals)
- Dish washer for lab glass wares
- Ph. Meter
- Balance (3 digits)
- Balance (4 digits)