

وزارة التعليم العالي والبحث العلمي
جهاز الإشراف والتقويم العلمي
دائرة ضمان الجودة والاعتماد الأكاديمي
قسم الاعتماد الدولي

استمارة وصف البرنامج الأكاديمي للكليات للعام الدراسي 2017 – 2018



اسم الجامعة : جامعة المثنى

اسم الكلية: كلية التربية للعلوم الصرفة / قسم علوم الحياة

عدد الأقسام والفروع العلمية في الكلية : 2

تاريخ ملء الملف :

اسم مدير شعبة ضمان الجودة والأداء الجامعي

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التاريخ / / 2017

التوقيع

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م.د نورس ناهض امين

التاريخ / / 2017

التوقيع

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التاريخ / / 2017

التوقيع

مصادقة عميد الكلية

أ.د طالب عبد الحسين موسى

التاريخ / / 2017

التوقيع

نموذج وصف البرنامج الأكاديمي

مراجعة أداء مؤسسات التعليم العالي ((مراجعة البرنامج الأكاديمي))

وصف البرنامج الأكاديمي

يوفر وصف البرنامج الأكاديمي هذا إيجازاً مقتضياً لأهم خصائص البرنامج ومخرجات التعلم المتوقعة من الطالب تحقيقها مبرهنًا عما إذا كان قد حقق الاستفادة القصوى من الفرص المتاحة . ويصاحبه وصف لكل مقرر ضمن البرنامج

| | |
|-----------------------------|---|
| 1. المؤسسة التعليمية | كلية التربية للعلوم الصرفة / جامعة المثنى |
| 2. القسم الجامعي / المركز | علوم الحياة |
| 3. اسم البرنامج الأكاديمي | بكالوريوس علوم الحياة |
| 4. اسم الشهادة النهائية | بكالوريوس علوم الحياة |
| 5. النظام الدراسي | سنوي |
| 6. برنامج الاعتماد المعتمد | لن يحصل على أي اعتماد |
| 7. المؤثرات الخارجية الأخرى | التطبيق في المدارس |
| 8. تاريخ إعداد الوصف | 2017/12/18 |
| 9. أهداف البرنامج الأكاديمي | ● أعداد طلبة خريجين من قسم علوم الحياة ليكونوا مدرسين جيدين في المدارس المتوسطة والثانوية |

10. مخرجات التعلم المطلوبة وطرائق التعليم والتعلم والتقييم

| | |
|---|---|
| <p>أ- المعرفة والفهم</p> <p>أ1- أن يتعرف الطالب على المفاهيم العلمية البايولوجية للنبات.</p> <p>أ2- أن يتعرف الطالب على المفاهيم العلمية البايولوجية للحيوان.</p> <p>أ3- أن يتعرف الطالب على المفاهيم العلمية السلوكية المرتبطة بعملية التعلم للاحياء المجهرية والمناعة.</p> <p>أ4- أن يتعرف الطالب على كيفية الاستفادة واستخدام الأجهزة المختبرية.</p> <p>أ5- أن يتعلم الطالب استخدام طرائق متنوعة في التدريس.</p> <p>أ6- أعداد كوادر مدربة ومؤهلة للعمل في المؤسسات التربوية.</p> | <p>ب -المهارات الخاصة بالموضوع</p> <p>ب 1 – مهارة التدريس في مادة الاحياء</p> <p>ب 2 - ان يكون للطالب القدرة على توصيف النماذج والايوساط المختبرية.</p> <p>ب 3 - ان يمتلك الطالب القدرة على ربط الأسباب بالمسببات الطبيعية.</p> |
| طرائق التعليم والتعلم | |
| <p>1. أسلوب التفكير والمناقشة .</p> <p>2. الاختبارات العملية التي تستخدم في المختبرات .</p> <p>3. التعليم بواسطة المحاضرة الاستكشافية.</p> | |
| طرائق التقييم | |
| <p>1. تقديم تقارير أسبوعية</p> <p>2. درجات الامتحانات</p> <p>3. بحوث التخرج</p> <p>4- درجات التطبيق</p> | |
| <p>ج-مهارات التفكير</p> <p>ج1- أسلوب المحاورة بين الطالب والاستاذ</p> <p>ج2- أعداد تقارير اسبوعية</p> <p>ج3- أجراء مناقشات للنتائج في نتائج التحليلات البايولوجية.</p> <p>ج4- التفكير الاستكشافي (أكتشاف الحقائق العلمية من خلال التجارب في المختبرات)</p> | |
| طرائق التعليم والتعلم | |
| <p>1. الدرجات</p> <p>2. المناقشة والتحاور</p> <p>3. الاختبارات</p> | |
| طرائق التقييم | |

الدرجات , البحوث والتقارير , الاختبارات

د -المهارات العامة والمنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي).

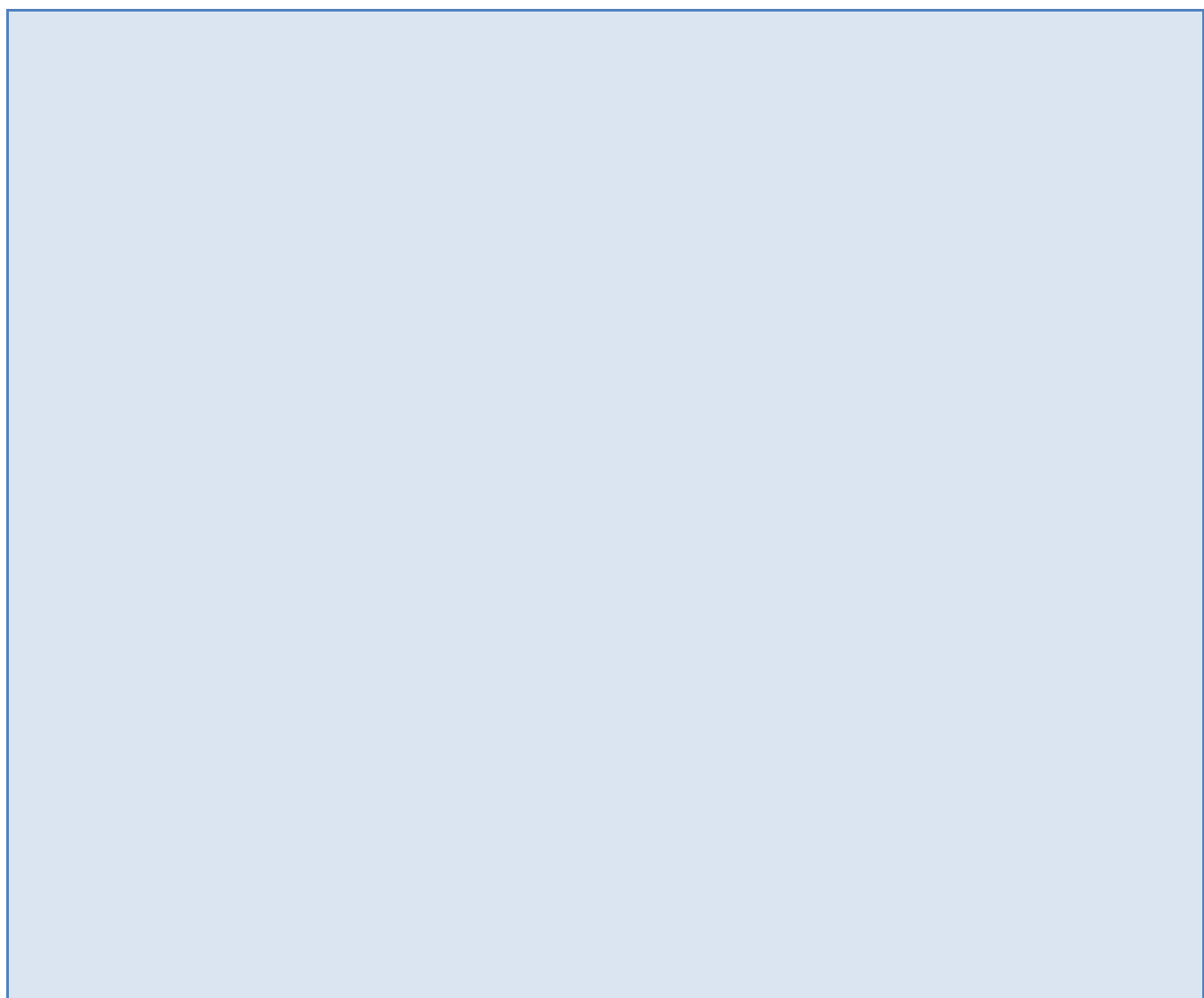
- د1- أن يستطيع الطالب من توظيف المعرفة التي تلقاها
- د2- أن يتمكن الطالب من الاستفادة من المعرفة وكيفية توظيفها
- د3- أن يكتسب الطالب مهارة مهنية التعليم والتدريس
- د4- أن يستطيع الطالب من تجسيد ما أكتسبه في التطوير المهني

طرائق التعليم والتعلم

التطبيقات العملية
الزيارات الميدانية
بحوث التخرج
الندوات والدورات التي يقيمها القسم والكلية .

طرائق التقييم





| 11. بنية البرنامج | | | | 12. الشهادات والساعات المعتمدة |
|-------------------|----------------------|--|---------------------------|---|
| المستوى / السنة | رمز المقرر أو المساق | اسم المقرر أو المساق | الساعات والوحدات المعتمدة | |
| الاولى | — | علم الاحياء تشريح النبات حياتية الخلية | 4ساعة – 6 وحدات | درجة البكالوريوس تتطلب (25) ساعة اسبوعيا للطلاب في جميع المواد للمرحلة الاولى |
| | | | 4ساعة – 6 وحدات | |
| | | | 4ساعة – 6 وحدات | |
| | | | 3ساعة – 4 وحدات | |
| | | | 1ساعة – 2 وحدات | |
| | | | 2ساعة – 4 وحدات | |

| | | |
|--|-------------------------------|-----------------|
| | كيمياء عامة | 2ساعة – 4 وحدات |
| | علم الأرض | 1ساعة – 2 وحدات |
| | علم النفس التربوي | 3ساعة – 4 وحدات |
| | أسس تربية | 1ساعة – 2 وحدات |
| | اللغة العربية | |
| | علم الحاسبات | |
| | حقوق الانسان والديموقراطية | |



| | | | | |
|---|-----------------|------------------------------|---|---------|
| <p>درجة البكالوريوس تتطلب (34) ساعة اسبوعيا للطالب في جميع المواد للمرحلة الثانية</p> | 4ساعة – 6 وحدات | لافقریات | — | الثانية |
| | 4ساعة – 6 وحدات | تصنيف نبات | | |
| | 4ساعة – 6 وحدات | الانسجة | | |
| | 4ساعة – 6 وحدات | الاجنة | | |
| | 4ساعة – 6 وحدات | الكيمياء الحياتية | | |
| | 3ساعة – 4 وحدات | الحاسبات | | |
| | 2ساعة – 4 وحدات | علم النفس النمو | | |
| | 2ساعة – 4 وحدات | تعليم ثانوي وأدارة نربوية | | |
| | 3ساعة – 4 وحدات | الإحصاء الحياتي | | |

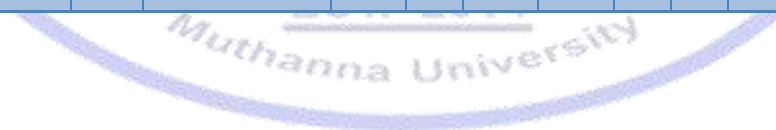
| | | | | |
|---|--|--|----------|----------------|
| <p>درجة البكالوريوس تتطلب (31) ساعة اسبوعيا للطالب في جميع المواد للمرحلة الثالثة</p> | <p>4ساعة – 6 وحدات 4ساعة – 6 وحدات 4ساعة – 6 وحدات 4ساعة – 6 وحدات 3ساعة – 4 وحدات 4ساعة – 6 وحدات 2ساعة – 4 وحدات 3ساعة – 4 وحدات 2ساعة – 4 وحدات</p> | <p>بيئة وتلوث حشرات تشريح مقارن للحبيبات الطحالب والاركيونات الوراثة الفطريات منهج وفلسفة البحث العلمي مناهج وطرائق التدريس الإرشاد التربوي والصحة النفسية</p> | <p>—</p> | <p>الثالثة</p> |
|---|--|--|----------|----------------|

| | | | | |
|---|-----------------|----------------------|---|---------|
| <p>درجة البكالوريوس تتطلب (28) ساعة اسبوعيا للطلاب في جميع المواد للمرحلة الرابعة</p> | 4ساعة – 6 وحدات | الطفيليات | — | الرابعة |
| | 4ساعة – 6 وحدات | فسلجة الحيوان | | |
| | 4ساعة – 6 وحدات | فسلجة النبات | | |
| | 4ساعة – 6 وحدات | الاحياء المجهرية | | |
| | 3ساعة – 4 وحدات | المناعة | | |
| | 2ساعة – 4 وحدات | أختياري | | |
| | 2ساعة – 2 وحدات | مشروع بحث | | |
| | 2ساعة – 4 وحدات | قياس وتقويم | | |
| | 3ساعة – 4 وحدات | المشاهدة والتطبيق | | |

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|---|
| 13.التخطيط للتطور الشخصي |
| <p>1- الاهتمام بالوقت والالتزام بالزمن الموحد</p> <p>2- الاتزان السلوكي داخل الحرم الجامعي من خلال نشر الوعي الخاص بأنظمة وقوانين انضباط الطلبة</p> <p>3- يمكن أن يتطور طالب البكالوريوس من خلال جعله ذات قابلية في أن يكون مدرس ناجح في مهنة التدريس</p> |
| 14.معيار القبول (وضع الأنظمة المتعلقة بالالتحاق بالكلية أو المعهد) |
| <p>1. القبول المركزي</p> <p>2.قبول الطلبة خريجي الفرع العلمي حصراً</p> <p>3. قبول الطلبة خريجي المعاهد التربوية</p> <p>4. المقابلة الشخصية للطلبة لغرض تحديد مدى ملائمة الطالب للتدريس</p> <p>5- الطاقة الاستيعابية لأقسام الكلية .</p> |
| 15.أهم مصادر المعلومات عن البرنامج |
| <p>1- وثيقة تخرج الطالب من الاعدادية الصادرة من وزارة التربية</p> <p>2- نتائج القبول المركزي (الصادرة من وزارة التعليم العالي)</p> <p>3- الوثائق الرسمية الشخصية للطلاب</p> |

| مخطط مهارات المنهج | | | | | | | | | | | | | | | | | | | | | |
|--|------------|---------------|------------------|----|----------------|----|----|----|--------------------------|----|----|----|----------------|----|----|----|--|----|----|----|----|
| يرجى وضع اشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم | | | | | | | | | | | | | | | | | | | | | |
| مخرجات التعلم المطلوبة من البرنامج | | | | | | | | | | | | | | | | | | | | | |
| السنة / المستوى | رمز المقرر | اسم المقرر | أساسي أم اختياري | | المعرفة والفهم | | | | المهارات الخاصة بالموضوع | | | | مهارات التفكير | | | | المهارات العامة والمنقولة (أو) المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي | | | | |
| | | | | 1أ | 2أ | 3أ | 4أ | 5أ | 6أ | 1ب | 2ب | 3ب | 4ب | 1ج | 2ج | 3ج | 4ج | 1د | 2د | 3د | 4د |
| 2016 | B11 | علم الاحياء | | √ | √ | | | √ | | √ | √ | | | √ | √ | | | √ | √ | | |
| | P11 | تشريح النبات | | √ | | | | √ | | √ | √ | | | √ | √ | | | √ | √ | | |
| 2016 | C11 | حياتية الخلية | | | √ | | | √ | | √ | √ | | | √ | √ | | | √ | √ | | |
| | G11 | علم الارض | | | | | | √ | | √ | √ | | | √ | √ | | | √ | √ | | |
| 2016 | V22 | لافقریات | | | √ | | | √ | | √ | √ | | | √ | √ | | | √ | √ | | |
| | P22 | تصنيف نبات | | | √ | | | √ | √ | √ | √ | | | √ | √ | | | √ | √ | | |
| 2016 | H22 | الانسجة | | | | | | | | √ | √ | | | √ | √ | | | √ | √ | | |
| 2016 | E22 | الاجنة | | | | | | √ | | √ | √ | | | √ | √ | | | √ | √ | | |

| | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|---|--|--|---|---|--|--|---|---|---|---|---|---|---|---|--|----------------------|-----|------|
| | | √ | √ | | | √ | √ | | | √ | √ | | √ | √ | | | | | بيئة وتلوث | O33 | 2016 |
| | | √ | √ | | | √ | √ | | | √ | √ | | √ | | | √ | | | حشرات | I33 | 2016 |
| | | √ | √ | | | √ | √ | | | √ | √ | | √ | | | √ | | | تشريح مقارن للحبليات | N33 | 2016 |
| | | √ | √ | | | √ | √ | | | √ | √ | | √ | | | | √ | | الطحالب والاركيونات | L33 | 2016 |
| | | √ | √ | | | √ | √ | | | √ | √ | | √ | | | √ | | | الوراثة | G33 | 2016 |
| | | √ | √ | | | √ | √ | | | √ | √ | √ | √ | | √ | | √ | | الفطريات | F33 | 2016 |
| | | √ | √ | | | √ | √ | | | √ | √ | √ | √ | | √ | √ | | | الطفيليات | R44 | 2016 |
| | | √ | √ | | | √ | √ | | | √ | √ | √ | √ | | | √ | | | فسلجة حيوان | A44 | 2016 |
| | | √ | √ | | | √ | √ | | | √ | √ | | √ | | | | √ | | فسلجة نبات | P44 | 2016 |
| | | √ | √ | | | √ | √ | | | √ | √ | √ | √ | | √ | | √ | | الاحياء المجهرية | M44 | 2016 |
| | | √ | √ | | | √ | √ | | | √ | √ | √ | √ | | √ | | √ | | المناعة | I44 | 2016 |



معايير المراجعة الناجحة وتقييم العملية

معايير المراجعة الناجحة

1. تتمثل معايير المراجعة الناجحة في ترتيبات مراجعة البرنامج الأكاديمي وتقييمه في الآتي:
 1. ان يكون البرنامج الذي تتم مراجعته مدعوماً بأنظمة داخلية قائمة أو قيد التحسين تتضمن المواصفات والمراجعة استناداً إلى ثقافة التقييم الذاتي والتحسين المستمر. إذ توفر خصائص المراجعة الداخلية هذه أساساً قوياً للمراجعة الخارجية.
 2. ان يكون توقيت المراجعة الخارجية مناسباً.
 3. ان تكون الصورة العامة للجنة خبراء المراجعة مطابقة إجمالاً للصورة العامة للمراجعة الخارجية.
 4. ان يتم الاعتناء بالتفاصيل في التخطيط والإعداد من قبل كل من:
 - دائرة ضمان الجودة والاعتماد الأكاديمي : بأن تستمر في تطبيق إجراءاتها الخاصة بالعمل مع المؤسسة التعليمية والمراجعين وتوفير الدعم المناسب واللازم للمراجعة الخارجية.
 - منسق المراجعة: بأن يحرص على ان تكون قاعدة الأدلة التي تنتجها أنظمة المراجعة الداخلية وإعداد التقارير متوافرة في الوقت المناسب للمراجعين الخبراء الزائرين وأن يتم تلبية أية إيضاحات أو معلومات إضافية مطلوبة.
 - المؤسسة التعليمية: بأن توفر تقريراً للتقييم الذاتي للبرنامج الأكاديمي الذي سيخضع للمراجعة الخارجية.
 - المراجعون الخبراء: بأن يقوموا بالتحضير للزيارة بما في ذلك قراءة الوثائق المقدمة وإعداد التعليقات الأولية التي يسترشد بها في إجراء الزيارة.
 5. ان يكون هنالك تطابق في تطبيق أسلوب المراجعة المعلنه والبروتوكولات من قبل جميع المشاركين بما يحترم رسالة وفلسفة العملية ويدعمها للمراجعة والتحسين المستمرين.
 6. ان يعقد المراجعون وممثلو المؤسسة التعليمية حواراً مفتوحاً ينم عن الاحترام المتبادل طوال مدة المراجعة.
 7. ان تكون أحكام المراجعين واضحة ومستندة إلى الأدلة المتوافرة ومدونة بشكل نظامي.
 8. ان يتم إعداد تقرير المراجعة في الوقت المناسب وفقاً لمعيار وهيكله التقارير وأن تؤكد المؤسسة صحة ما يرد فيه من حقائق.
 9. ان تكون مجموعة الاستنتاجات المستمدة من المراجعة بناءة تقدم رأياً منصفاً ومتوازناً عن البرنامج الأكاديمي.
 10. ان تكون المؤسسة قادرة على الاستفادة من المراجعة الخارجية بدراسة نتائجها وأخذها بعين الاعتبار وإعداد خطة واقعية للتحسين عند اللزوم.

التقييم:

2. تسعى دائرة ضمان الجودة والاعتماد الأكاديمي إلى وضع وتطبيق إجراءات للتقييم النظامي لجميع المراجعات الخارجية للبرامج الأكاديمية التي تنظمها وسوف يطلب من المؤسسة التعليمية ورئيس المراجعة والمراجعين المختصين ان يقوموا بتقييم كل مراجعة خارجية عن طريق ملء استبيان مقتضب. وستقوم دائرة ضمان الجودة والاعتماد الأكاديمي بتحليل الملاحظات المنهجية كما سيقوم عند الضرورة بمتابعة أية صعوبات تتم الإشارة إليها.
- كما ستقوم دائرة ضمان الجودة والاعتماد الأكاديمي بتفحص الملاحظات المنهجية للخروج بتقارير موجزة تظهر أهم الجوانب التطبيقية لعملية المراجعة بما في ذلك المستويات العامة للرضا الذي يبديه المشاركون، إضافة إلى أمثلة من الممارسات الجيدة وفرص التحسن المستمر.

قائمة مصطلحات مراجعة البرنامج الأكاديمي

تعريف المصطلحات المستعملة في دليل مراجعة البرامج

قد تحتل بعض المصطلحات المستعملة في هذا الدليل و/أو المراجعة الداخلية والخارجية وإعداد التقارير معان مختلفة حسب السياق التي ترد فيه. ولإزالة الإبهام فقد وضعت التعريفات الآتية لتلك المصطلحات:

الحقول الأكاديمية / مجالات التخصص / التخصصات

تصنف الحقول الأكاديمية مجالات محددة ومتراصة أو مجال الدراسة كالرياضيات والطب والهندسة والفلسفة. وغالبا ما يتم تقسيم الحقول ذات المجال الواسع: فالدراسات الإنسانية على سبيل المثال تشتمل على موضوعات كالتاريخ والأدب، وقد تشتمل الفنون على تخصصات منفصلة منها الفنون الجميلة والتصوير. وقد تجمع مناهج بعض البرامج حقليْن أو أكثر، أو قد تضم موضوعات وتخصصات مختلفة كالرياضيات في الهندسة أو المحاسبة في إدارة الأعمال.

المعايير الأكاديمية

هي معايير محددة تضعها المؤسسة التعليمية بالاستفادة من نقاط مرجعية خارجية. وتشتمل على المستوى أو الحد الأدنى من المعارف والمهارات التي يكتسبها الخريجون من البرنامج الأكاديمي ويمكن استخدامها في التقييم والمراجع.

الاعتماد

هو الاعتراف الذي تمنحه وكالة أو منظمة ما لبرنامج تعليمي أو مؤسسة تعليمية لتأكيد مقدرتها على إثبات أن ذلك البرنامج (أو البرامج) يفي بالمعايير المقبولة وأن لدى المؤسسة المعنية أنظمة فاعلة لضمان جودة أنشطتها الأكاديمية وتحسينها المستمر وفقاً للمعايير المعلنة.

خطط العمل أو التحسين

هي خطط التحسين الواقعية المستمدة من النظر في الأدلة والتقييمات المتوافرة. وقد يتم تطبيقها لأكثر من سنة واحدة إلا أنه يجب إعدادها ومراجعتها كل سنة على مستوى المقررات والبرامج الأكاديمية والمؤسسة التعليمية.

الطلبة المقبولين

هم الطلبة المسجلون في برنامج أكاديمي بمن فيهم أولئك المقبولون ممن اجتازوا ساعات معتمدة سابقة للقبول لما بعد السنة الأولى.

النقاط المرجعية/المعيارية

تمثل العبارات المعيارية التوقعات العامة لمستويات الإنجاز والمهارات العامة المتوقعة من خريجي حقل أو موضوع معين. وقد تكون المعايير المرجعية خارجية أو داخلية. فالنقاط المرجعية الخارجية تسمح بمقارنة المعايير الأكاديمية وجودة برنامج أكاديمي بالبرامج المماثلة له في العراق والعالم. أما النقاط المرجعية الداخلية فيمكن استخدامها للمقارنة بين الحقول الأكاديمية أو لتحديد التوجهات خلال فترة زمنية معينة.

المجموعة

هي تلك الشريحة المحددة من المجتمع التي تخدمها المؤسسة التعليمية وفقا لرسالتها ونظامها الداخلي. وقد تكون محددة جغرافيا او وفقا للمنظمات والمجموعات والافراد الداخلة في أنشطتها.

اهداف المقرر

يجب التعبير عن الأهداف العامة للمقرر باعتبارها المخرجات التي ينبغي ان يحققها الطلبة الذين يكملون المقرر كمزايا مهمة وقابلة للقياس. ويجب ان تسهم في تحقيق الأهداف المحددة لبرنامج او أكثر من البرامج التعليمية.

المنهج الدراسي او المناهج الدراسية

هي العملية التعليمية المنظمة بأكملها التي تصممها المؤسسة التعليمية وتديرها للطلاب المقبول وفقا لمخرجات التعلم المطلوبة، وتتألف من المحتوى وترتيبات التعليم والتعلم وتقويم إنجازات الطلبة بالإضافة إلى إمكانية استخدام مجموعة من المرافق المتوافرة في الجامعة وخارجها وفقا لترتيبات معينة؛ بما في ذلك المكتبات، ودراسات الحاسوب، والدراسات الاجتماعية، والرياضية، والتدريبية، والميدانية.

التعلم الذاتي/ المستقل الموجه (المهارات المكتسبة)

هو التعزيز الفاعل للمهارات الشخصية المشمولة بالمنهج الدراسي والتي تدعم الطالب والخريج في البحث عن الخبرات المنظمة وغير المنظمة واستيعابها والتعلم منها. وتشمل أساليب التعزيز التعلم الإلكتروني والتعلم الشخصي والذاتي والعمل الميداني والواجبات والتدريب والتعلم الانعكاسي. ومن الأدوات المستعملة لدعم التعلم الذاتي الموجه خارج المحاضرات الدراسية الرسمية السجلات الدورية وتقارير التقييم الذاتي وأدوات التعلم التفاعلية وما إلى ذلك.

التعليم الإلكتروني

قد يكون التعلم بطريقة إلكترونية باستخدام تقنية المعلومات المكون الأولي او الثانوي للمواد الخاصة بالبرنامج الأكاديمي او المقرر. وقد يكون مستقلا بذاته او داخلا في مناح التعليم والتعلم الاخرى. وقد يشتمل على التحديد الذاتي للأهداف ومخرجات التعلم المطلوبة والمواد عن طريق الاختيار الذاتي، ويتضمن عادة التقييم الذاتي. وهو يزيد بصورة عامة مستوى الذاتية في التعلم والمسؤولية عنه. ولا يعد تحويل النصوص او المحاضرات الحالية إلى موقع إلكتروني او إلى إحدى الوسائط المسجلة مسبقا بحد ذاته تعلمًا إلكترونيًا .

المقيم/التقييم الخارجي

هو قيام المؤسسة بتعين لبرنامج أكاديمي محدد او جزء من برنامج او مقرر للخروج برأي خارجي مستقل عن المعايير الأكاديمية الموضوعة والمتحققة في الامتحانات الخاصة بمنح الدرجة العلمية.

إطار التقييم

يوفر إطار التقييم بنية معيارية لتقييم البرامج الأكاديمية. ويشكل اساس التقييم الذاتي والزيارة الميدانية من قبل المراجعين المختصين وتقارير مراجعة البرنامج الأكاديمي، وهو معد للاستخدام في جميع الحقول الأكاديمية والمؤسسات التعليمية ولتطبيقه على المراجعات الداخلية والخارجية.

المفاهيم العامة (اللوائح)

هي المبادئ والنظم والتعليمات اللازمة للمؤسسة التعليمية ضمن السياسات التي تحكم أعمالها.

مؤسسة التعليم العالي

هي الكلية أو المعهد أو الجامعة التي تقدم برامج التعليم العالي المؤدية إلى الحصول على الدرجة الجامعية الأولى (البكالوريوس/ دبلوم) أو أية درجة أعلى من ذلك.

مخرجات التعلم المطلوبة

هي النتائج المتعلقة بالمعرفة التي تريدها المؤسسة التعليمية من برامجها وفقاً للمخرجات. ويجب أن تكون مرتبطة بالرسالة وقابلة للقياس (قابلة للتقييم) وأن تعكس المعايير المرجعية الخارجية بالمستوى المناسب.

النظام الداخلي لإدارة وضمان الجودة

هو النظام الذي تعتمد عليه المؤسسة التعليمية لضمان تحقيق برامجها التعليمية والعناصر الداخلة فيها بالاحتياجات المحددة وأن تخضع للمراجعة والتحسين المستمرين. ويتضمن نظام إدارة الجودة المستند إلى المخرجات مواصفات محددة للجودة من التصميم إلى التقديم، والتقييم وتحديد الممارسات الجيدة وأوجه القصور والمعوقات، ومتابعة الأداء ومقترحات التحسين وتعزيز والمراجعة والتحسين النظاميين للعمليات لوضع السياسات والاستراتيجيات والأولويات الفاعلة لدعم التحسين المستمر.

سوق الوظائف/ العمل

هو توفر مجالات التوظيف المهنية والتجارية وذات التوجه البحثي وغيرها من المجالات التي يكون الخريج مؤهلاً للعمل فيها بعد التخرج.

بيان الرسالة

هو بيان موجز يحدد بوضوح مهمة المؤسسة التعليمية ودورها في تنمية المجتمع. كما قد يعرض بيان الرسالة بيانات مساندة موجزة حول رؤية المؤسسة التعليمية وقيمتها وأهدافها الاستراتيجية.

المراجع المختص

هو شخص ذو المستوى المهني والخبرة الإدارية أو الذي لديه خبرة في الموضوع المعني (إلا أنه ليس من نفس المؤسسة التعليمية وليس لديه تضارب في المصالح، بحيث يمكنه المساهمة بمراجعة البرنامج التعليمي لضمان الجودة الداخلية والخارجية أو لغايات الاعتماد).

البرنامج الأكاديمي

لغرض مراجعة البرنامج الأكاديمي يعرف البرنامج التعليمي بأنه ذلك الذي يقبل الطلبة الذين يحصلون بعد إتمامه بنجاح على درجة أكاديمية.

اهداف البرنامج

هي الغايات العامة لتقديم البرنامج الأكاديمي والتي توجه بدورها تطوير الأهداف الاستراتيجية وتنفيذها (لضمان تحقيق الأهداف) ومخرجات التعلم المطلوبة (للتأكد من قيام الطلبة بالعمل من أجل تحقيق النتائج المطلوبة)

مراجعة البرنامج الأكاديمي

تنطبق مراجعة البرنامج الأكاديمي على جميع البرامج التعليمية في جميع مؤسسات التعليم العالي. وفي حالة البرامج التي تعلم في أكثر من مؤسسة تعليمية يكون البرنامج بأكمله مشمولاً بالمراجعة.

وهناك ثلاثة أهداف لمراجعة البرامج في العراق، وهي:

- 1- تزويد صانعي القرار (في مؤسسات التعليم العالي ودائرة ضمان الجودة والاعتماد الأكاديمي في الوزارة وأولياء الأمور والطلبة وغيرهم من أصحاب المصلحة) بالأحكام المدعومة بالأدلة حول جودة برامج التعلم.
- 2- دعم تطور عمليات ضمان الجودة الداخلية بالمعلومات حول الممارسات الجيدة والتحديات وتقييم الالتزام التحسين المستمر.
- 3- تعزيز سمعة التعليم العالي في العراق على المستوى الإقليمي والدولي.

ضمان الجودة

ان تتوافر في المؤسسة التعليمية الوسائل اللازمة لضمان تحديد المعايير الأكاديمية لكل برنامج تعليمي وفقاً للمعايير الدولية المماثلة، وأن تكون جودة المنهج الدراسي والبنية التحتية المعنية مناسبة وتحقق توقعات الأطراف المعنية وأن يمتلك خريجها مجموعة من المهارات المحددة وأن تكون المؤسسة التعليمية قادرة على التحسين المستمر.

منسق المراجعة

هو الشخص الذي ترشحه المؤسسة التعليمية لتنسيق مراجعة البرنامج الأكاديمي للمساعدة في جمع المعلومات وتفسيرها وتطبيق أساليب المراجعة المعلنة.

التقرير

التقارير المنتظمة المعدة استناداً إلى مراجعات البرنامج الأكاديمي وتقييمات برنامجه التعليمي.

التقييم الذاتي

هو قيام المؤسسة التعليمية بتقييم برنامج أكاديمي معين كجزء من مراجعة البرنامج وضمن نظام داخلي لإدارة وضمان الجودة.

الزيارة الميدانية

هي زيارة معد لها لمراجعين مختصين خارجين ضمن مراجعة البرنامج الأكاديمي. وتستمر الزيارة الميدانية عادة لمدة يومين أو ثلاثة. ويضم جدول (1) نموذجاً لذلك.

هو الوصف التفصيلي لأهداف البرنامج وبنيته والمخرجات المطلوبة منه وإية مقررات او مرافق محددة او موارد داخلية فيه. ويوفر التوصيف المعلومات اللازمة لتصميم البرنامج وتقديمه ومراجعته.

الجهات ذات العلاقة

هي تلك المنظمات او المجموعات او الأفراد ذات المصلحة المشروعة في الانشطة التعليمية للمؤسسة من حيث جودة التعليم ومعايير وفاعلية أنظمة ضمان الجودة وإجراءاتها. وتضم عملية المراجعة الاستراتيجية الفاعلة اهم مجموعات الأطراف المعنية. ويعتمد المدى الدقيق لمجموعات الأطراف المعنية واهتماماتهم المختلفة على رسالة المؤسسة التعليمية ومدى أنشطتها التعليمية وظروفها المحلية. ويتحدد المدى عادة بدراسة لتحديد النطاق. وتشتمل المجموعات ذات المصلحة المشروعة على الطلبة الحاليين والخريجين والطلبة الراغبين بالالتحاق واولياء امورهم او عائلاتهم وطاقم المؤسسة التعليمية والوسط التوظيفي والوزارات الحكومية المعنية والراعين وغيرهم من المنظمات الممولة والمنظمات والاتحادات المهنية إن وجدت.

الأهداف الاستراتيجية / الخطط الاستراتيجية

هي مجموعة من الأهداف الخاصة بالمؤسسة التعليمية والمستمدة من رسالتها والمحولة إلى خطة واقعية تقوم على التقييمات المدعومة بالأدلة. وتركز الاهداف على الوسائل التي تسعى المؤسسة عن طريقها إلى تحقيق رسالتها وتحدد الخطة الامور التي ينبغي معالجتها والإطار الزمني والشخص المسؤول والتكاليف التقديرية، وترافقها خطة تنفيذية تتضمن ترتيبات لمراقبة التقدم وتقييم الآثار.

تقييم الطلبة

هي مجموعة من الإجراءات التي تشمل الامتحانات وغيرها من الأنشطة التي تقوم بها المؤسسة التعليمية لقياس مقدار إنجاز مخرجات التعلم المطلوبة للبرنامج الأكاديمي ومقرراته. كما توفر التقييمات وسيلة لتصنيف الطلبة وفقاً لإنجازاتهم , ويسعى التقييم التشخيصي إلى تحديد المدى الحالي لمعارف الطالب ومهاراته سعياً وراء اعداد منهج مناسب . ويوفر التقييم التكويني المعلومات عن أداء الطالب وتقدمه دعماً لمتابعة التعلم دون احتساب علامة من أجل التخرج بالضرورة. اما التقييم الشمولي فيحدد المستوى النهائي لتحصيل الطالب في البرنامج او عند نهاية المقرر الذي يدخل في الساعات المعتمدة للبرنامج الأكاديمي.

تقييمات الطلبة

هي عملية جمع لآراء الطلبة حول جودة برنامجهم في بنية قياسية مع تحليل للمخرجات. ومن أكثر الأساليب استخداماً لجمع الآراء: الدراسات المسحية والاستبيانات، ومن الآليات الأخرى المؤتمرات الإلكترونية والهيئات ومجموعات العمل المركزة والتمثيل في المجالس والأوساط الأخرى.

طرائق التعليم والتعلم

هي مجموعة الطرائق التي يستخدمها التدريسيين لمساعدة الطلبة على تحقيق مخرجات التعلم المطلوبة من المقرر. ومن امثلة ذلك المحاضرات، وتعليم المجموعات الصغيرة كالجلسات التعليمية والندوات، ودراسة حالة لك طالب حول كيفية تحليل المعلومات والوصول إلى القرارات، والواجبات ككتابة اوراق بحثية ليكتسب الطلبة مهارات التعلم الذاتي والتقديم، والرحلات الميدانية، والجلسات العملية لإكساب الطلبة المهارات العملية وإجراء التجارب لتدريب الطلبة على تحليل النتائج والوصول إلى استنتاجات محددة وإعداد التقارير او العروض او الملصقات.

Bachelor and research focuses of Biology in Department of Biology, College of Education for Pure Sciences, Al Muthanna University

The Department of Biology is committed in preparing well-rounded and skilful graduates by using the interdisciplinary approach in the fields of Biology of Education for Pure Sciences. The department also dedicated in producing students with imbued leadership spirit, and entrepreneurship for a successful and meaningful post-tertiary life.

The mission, vision and goal of the Department of Biology program are the same as employed by Al Muthanna University. All of the research, plan, teaching, and learning in this department are parallel to the mission, vision and the objective of Quality Management System of Al Muthanna University.

The Department of Biology in College of Education for Pure Sciences from several areas who meet weekly in a seminar series.

Our research focuses on:

Human anatomy & physiology, invertebrate zoology, animal behavior, microbial pathogenesis, molecular biology, plant molecular and developmental biology; plant physiology, plant biotechnology, microbiology, food microbiology, and genetics.

Our research applications on the molecular bases of DNA Fingerprinting, gene function genetic diversity, molecular relationships and processes that control development.

Research in ecological genetics is more evolutionary. Several methods such as morphological data and DNA sequences, comparative analyses of multivariate patterns of covariation) are also being use to clarify large-scale patterns in biological diversity.

Research interrelated to plant cell biology includes the study of antioxidants enzymes, histology and Photosynthetic to adaptive response in callus by stimulating antioxidant enzyme activities and showing the relationship between salt-tolerant callus cell lines and the histological structure of shoot and root.

Research in Microbiology immunology and virology, group has widely ranging research benefits. Microbiology studies are applications on plant, animals and human symbiotic interactions. Such studies can reveal fundamental insights into how bacteria invade and survive within eukaryotic cells, and microscopic organisms, such as protozoa, fungi, archaea, viruses, and bacteria. This discipline includes fundamental research on the evolution, ecology, biochemistry, cell biology, physiology and clinical aspects of microorganisms, including the host response to these agents.

Research in zoology include animal anatomy, ecology, evolution, genetics, physiology, biochemistry, behaviour and conservation.

| Description of the academic program | |
|---|--|
| This academic program description provides a concise summary of the most important characteristics of the program and the learning outcomes expected of the student to achieve and make the most of the opportunities available. It is accompanied by a description of each course within the program | |
| Educational institution | Education College for Pure Sciences / Al Muthanna University |
| Department | Biology |
| The name of the academic program | Bachelor's degree in biology |
| Study system | annual |
| Other external influences | Application in schools |
| Objectives of the academic program | |
| Qualifying graduate students from the Department of Life Sciences to be good teachers in middle and high schools. | |
| Learning Outcomes Required | |
| <p>Knowledge and understanding –</p> <ul style="list-style-type: none"> ❖ The student should be acquainted with the scientific and biological concepts of the plant. ❖ The student should be familiar with the scientific and biological concepts of the animal. ❖ The student should be acquainted with the scientific behavioral concepts related to the learning process of microorganisms and immunity. ❖ The student should know how to use and use the laboratory equipment. ❖ The student learns to use a variety of teaching methods. ❖ The number of trained and qualified cadres to work in educational institutions. | |
| <p>Subject-specific skills</p> <ul style="list-style-type: none"> ❖ Teaching skill in biology. ❖ The student should be able to describe the models and the laboratory. ❖ The student has the ability to link the causes to natural causes. | |
| <p>Teaching and learning methods</p> <ul style="list-style-type: none"> ❖ Method of thinking and discussion. ❖ Practical tests used in laboratories. | |

| |
|---|
| ❖ Education by exploratory lecture. |
| Assessment methods |
| <ul style="list-style-type: none"> ❖ Submit weekly reports ❖ Exam grades ❖ Graduation Research ❖ Application grades |
| thinking skills : |
| <ul style="list-style-type: none"> ❖ Method of dialogue between the student and the professor. ❖ Preparing weekly reports. ❖ Discuss the results in the results of the biological analyzes. ❖ Exploratory thinking (discovering scientific facts through laboratory experiments) |
| Teaching and learning methods |
| <ul style="list-style-type: none"> ❖ Degrees ❖ Discussion and dialogue ❖ Tests |
| Assessment methods |
| Grades, research and reports, tests |
| General and transferred skills (other employability and personal development skills) |
| <ul style="list-style-type: none"> ❖ The student can use the knowledge received. ❖ To be able to benefit from the knowledge and how to employ it. ❖ The student should acquire professional teaching and teaching skills. ❖ The student can apply what he has gained in professional development. |
| Teaching and learning methods |
| <ul style="list-style-type: none"> ❖ Practical applications ❖ Field visits ❖ Graduation Research ❖ Seminars and courses held by the department and college. |

Program structure

| Level | Course Code | Course Name | n. of hours weekly |
|---------|-------------|--|--------------------|
| Level 1 | Bio 100 | Biology | 4 |
| | Bio 101 | Plant anatomy | 4 |
| | Bio 102 | Cell biology | 4 |
| | Bio 103 | General chemistry | 3 |
| | UREQ 104 | English language | 1 |
| | UREQ 100 | Principles of education | 2 |
| | UREQ 101 | Education psychology | 2 |
| | Bio 104 | Geology | 1 |
| | UREQ 102 | Arabic language | 1 |
| | UREQ 105 | Human rights & democracy | 1 |
| | UREQ 103 | Computer science | 3 |
| Level 2 | Bio 201 | Plant taxonomy | 4 |
| | Bio 202 | Histology | 4 |
| | Bio 204 | Biochemistry | 4 |
| | Bio 200 | Invertebrates | 4 |
| | Bio 203 | Embryology | 4 |
| | Math 205 | Biostatistics | 3 |
| | UREQ 201 | Growth psychology | 2 |
| | UREQ 202 | Secondary education & educational management | 2 |
| | UREQ 201 | Computer science | 3 |
| | UREQ201 | English language | 1 |
| | | | |
| Level 3 | Bio 300 | Environment & pollution | 4 |
| | Bio 301 | Insects | 4 |
| | Bio 302 | Mycology | 4 |
| | Bio 303 | Comparative anatomy of chordata | 4 |
| | Bio 304 | Algae & Archaea | 4 |
| | Bio 305 | Genetics | 3 |
| | UREQ | Counseling & mental health | 2 |
| | UREQ302 | Methodology & philosophy | 2 |
| | UREQ300 | Teaching methods | 2 |

| | | | |
|---------|----------|--------------------------|---|
| | UREQ301 | English language | 1 |
| Level 4 | Bio 400 | Parasitology | 4 |
| | Bio 401 | Microbiology | 4 |
| | Bio 402 | Animal physiology | 4 |
| | Bio 403 | Plant physiology | 4 |
| | Bio 404 | Immunology | 3 |
| | UREQ401 | Measurement & assessment | 2 |
| | UREQ402 | Viewing & application | 3 |
| | | Biotechnology | 2 |
| | | Research project | 2 |
| | UREQ 403 | English language | 1 |



COURSE: CELL BIOLOGY ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing**TEACHER:** Assistant Professor. Rahem Alziadi**E-mail:** rahem_enad@mu.edu.iq**Language:** Arabic**Exclusions:** Bio 102**Level:** 1**n. of hours weekly:** 4 (2 of theoretical and 2 of practice).**n. of hours annually:** 120 (60 of lessons and 60 of tutorials/practice)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The lecture course will explore the structure and function of cells, and cover aspects ranging from micro organisms to higher order structures including the complexity and purpose of cell compartmentalisation in higher life-forms. The way in which cells containing identical genetic information develop into specialised cell types to form tissues with different functions will be used to introduce the concepts of cell polarity, cell adhesion, and plant and animal development. The scope of the course will include microbial, plant and animal examples, and it aims to provide the foundation for the study of more complex and ethically sensitive organisms (ie humans) which are generally not subject to rigorous experimental analysis. The course also aims at illustrating how multidisciplinary approaches will be crucial for the new post genomic research era we are starting to explore, depending not only on classic biology and biochemistry, but also involving mathematics and physics.

Cell Biology Learning Objectives Core objectives :

1. Students will understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles
2. Students will understand how these cellular components are used to generate and utilize energy in cells
3. Students will understand the cellular components underlying mitotic cell division .
4. Students will apply their knowledge of cell biology to selected examples of changes or losses in cell function. These can include responses to environmental or physiological changes, or alterations of cell function brought about by mutation.

SYLLABUS

All cell biology sections will cover the following topics Understand the basic components of prokaryotic and eukaryotic cells The cell doctrine Chemistry of molecules: Covalent and hydrogen bonds Water and polarity: hydrophilic vs. hydrophobic Organic molecules, functional groups Polymer macromolecules Monomers and polymers Monosaccharides and carbohydrates Nucleotides and nucleic acids Nucleotides, sugar-phosphate backbone Amino acids and proteins Peptide bonds Side-chains 1o-4o structure Roles of different macromolecules: Enzymes Information storage: nucleic acids to protein Energy storage Membranes Lipids, bilayers Chemical evolution: micelles into cells Membrane proteins, fluid mosaic model Pores and pumps: facilitated diffusion, active transport, cotransport Organelles Prokaryotes vs.

eukaryotes Nucleus DNA mRNA and cytoplasmic ribosomes nuclear pores Endomembrane system Smooth and rough ER Golgi Transport and secretory vesicles Endo and exocytosis Other vesicles and vacuoles Mitochondria and chloroplasts Structure and roles Endosymbiont theory Cytoskeleton Microtubules, microfilaments and intermediate filaments Tubulin and actin Motor proteins Cilia, flagella and microtubules Microfilaments and cell shape changes Understand how energy is used and generated in cells ATP and its uses Respiration Electron carriers Roles of enzymes Glycolysis Krebs Oxidative phosphorylation Electron transport chain and proton pumps ATP synthase Fermentation Photosynthesis Light reactions Electron transport chain and proton pumps ATP synthase and NADPH Cyclic vs. non-cyclic Calvin cycle RUBISCO Production of G3P Understand how cells undergo mitosis Prokaryotic fission Circular chromosomes Eukaryotic mitosis Linear chromosomes Production of sister chromatids Phases of mitosis Centrioles and the mitotic spindle Cytokinesis Cell cycle Phases Checkpoints.

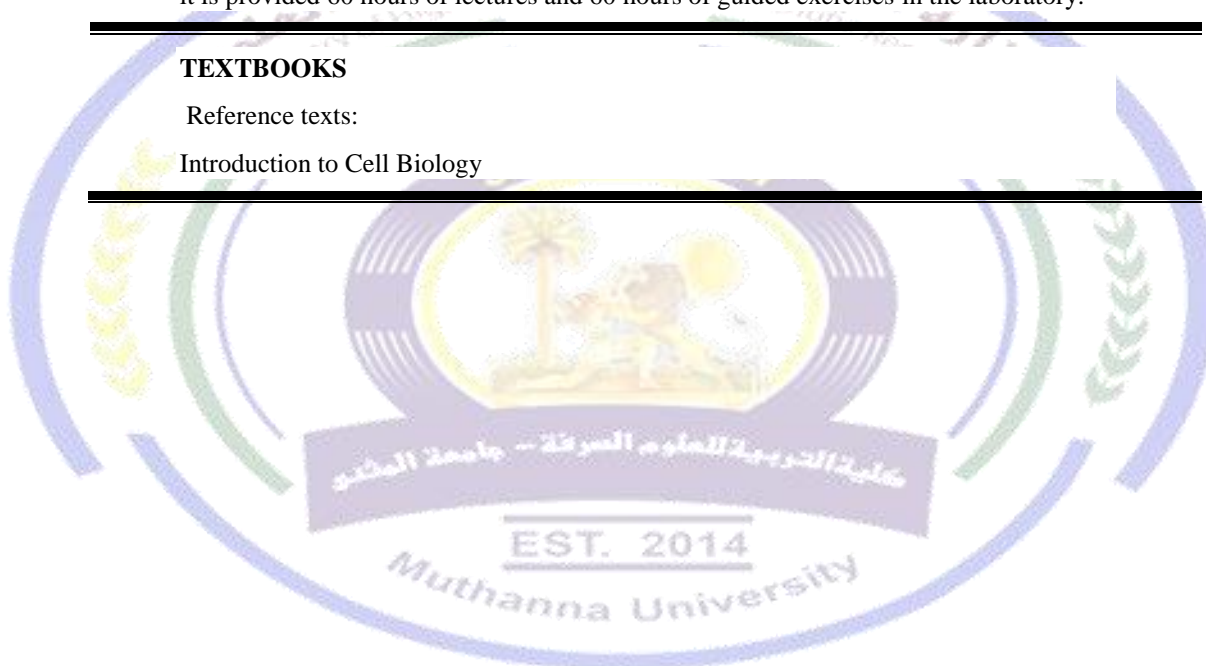
TEACHING METHODS

The course includes 120 hours of teaching between lessons and exercises. In particular it is provided 60 hours of lectures and 60 hours of guided exercises in the laboratory.

TEXTBOOKS

Reference texts:

Introduction to Cell Biology



COURSE: General Geology ACADEMIC YEAR 2019-2020

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing

LECTURER: DR. Nawrass Nahid Ameen

E-mail: nawrass@mu.edu.iq

Language: Arabic

Exclusions: Bio 104

Level: 1st

n. of hours in week: 1 h/w

n. of hours annually: 30 h/y

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

- Be able to identify and classify common rocks and minerals.
 - Understand how geologic resources form, how they are used, and the differences between renewable and nonrenewable resources.
 - Understand plate tectonics and its central role as the unifying theory of geology.
 - Be able to articulate the relationship between volcanoes, earthquakes, and mountain belts and tectonic plate boundaries.
 - Understand basic agents and processes that impact the earth's surface including rivers, glaciers, wind, and oceans.
 - Understand how humans act as geologic agents and the impacts we make on the environment.
 - Understand the scientific process and scientific basis for geologic interpretations.
-

PRE-REQUIREMENTS

Students need to know the basics of geology which is given to them in high school, so they are able to take a detailed course of geology.

SYLLABUS

General Geology includes: Introduction- Planet Earth: Earth Systems Science- Planet Earth, Minerals- Volcanoes and Igneous Rocks- Igneous Rocks- Sedimentary Rocks- Metamorphic Rocks- Weathering- Glacial Systems- Earthquakes and the Earth's interior-

TEACHING METHODS

Undergraduate students are taught Earth Sciences through a variety of teaching methods: lectures, practical, supervisions, fieldwork and seminars.

TEXTBOOKS

Principles of geology. Al Omary Farooq, 2001.

Geology of Iraq. Saad Z. Jassim & J.C. Goff, 2006.

COURSE: General Chemist ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing

| | | |
|---|----------------------------|--|
| LECTURER: ...israa abd alhasan hamdn | | E-mail asraaabdalhasan@gmail.com |
| Language: Arabic | Exclusions: Bio 103 | Level: 1 |

n. of hours in week: 3(1 h. theoretical and 2 h. practical)

n. of hours annually: (4 units)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The main objective of the course is to provide students with the basis to face the study of the major fundamentals in chemistry.

PRE-REQUIREMENTS:

You must have acquired and assimilated the knowledge and the basic concepts provided by the course of general chemistry and having taken and passed the exam because of preparation for the chemical course.

SYLLABUS:

- Introduction in chemical science ..
 - ..The elements classification and periodic table.
 - Volumetric analysis, and types of titration reactions.
 - **Standard solutions and preparing they.**
 - **nutrilazition reactions.**
 - **Chemical calculations.**
 - **Indicators.**
 - **Precipitation reactions.**
 - **Precipitation titrations.**
 - **Gravimetric analysis (gravimetric factor, and related equations).**
 - **Organic chemistry.**
 - **Organic bonds.**
 - **Chemistry of carbon.**
 - **alkane, alkene, alkayen.**
 - **iupac name and reactions.**
 - **Preparations.**
 - **Aromatic hydrocarbons.**
 - **Benzene and its derivatives.**
 - **reactions of benzene**
 - preparation of benzene derivatives.**
-

TEACHING METHODS

The course includes 120 hours of teaching between lessons and exercises. In particular it is provided 60 hours of lectures and 60 hours of guided exercises in the laboratory.

TEXTBOOKS :

COURSE: HISTOLOGY ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing

| | | |
|---------------------------------------|---------------------------|---|
| LECTURER: Kadhém Mohamed Sabea | | E-mail: dr.kadhemajalr@edu.mu.iq |
| Language: Arabic | Exclusions: Bio202 | Level: 2 |

n. of hours in week: 4 (1 of theoretical and 2 of practice).

n. of hours annually: 12 (60 of lessons and 60 of tutorials/practice)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The main objective of the course is to provide students with the basis to face the study of the major fundamentals of Histology. The main knowledge provided will be:

- 1-Introduction to histology
 - 2- The relation between histology and other science
 - 3- Epithelial tissue
 - 4-Type of epithelial tissue
 - 5- Simple epithelial tissue
 - 6- Stratified epithelial tissue
 - 7-Glandular epithelial tissue
 - 8- Types of glands
 - 9-Connective tissue
 - 10-General connective tissue
 - 11-Specialized connective tissue
 - 12-Blood
 - 13-Cartilage
 - 14-Bone
 - 15-Mascular system
 - 16-Types of muscle
 - 17-blood compenamet
-

-
- 18-Solid compenants
 - 19- Liquid compenents
 - 20- Histology of nervous system
 - 21-Types of nerve cells
 - 22-Histology of urinary system
 - 23-Histology of digestive system
 - 24-Histology of respiratory system
 - 25-Histology of male reproductive system
 - 26-Histology of female reproductive system
 - 27-Histology of sense organs
-

PRE-REQUIREMENTS

Students in histology associate's courses study how to collect and remove tissue samples that are used by pathologists to make diagnostic tests. Students gain a thorough understanding of the anatomy and human body.

SYLLABUS

Histology is the education of the microanatomy of organs, tissues, and cells as seen through a microscope. It studies the association between function and structure. Histology Guide imparts the visual art of recognizing the structure of tissues and cells and understanding how this is determined by their function.

TEACHING METHODS

The course includes 120 hours of teaching between lessons and exercises. In particular it is provided 60 hours of lectures and 60 hours of guided exercises in the laboratory.

TEXTBOOKS

COURSE: BIOCHIMESTRY ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing**LECTURER: Prof. Dr. Talib Abdalhusein Mousa****E-mail: taleb1957@edu.mu.iq****Language: Arabic****Exclusions: Bio 204****Level: 2****n. of hours in week: 4 (2 of theoretical and 2 of practice).****n. of hours annually: 120 (60 of lessons and 60 of tutorials/practice)**

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

Biochemistry course is aimed to provide academic research and skills for a successful career in Biochemistry. The course delivery methods consist of lectures, practical lab work and workshops. In the final assessment, tutorials, end-semester examination and projects are taken into consideration.

The syllabus strengthens to acquire an advanced knowledge and understanding of the core principles of Biochemistry. The major objectives of B.Sc., Biochemistry course are:

1. To study the structures and functions of biomolecules.
2. To understand the principles, instrumentation and applications of bioanalytical techniques.
3. To study the enzyme catalysis, bioenergetics and major metabolic pathways.
4. To study the techniques to understand molecular and gene expression.
5. To understand human physiology and nutritional requirements.
6. To impart knowledge in principles and applications of clinical Biochemistry.
7. To acquire skills for laboratory experiments.

PRE-REQUIREMENTS

You must have acquired and assimilated the knowledge and the basic concepts provided by the course of general chemistry.

SYLLABUS**UNIT-I****Carbohydrates :**

Introduction and general classification of carbohydrates.

Monosaccharides :

Structures, properties and biological functions of monosaccharides. Isomerism - structural and stereo

isomerism, interconversion of sugars, mutarotation.

Oligosaccharides : Dissaccharides - structures, properties and functions.

Polysaccharides :

Classification, structures and functions.

UNIT-II

Amino acids :

Structure, classification, physical, chemical and electrochemical properties, Non standard aminoacids,

Non protein aminoacids.

Peptides :

Peptide bond, biologically important peptides – Glutathione.

Proteins :

Classification, structural organization of proteins - Primary, secondary, tertiary and quarternary structures,

forces stabilizing the structure, properties of proteins.

UNIT-IV

Fatty acids :

Classification, structure and properties of fatty acids.

Lipids :

Classification, structure and properties of lipids.

Lipoproteins :

Types and functions..

UNIT-V

Nucleic acids:

Introduction, structure of nitrogenous bases - purines and pyrimidines, nucleosides, nucleotides, formation of phosphodiester bonds. Structure, types, properties, functions of DNA and RNA, codon and anticodon Nucleoproteins with example. Special base sequences of DNA mutation.

UNIT-IV

Vitamins:

Introduction, structures, sources, RDA, functions, deficiency diseases of fat soluble and water soluble vitamins.

TEACHING METHODS

The course includes 60 hours of teaching between lessons and exercises. In particular it is provided 30 hours of lectures and 30 hours of guided exercises in the laboratory.

TEXTBOOKS

1. Fundamentals Of Biochemistry,.
 2. Lehninger's Principles of Biochemistry
-

UNIT-IIIV

Metablism, Metabolites, Anabolism, Catabolis, Metabolism of carbohydrates, Digestion, Glycolysis, TCA cycle.

UNIT-III

Enzymes, Activity of enzyme, Active site, Factor effect on the enzyme activity, Types of Inhibitors, allosteric Enzymes.

| | | |
|--|----------------------------|--|
| COURSE: INVERTEBRATE BIOLOGY ACADEMIC YEAR | | |
| TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing | | |
| LECTURER: Assistant Professor. Sahib Shanon Ibrahim | | E-mail; sahibkinani@mu.edu.iq Sahib1@yahoo.com |
| Language: Arabic | Exclusions: Bio 200 | Level: 2 |
| n. of hours in week: 4 (2 of Theoretical and 2 of Practical) | | |
| n. of hours annually: 120Hrs (60 of lessons and 60 of tutorials/practice) | | |

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The curriculum of invertebrates by invertebrate phylum as follows: -

1.Protozoa 2.Porifera 3.Cnidaria 4.Plalyhelminthes 5.Aschelminthes 6.Nematoda
7.Annelide 9.Onychophora 10.Arthropoda 11.Mollusca 12.Ecinodermata

1. Definition of invertebrates, invertebrate benefits and harms, their position in modern classification, evolutionary relationships between animals, theories of the emergence of multi-cellular organisms, supporting structures in invertebrates and contributions of some scientists. 2 - Definition of each phylum continued Latin naming and general characteristics of each phylum separately and some rows and developmental qualities and organs of digestion and reproduction and growth and its modalities and devices and the types of nutrition and types of movement of all studied organisms and comparisons The course aims to give a complete idea of invertebrates and their importance, classification, evolutionary relationships, animal divisions and detailed study of some classes of invertebrates. explanation of the invertebrates, their species and study their importance, benefits and harms, methods of nutrition, reproduction, movement, breathing, and other life activities. Description of its forms and internal and external structures as well as the classification and study of some models in the laboratory.

PRE-REQUIREMENTS

You 'must have acquired and assimilated the knowledge and the basic concepts provided by the course of Cell Biology and biodiversity having taken and passed the exam because of preparation for the Invertebrate course.

SYLLABUS:

- The evolutionary relations between groups - invertebrates - the theory of cellular compact - the theory of colonies - flagellation - the theory of multiple origins. Kingdom of Protista - Secondary

Kingdom Elementary — Arcella — Unicellular ---- Body and Size for Elementary — Nucleus and Cyto-Plasm Components — Casings and Crusts — Movement Organelles:1 Installation of cilia and flagpoles and different water disturbance.

2 pseudo poda.osmotic regulation - shrinking gaps - simple and complex shrinking gaps - feeding in primary - primary classification - reproduction - colonization.- Examples of Phytoflagellates Euglega Elementary Objects Environment / Structure and Structure / Feeding Method.Their susceptibility / behavioral reaction avoided towards the Volvox light model of living within the colony.Composition of colony members / colony shape / somatic cells and germ cells sexual and asexual reproduction in their life cycle.Zooflagellates_ - Leishmania — Trypanosoma - General form - The effect of integrative living on the termite gut and cockroaches in cellulose digestion .General form - Monocystis and life cycle - Plasmodium species that infect humans and the severity of malaria caused by - their life cycle - Paramecium form and general arrangement - Mutual fertilization.Animal Kingdom — Porifera — Iconic-Psycho-Type-Cell Types Pinacocytes-Choanocytes-Porocytes-Trophocytes-glandcells .Amoebiasis, respiration, accentuation, sensation and movement, sexual reproduction (species), sexual reproduction and the phenomenon of reflection in embryonic growth and species of larvae - differences and somatic genetic growth in sponges - origin and development of sponges.Cnidaria - About the Origin of the Nomenclature and Enlargement Environment - General Characteristics - General Classification - Polymorphism

Polymorphism in stingers — filamentous vesicles — filamentous vesicles and stinging cells (their structure and mechanical theories of their release) —hydrozoa class exterior appearance, body wall layers, outer and inner layer cells structure and functions.Nutritional Behavior - the catalyst for the act of nutrition - digestion - gas exchange - highlighting - movement and types - sexual and asexual reproduction - About the synthesis and life cycle of Obelia (a model that represents the stinging stages of Polyp and Mrdusa, the Scyphozoa class of cysts qualities) - a profile of the Aurelia life cycle.Cubozoa cube animals - About the external appearance of the genus Carybdea - Class of vases - Model of a species of sea anemones Metridium - Exterior appearance Internal structure - Behavior of feeding in the sea anemones with sea organisms - Integrative behavior of the sea anemones with other organisms - The act of escape from enemies That — reproduction.Coral reefs and atoll formation - the emergence of amplitudes and radial adaptation - real physical cavities - lymphatic animals - animals with false body cavity - animals with real cavity.Platyhelminthes phylum- General Characteristics Class Characteristics - Turbellaria Class - Planaria Model External Appearance - Body Layers - Digestive System - Breathing - Highlighting System - Nervous System - Reproductive System - Reproduction.

Cyst worms: Aschelminths –phylum of wheelworms - General attributes - Appearance and body composition - Sexual reproduction and virgin reproduction Strategy for the production of virgin eggs - About the characteristics of the ciliary abdomen Gastrotricha.Nematoda - General characteristics - Ascaris exterior - Nematomorpha - Acanthocephala - Entoprocta.. Phylum (ringworms) Annelida Polychaeta - Nereis – epitoky,, Oligochaeta-Lumbricus terrestris.. Hirudo - external appearance - digestive system and nutrition (the absence of digestive enzymes) and the presence of integrative bacteria that perform digestive processes Pseudomonas hirudinicola) - nervous system - circulatory system - breathing - highlighting - reproductive and reproductive system - evolutionary relationship

Onychophora phylum - Common traits with arthropods - Common traits with ringworms - Characteristics - nervous system - circulatory system - respiration - protrusion system - reproductive system and reproduction .Arthropoda Division - General Characteristics - Arthropod Environment - Crustacean Class – Characteristics, Daphnia, Cambarus, crustacean larvae. Arachnids - Characteristics and Environment - Appearance, Physical Areas and Attachments, Body Organs of Buthus and Argiope.Mollusca - Anodonta -I Animal environment - Interior and exterior appearance of the shell shutter - Shell layers - Nervous system - Circulatory system ,Respiratory System - Reproductive System - Reproductive System - Digestion and Nutrition - Helix Genus Model - Body Composition - Nervous System - Circulatory System - Respiration, Reproductive system and reproduction – breathing.Echinodermata Characteristics and Environment - Exterior

appearance, body areas and accessories

Laboratory Requirements Microscope and how to use it And check a drop of water. Kingdom of Protista Sub Kingdom protozoa ,And classification Euglena w. m. Volvox, chilomonas, Noctiluca Goctiluca , Giardia (troph-cyst), Tricomonas vaginalis Trichonympha, Trypanosoma , , Amoeba proteus, Pelomyxa, Arcella, Foraminifera, Actinospharium, Entamoebahistolytica Plasmodium (rigstage) ameoidstage, schizont stage sporozit, ookinate, exoflagellate,) Monocytes (trophozoit) , Paramecium (w. m, binary fiasion, conjugation, (Trichoysts) Didinium, stentor, vorticella. Nereis (external feature, C.S. Parapodium, anteriorend) , Arenicola, Aphrodite . Lembricus terrestris (external feature, C.S.) Hidruda medicinalis (external feature, C.S. reproductive system). Peripatus.. Arthropoda ,general chract & classification Cypris, Cyclops, Daphina, Oniscus, Artemia , Gammarus Cambarus, Lipas, Balanum, Julus, Limulus Buthus, Argiope.. Molluskes, ,general chract & classification , Helix, Anodontam Dentalium Octopus, Nautilus ... general chract of Asterias, Ophiura, Cucumaria, Antedon Echinus.

TEACHING METHODS

There are 120 hours of teaching in the course divided between lessons and exercises. In particular it is provided 60 hours of lectures and 60 hours of guided exercises in the laboratory.

TEXTBOOKS

Reference texts:

An introduction to The Invertebrates , Invertebrates biology , Biodiversity , Invertebrate,

COURSE: PLANT TAXONOMY ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing

LECTURER: Mr. Haider Mahmood Jsim

E-mail: haider.jasim@mu.edu.iq

Language: Arabic

Exclusions: Bio 201

Level: 2

n. of hours in week: 4(2 hours for theory and 2 hours for practice)

n. of hours annually: 120 hours

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

- 1- To demonstrate to the student how to recognize and to identify the common vascular plants.
- 2- To acquaint the student with the principles, methods and history of plant taxonomy.
- 3- To develop in the student an appreciation of the scientific and aesthetic values of plants in the local flora.

PRE-REQUIREMENTS

You must have acquired and assimilated the knowledge and the basic concepts provided by the course of Cell Biology (General plant chapter) and Plant Anatomy in the first level.

SYLLABUS

1. Overview of Plant taxonomy, Course Objectives, Student Responsibilities. Seat and Equipment assignment.
Handouts.
2. Introduction to Plant Taxonomy
Objectives of the science of plant taxonomy
Concept of Taxa: Family, Genus, Species and Intraspecific Taxa
Species definition, Species problems; Biosystematics
3. Botanical Nomenclature
Plant names and naming plants. Handouts
4. Construction and Use of Keys for Plant identification
Vegetative Terminology.
5. Collecting and Preserving Plants for Scientific Purposes.
The herbarium
6. Flowering Plants - Inflorescence and Floral Morphology
Floral Terminology. Exercise graded
7. Seed Free Vascular Plants - The Ferns
Life cycle, morphology and taxonomy of ferns and fern allies
8. The Gymnosperms
Morphology and taxonomy of native gymnosperms
9. The Angiosperms
Pollination, Fertilization, fruit and seed structure in flowering plants
10. The Angiosperms
Taxonomy, distribution and economic importance of the common families of flowering plants in North America. Handouts
11. Threatened and Endangered Species
The concept and value of rare plants. Handouts
12. History and Development of Plant Taxonomy
People, concepts and systems of classification.
13. Study of the Local Flora¹, Field Trips², Collecting and Identification of the Local Flora. Handouts
14. Student Term Project
15. Graduate Student Projects

TEACHING METHODS

Study of the local flora will begin during week 2 and continue weekly throughout the course. Come prepared each class meeting to go to the field to collect plants. Student (all students) term projects will be assigned during the early part of the course. Projects are due 2 weeks before the last scheduled class day. Graduate students are required to do work beyond that required of undergraduate students. These projects will be assigned during the early part of the course. Project presentations are due on a date near the end of the course. The lab final is comprehensive as it relates to plant collections and study of the local flora. The final lecture exam, given during the Final Week, deals with lecture material since the mid-term exam.

TEXTBOOKS

Heywood, V.H. 1993. Flowering plants of the world. Chrysalis Books.

Walters, D.R., D.J. Keil, B. Walters and Z.F. Murrell. 2005. Vascular plant taxonomy,

COURSE: Educational Administration and Secondary Education

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing

LECTURER Dr. Nadia Saoudi

E-mail: nadisaoudi@mu.edu.Iq

Language:
Arabic

Exclusions: UREQ 202

Level: 2

n. of hours weekly: 3 (1 of theoretical and 2 of practice).

n. of hours annually: 80 (630 of lessons and 60 of tutorials/practice)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The general objective of studying the course of educational administration and supervision is to familiarize students with some of the concepts of management, historical development, educational management and its characteristics and factors influencing them, and patterns of school administration, as well as educational supervision and stages of development and types, and the most prominent duties .

Special Objectives of the Course: Upon completion of the course, the student will be familiar with the following:

1. Understand the many concepts of management.
2. Defines the stages of management development and delve into the study of the theories of administrative leadership and school management patterns. Recognizes the meaning of educational management.
3. Determines the characteristics of educational management.
4. Know the factors affecting educational management. Distinguish between administrative processes.
5. Recognizes school management patterns. 10. Familiarize with management skills.
6. Knows educational supervision.
7. Determine the advantages of educational supervision.
8. Know the educational calendar. 14. Extract the objectives of the educational evaluation.

SYLLABUS

Management concept and development of the concept of Directors , Administrative entrances , The concept of educational administration and school administration , The concept of classroom management , Leadership and Management , Public functions and characteristics of leadership , The concept of educational planning , Principles and rules of Educational Planning , Stages and requirements of the success of educational planning , Benefits of Educational Planning , The role of planning in the educational process , Definition resolution and its importance , Steps decision , Types of decisions , The concept of Educational Supervision and functions , Goals of Educational Supervision , Methods of Educational Supervision , Concept stimulus , The importance of incentives , Types of incentives , The concept of performance evaluation , The importance of evaluating performance , The goals of performance evaluation , Elements of performance evaluation , To evaluate the performance of the basic rules , The benefits of performance evaluation , The development of performance evaluation process , Stages of performance evaluation , Educational supervision: (objectives of educational supervision 'work of educational supervision, the development of the concept of educational supervision, principles of educational supervision, competencies and skills of educational supervision types of educational supervision, modern trends in educational supervision, the characteristics of educational supervision, tasks of educational supervision). - School system and discipline (objectives of the system and school discipline, problems of the school system, factors affecting the school system , Educational leadership

(definitions, pillars of leadership, the difference between administrative and leader, characteristics of the educational leader, roles of the educational leader, patterns of leadership, the specific considerations of the style of leadership)

TEACHING METHODS

The course includes 120 hours of teaching between lessons and exercises. Conducting tests for students with one test for each semester. The first test is 18 degrees and the second test is 17 degrees. And 10 grades distributed by 5 grades for the project and 5 grades for daily tests and attendance.

TEXTBOOKS

COURSE: Methodology and philosophy of scientific research

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing

LECTURER Dr. Nadia Saoudi

E-mail: nadiasaoudi@mu.edu.lq

Language:
Arabic

Exclusions: UREQ 302

Level: 3

n. of hours weekly: 3 (1 of theoretical and 2 of practice).

n. of hours annually: 80 (630 of lessons and 60 of tutorials/practice)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The decision is to accomplish the following objectives:

1. Developing the cognitive aspects of students in knowledge of scientific research concepts.
2. Developing the cognitive aspects regarding the types of scientific research and its division.
3. Introduce students to the importance of good researcher qualities.
4. Develop students' ability to understand the contents of the research framework.
5. Teach students how to create a research title page and preliminary papers.
6. Teaching students the contents of the first section and the problem of research.
7. Explain to students the contents of the first section (how to write and

-
- formulate the objectives of the research and hypotheses and areas).
8. Introduce students to the contents of the second section
 9. Develop the cognitive and applied aspects of the research methodology (research methodology, research community and sample, research tools).
 10. Teach students how to apply and write the exploratory experience and the main experience.
 11. Developing the cognitive aspects regarding the presentation, analysis and discussion of research results.
 12. Developing cognitive aspects regarding conclusions and recommendations
 13. Teach students how to write resources and supplements.
 14. Teach students the meaning and types of source and writing style.
 15. Develop scientific knowledge of the subject of the citation and types and conditions and objectives.
 16. Developing scientific aspects in understanding samples and their types
 17. Develop the scientific aspects in understanding the questionnaire
 18. Develop the scientific aspects in understanding the subject of the interview and its advantages and disadvantages and methods of conducting it
 19. Develop the scientific aspects in understanding the subject of observation and its advantages and disadvantages and methods of conducting it.
 20. Develop scientific aspects in understanding the subject of tests and types
 21. Develop the scientific aspects in understanding the subject and types of curricula.
 22. Develop scientific aspects in understanding the subject of the historical method.
 23. Develop the scientific aspects in understanding the subject of the descriptive method (surveys).
 24. Develop the scientific aspects of understanding the subject of the study of interrelationships (case, comparison)
 25. Developing scientific aspects in understanding the subject of relational studies.
 26. Develop scientific aspects in understanding the subject of
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evolutionary studies of growth.

27. Development of scientific aspects in the subject of the experimental method (its concept and steps to implement it).

SYLLABUS

Science: the definition of science, the emergence and development of science , Science objectives , The difference between science and knowledge, scientific thinking and its fundamentals , Scientific research and its relationship to science, the evolution of the concept of dissemination of scientific research , Research plan and hypotheses, problem, determine the title of the problem, preparation of the research plan, hypotheses , Scientific research methods and tools, survey method and tools , Descriptive method, statistical method, case study method, comparative method, experimental method and the main requirements for conducting research, information sources, written sources, electronic sources, title of the illustrations, collection of sources or references, method of writing the source, meaning of citation and codification, types of citation, Data collection, questionnaire, interview, observation

TEACHING METHODS

The course includes 120 hours of teaching between lessons and exercises. Conducting tests for students with one test for each semester. The first test is 18 degrees and the second test is 17 degrees. And 10 grades distributed by 5 grades for the project and 5 grades for daily tests and attendance

TEXTBOOK

1- Wajih Mahgoub. Scientific Research and Methods, University of Baghdad, Dar Al-Kutub for Printing and Publishing, 2002

COURSE: GENETICS ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing**LECTURER:** Dr. Arshad Naji Alhasnawi**E-mail:** arshad@mu.edu.iq
arshadnhq@siswa.ukm.edu.my
arshadnhq@gmail.com**Language:** Arabic**Exclusions:****Level:** 3**n. of hours in week:** 3 (1 of theoretical and 2 of practice).**n. of hours annually:** 80 (30 of lessons and 60 of tutorials/practice)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The main objective of the course is to provide students with the basis to face the study of the major fundamentals of Genetics. The main knowledge provided will be:

Genetics, Molecular Biology, Mendelian inheritance of characters, Physical basis of Mendelian heredity, Gene, Chromosome, Genetics First Law of Mendel's solution law, Mendel's second inheritance law, The cytological basis of Mendelian inheritance and the cytological interpretation of Mendel's laws, Phenotype, Genotype, Dominant and Recessive Allel, Mendelian inheritance of characters, Mitosis, Meiosis, Dominance, Lethal genes, Gene structure and gene function, Multiple Alleles, Sex related characters inheritance, Sex linkage, Gene expression, Quantitative Genetics, Gene frequency, Twins, Linkage, Crossing-Over and Genetic maps, Linkage Group, Genome Mapping, Two - point linkage, Three - point linkage, Combining Map Segments, Interference & Coincidence, DNA, RNA, Plasmid, Gene and Chromosome Mutation, Down Syndrome, Klinefelter Syndrome, Turner Syndrome, Cytoplasmic Inheritance, mt DNA, DNA structure, DNA structure, Synthetic oligonucleotides. Induced mutation, Physical mutagens, Chemical mutagens, Transposable elements, Deamination of bases, Damage due to reactive Oxygen, Transposable elements, Structural genes, Operator genes, Regulator genes, operon, Recombinant DNA Technology, and DNA Cloned Fragment Isolation.

PRE-REQUIREMENTS

Genetics is the study of the units of heredity known as genes and is a science making lots of new and exciting findings. Students who pursue this field learn about gene organization, function and communication.

SYLLABUS

Our textbook for course has 30 chapters and treats numerous sub disciplines as equal parts of an integrated whole. These divisions of genetics include: transmission genetics (also known as classical or Mendelian genetics), molecular genetics, and evolutionary and population genetics.

COURSE: ENTOMOLOGY ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing**LECTURER:** lecturer. Eqbal Awadh Gatea**E-mail:** eq_bio2013@mu.edu.iq**Language:** Arabic**Exclusions:****Level:** 3**n. of hours in week:** 4 (2 of theoretical and 2 of practice)**n. of hours annually:** 120 (60 of lessons and 60 of tutorials/practice)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The main objectives of studying of Entomology include the following points:

- Explain the importance of insects as members of ecosystems.
- 2. Gain an appreciation of insect biology, diversity and ecology.
- 3. Describe the basic anatomy, morphology, taxonomy, development, life histories and key characteristics of different insect groups.
- 4. Identify common orders and families of insects.
- 5. Demonstrate the ability to properly collect and curate insects

The main skills including:

- Basic knowledge to deal with different species of insects
- Knowledge the harmful types of insects and control it and to benefit from Beneficial species.

PRE-REQUIREMENTS

You must have acquired and assimilated the knowledge provided by course a general biology and having taken and passed the exam because of preparation for the entomology course

SYLLABUS: Introduction, external anatomy Integument and Cuticular Structures, head and appendage, thorax, abdomen, external anatomy, Digestion and Excretion, Circulation and Respiration Muscles and locomotion and Sensory, Growth and Molting, and Copulation and Reproductive Systems, Insect development, insect taxonomy, insect order, exopterygota and Order Ephemeroptera – mayflies, Order Odonata - dragonflies and damselflies, Order Orthoptera - crickets, grasshoppers and locusts, Order Phasmida - stick and leaf insects, Order Grylloblattodea - rock crawlers, Order Mantophasmatodea – gladiators, Order Dermaptera – earwigs, Order Plecoptera – stoneflies, Order Embiidina – web-spinners, Order Zoraptera - angel insect, Order Isoptera – termites, Order Mantodea – mantids, Order Blattodea – cockroaches, Order Hemiptera - true bugs, Order Neuroptera - nerve-winged insects, Order Hymenoptera - ants, bees, and wasps, Order Trichoptera – caddisflies, Order Lepidoptera - butterflies and moths, Order Siphonoptera – fleas, Order Mecoptera - scorpion flies and hangingflies, Order Strepsiptera - twisted-wing parasites, Order Diptera - true flies Thysanoptera – thrips, Order Psocoptera - barklice and booklice, Order Phthiraptera - biting and sucking lice, endopterygota division, Order Coleoptera – beetles.

TEACHING METHODS

The course includes 120 hours of teaching between lessons and exercises. In particular it is provided 60 hours of lectures and 60 hours of guided exercises in the laboratory.

TEXTBOOKS

General Entomology

[Fundamentals of Entomology](#)

Insect Biology: A Textbook of Entomology

COURSE: FUNGI ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing

LECTURER: Mr.Shams Kareem Mohamed

E-mail; shamskareem57@gmail.com

Language: Arabic

Exclusions: Bio 302

Level: 3

n. of hours in week: 4(2 hours for theory and 2 hours for practice)

n. of hours annually: 120 hours

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

This course will provide students with an overview of the major fungus diseases or mycoses that threaten animal and human health. The causal agents, symptoms, modes of infections, prognosis, and treatment of fungus-related illness will be discussed and explored in detail and after completing this course, students should:

1. be able to explain and apply their understanding of the principles of evolutionary biology and the phylogenetic relationships of fungi;
 2. be able to explain and apply their understanding of fungal physiology and ecology
 3. be familiar with the terminology, tools, and techniques for identifying fungi;
 4. be familiar with the distinguishing macro- and micro-characteristics of fungi in the Pacific Northwest;
 5. be able to collect, identify, and process fungi for an archival herbarium collection
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PRE-REQUIREMENTS

You must have acquired and assimilated the knowledge and the basic concepts provided by the course of Cell Biology (Fungi chapter) in the first level.

SYLLABUS

Introduction to the course; characteristics of fungi; fungal life cycles
Impact of exposure on animal and human health to fungal toxins
Types of Mushroom Poisoning and other Mycotoxins: Prognosis and Treatment
Culture isolation and identification
Treatment options for infections in animals humans
Isolation and culture of pathogenic fungi; Common laboratory contaminants
Antimycotic agents and treatment options
Superficial mycoses: Pityriasis Versicolor; Tinea Nigra; Piedra

Cutaneous mycoses - various forms of Tinea and their causes, symptoms, and treatment: Microsporum spp., Trichophyton spp., and Epidermophyton floccosum
Subcutaneous mycoses: Chromoblastomycosis; Phaeoerythromycosis; Sporotrichosis; Lobomycosis; Rhinosporidiosis
Systemic Mycoses - caused by true pathogenic fungi: Blastomycosis; Paracoccidioidomycosis; Histoplasmosis; Coccidioidomycosis
Opportunistic Infections - resulting from a weakened immune system due to a variety of intrinsic and extrinsic causes: Candidiasis; Cryptococcosis; *Pseudallescheriasis* *Aspergillosis*; *Zygomycosis*; Entomophthoromycosis; Geotrichosis and miscellaneous rare mycoses (including pneumonia caused by *Pneumocystis carinii*)

TEACHING METHODS

Laboratory orientation and Safety . Introduction to media and growing Fungi . Isolation and Identification of common fungal contaminants . Different forms of fungi . Microscopic exams of fungal cultures and making mounts Week 7 Staining and colony morphology of fungi . Dematiaceous fungi . Superficial mycoses and Dermatophytes Superficial mycoses and Dermatophytes . Processing of clinical specimen . . Zygomycetes, Aspergilli, and related hyphomycetes . Culture and speciation of Yeasts . Systemic and opportunistic mycoses . General revision

TEXTBOOKS

1. Clinical Mycology, Dismukes, Pappas and Sobel (2003).
2. Medical Mycology, Kwon-Chung and Bennett (1992).
3. 3. Atlas of Clinical Mycology, deHoog et al., (2000).

COURSE: Algae and Archenics ..ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing

| | | |
|-----------------------------|-------------------|--|
| LECTURER: Dr. Dhulfqar Hmiz | | E-mail: ph.d.tholfgar@gmail.com |
| Language: Arabic | Exclusions: | Level: 3 |

n. of hours in week: 6/2 of theoretical and 4 of practice..

n. of hours annually: 180/ 60 of lessons and 120 of tutorials practice.

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The main objective of the course is to provide students with the basis to face the study of the major fundamentals of algae and archenics.

- 1- Knowledge on the understanding of the concepts principles of algae.
- 2-In the features Knowledge of the structure, physiology and growth.
- 3-Analyze the different application of physiology and microbiology.

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PRE-REQUIREMENTS

You must have acquired the knowledge and the main concept by the course of plant and algae fram, you must have taken the exam.

SYLLABUS

Introduction from Algae. Thallopyta. Bryophyta. Spermaphyta. Pteridopyta. Blue green algae. Journal Characteristics. Reproduction in algae. Phylogenetic system of classification. Green Algae. Diatoms. Phaeophta.

Algae fram. Chlorealla. Chlamydomona. Microcystis. Dinobryon.

Unicellular algae. Colonial algae. Filamentous algae. Chara algae. Growth in algae. Reproduction in algae. Golden algae. Algae isolation and cultivation. Practical Experiments selected.

Volvox. Secendesmus. Pediastrum. Oedogonum. Scytonema. Cladophora. Cup shape Chlamydomona chlorella.

TEACHING METHODS

The course includes 180 hours of teaching between lessons and exercises.

In particular it is provided 60 hours of lectures and 120 hours of guided exercises in the laboratory.

TEXTBOOKS

Algae Science

Archenics

COURSE: GENERAL MICROBIOLOGY ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing

| | | |
|--|----------------------------|---|
| TEACHER: Assistant Professor. Rahem Alziadi | | E-mail: rahem_enad@mu.edu.iq |
| Language: Arabic | Exclusions: Bio 401 | Level: 4 |

n. of hours in week: 4 (2 of theoretical and 2 of practice).

n. of hours annually: 120 (60 of lessons and 60 of tutorials/practice)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The main objective of the course is to provide students with the basis to face the study of the major fundamentals of microbiology including bacteriology, virology and immunology. The main knowledge provided will be:

- ❖ knowledge on the understanding of the concepts and fundamental principles of microbiology;
- ❖ key features of the structure, growth, physiology and behavior of bacteria, viruses, fungi and protozoa;
- ❖ Basic knowledge to deal with the study of genetic, metabolic strategies and ecology of microorganisms;
- ❖ basic knowledge of the main microbiological techniques to be applied in the laboratory.

The main skills (ie the ability to apply their knowledge) will be:

- ❖ identify and evaluate critically the principles and the mechanisms underlying the different fields of microbiology;
- ❖ analyze the different applications of microbiology in biotechnology, industry and medicine;
- ❖ use the acquired knowledge to the use of bacteria in the lab and the main sterilization techniques.

PRE-REQUIREMENTS

You must have acquired and assimilated the knowledge and the basic concepts provided by the course of Cell Biology and having taken and passed the exam because of preparation for the microbiology course.

SYLLABUS

Microbial cell . Microbial cell composition. Methodologies to study the microorganisms. Principal features of fungi, algae and protozoa. Microbial metabolism: carbon and energy sources. Fermentations. Aerobic and anaerobic respiration. Bacterial photosynthesis. Fixation of carbon dioxide. Microbial cell structure . Size, shape, growth and movement of bacteria. Gram positive and negative. Structure and function of the cell membrane and wall. molecular structure of flagella and pili. Mathematical nature and expression of microbial growth. cellular transport systems. Taxonomy and classification of bacteria . Archaea. Photosynthetic eubacteria. Chemoautotrophs and mesophilic eubacteria. Gram-negative aerobic eubacteria. Enterobacteria. Gram-negative anaerobes eubacteria. Gram-positive spore-forming eubacteria. Gram-positive fermenting eubacteria. Ascomycetes. imperfect fungi. Yeasts. Bacterial genome . Bacterial chromosome. Transposable genetic elements in prokaryotes. Sequences of insertions. Polar mutations. IS elements. Transposons. Transposable elements in yeast. Mutations. Mutations in evolution. The plasmids. Types of plasmids and their biological significance. Bacterial transformation. Transduction: generalized transduction mediated by phage P22; specialized transduction mediated by phage λ . Conjugation. The properties of the F plasmid and HFR strains. Transfer of other plasmids mediated by plasmid F. Recombination. General homologous recombination: the Rec system in *E. coli*. The site-specific recombination: integration of the phage. Regulation of gene

expression . Regulatory models in catabolic systems. Lac operon. Maltose regulon: example of positive regulation. Arabinose operon: positive and negative regulation. Feedback regulation of enzyme activity. Transcriptional regulation of the trp operon. Systems of regulation of the synthesis of amino acids and of protein synthesis. Global regulation models. Viruses . Structure and organization. Classification of viruses. Viral replication. Viruses of prokaryotes: bacteriophages. Reproduction of bacteriophages. Lytic cycle. Lysogenic cycle. Fago λ . P1 phage. Phage mu. Isolation and characterization of microorganisms from the food matrix (laboratory) Description of the microbiology laboratory, equipment and materials used. Preparation of solutions and of liquid and solid substrates. Isolation of microorganisms from a food matrix. Decimal dilutions. Plates construction. Colony count. Purification of the isolates. Microscopic observation. Layout slides. Coloration. Morphology observation. Treatment with 3% KOH. Catalase test. Phenotypic characterization.

TEACHING METHODS

The course includes 120 hours of teaching between lessons and exercises. In particular it is provided 60 hours of lectures and 60 hours of guided exercises in the laboratory.

TEXTBOOKS

Reference texts:

Microbiology Sciences.

Medical M.O ,

Food M.O ,

Mycology

COURSE: BIOTECHNOLOGY ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing

TEACHER: Assistant Professor. Rahem Alziadi

E-mail; rahem_enad@mu.edu.iq

Language: English

Exclusions: Bio 401

Level: 4

n. of hours in week: 2 theoretical

n. of hours annually: 60 of lessons

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

To produce graduates that understand fundamental genetic principles and apply that understanding to analyze and manipulate traits in living organisms. Graduates' ability to analyze and manipulate the genetics of these organisms derives from competency in fundamental molecular genetic laboratory techniques and appreciation of the sanctity of all life. Through Gospel-centered values, they recognize the worth of human life along with our role as stewards over the earth. The genetics and biotechnology curriculum is flexible and has been designed to meet the needs of individual students with varying scientific interest. Basic requirements include a minimum of 61 credit hours of course work within four general tracks: animal and human genetics; plant genetics; microbial genetics; and biotechnology business (see program MAP). Evidence that this program is achieving its goals comes from the placement of graduates in the life sciences industry, in health professions schools, in law or graduate business programs, or in scientific graduate programs at leading universities in the United States and abroad.

Learning Objectives

By the end of the term, you should be able to:

- Understand the basic biological principles that are an integral part of modern day research
- Understand how biological principles are applied in research in terms of the strategy and tools
- Gain an overview of the Biotechnology industries
- Understand the product-based goals of Biotechnology and how biology is being used to achieve them

PRE-REQUIREMENTS

You must have acquired and assimilated the knowledge and the basic concepts provided by the course of Genetics, Microbiology and having taken and passed the exam because of preparation for the microbiology course.

SYLLABUS

- ❖ introduction to biotechnology
 - ❖ Protein structure and engineering
 - ❖ Plant cell culture
 - ❖ some of the basic concepts of biotechnology.
 - ❖ Oncogenes and Tumor suppressors p53-Mdm2 Metabolism
 - ❖ Genome sequencing and personalized medicine
 - ❖ Therapeutic approaches BRCA Biomarkers Epigenetics
 - ❖ Transgenic mice
 - ❖ Cloning exercise.
 - ❖ The human genome project
 - ❖ Genetic Engineering
 - ❖ •CRISPR/Cas9 system
-

TEACHING METHODS

The course includes 60 hours of teaching lessons.

TEXTBOOKS

Principles of Biotechnology



COURSE: PLANT PHYSIOLOGY ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing**LECTURER:** Dr. Arshad Naji Alhasnawi**E-mail:** arshad@mu.edu.iq
arshadnhq@siswa.ukm.edu.my
arshadnhq@gmail.com**Language:** Arabic**Exclusions:****Level:** 4**n. of hours in week:** 4 (1 of theoretical and 2 of practice).**n. of hours annually:** 12 (60 of lessons and 60 of tutorials/practice)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The main objective of the course is to provide students with the basis to face the study of the major fundamentals of Plant Physiology. The main knowledge provided will be:

Solutions and colloidal system, Colloidal system, Plant Water Relationship, Diffusion, Diffusion of Gases, Properties of colloidal system, The plant cell, Vacuoles, Nucleus, Endoplasmic reticulum, Golgi Apparatus, Plastids, Mitochondria, Cell wall, Translocation of water and solutes, Plant cell-Water relations, Water Movement, Diffusion, Osmosis, The concept of water potential, Water potential and its components in the plant cell, Imbibition, Plant water relations, Ascent of water in the Xylem tissue, Mechanisms of water translocation, Transpiration, Structure of stomata, Opening and closing of stomata, Factors affecting stomatal movement, Significance of transpirations, Phloem translocation, Structure of phloem, Nature of Materials translocated in the phloem, Mechanisms of transport, Mineral nutrition, Criteria of essentiality, Methods studying mineral nutrition, Cellular metabolism, Enzymes, Electron transport system, Photophosphorylation, Oxidative Photophosphorylation, Carbon cycle that represents photosynthesis, PS I, PS II, Dark reaction photosystem (Dark system), Factors affecting photosynthesis, Respiration, Respiration quotient, Mechanism of respiration, Krebs cycle, Crassulacean Acid Metabolism, Electron transport system, ATP system, Factors affecting the respiration, Carbohydrate metabolism, Growth and development, Plant growth and morphogenesis, Control of the plant of cell division, Plant growth regulators, Auxins, Physiological effects of Auxins, Gibberellins, Physiological effects of Gibberellin, Cytokinins, Physiological effects of Cytokinin, Growth Inhibitors, Absciscic acid, Ethylene, Biosynthesis of Ethylene, Growth Retardants, the control of flowering, and Methods of breaking seed dormancy

PRE-REQUIREMENTS

You must have acquired and assimilated the knowledge and the basic concepts provided by the course of is the study of how plants work. The emphasis of this course is plant function at the level of the organism. To understand organisms, however, it is necessary to understand the functions of

COURSE parasitology ACADEMIC YEAR 2019-2020

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing

| | | |
|---|------------------------|---|
| LECTURER: Assistant Professor dr. yassir dakheel kremsh alasadiy | | E-mail: dr.yassiralasadiy@mu.edu.iq dr.yassiralasadiy71@gmail.com |
| Language: Arabic | Exclusions: M44 | Level: 4 |

n. of hours in week: 4 (2 of theoretical and 2 of practice).

n. of hours annually: 120 (60 of lessons and 60 of tutorials/practice)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

Goal is a broad definition of student competence. You may remember that we now have eight goals. Examples of these goals include:

- 1- Give a general idea of parasites
- 2- clarifying the relationship of these organisms with other organisms from where be affected and effect
- 3- what are the most important diseases caused by these organisms
- 4- To identify the most important relationships down to the parasitic relationship
- 5- TO identify the most important terms used in parasitology from where the types of host, parasites and infectious stages
- 6- Addressed to the most important parasitic phyla
- 7- Illustrate the types of parasites and diseases caused by them and the qualities of each parasite, life cycle and methods of diagnosis, prevention
- 8- Adapting a case-based, cooperative learning strategy to a parasitology laboratory

PRE-REQUIREMENTS

Parasitologists have bachelor's degrees in biology, biochemistry, or microbiology, along with master's degrees. Those who want to teach or lead research programs also have Ph.D.s. They are professionals with curiosity and skills in teamwork, communication data analysis and using research software.

SYLLABUS

Introduction of parasitology-Types of parasites-Taxonomic classification of protozoa and helminthic

The nature of HOST-PARASITE Interactions-PARASITE SURVIVAL FACTORS -

CONDITIONS NECESSARY FOR SUCCESSFUL ENDEMIC - PARASITISM

Types of parasitism-Geographic distribution-Types of host-Types of Life cycle-Vector- Carrier host - Phoresis (Phoresy)-infections and exits of infection, factors affecting the spread and intensity of parasitic infections- Phylum: protozoa , characteristics and manifestations of the phylum (characteristics of the Phylum: protozoa, body composition)- Life aspects of the Division (nutrition, movement, respiration, secretion, reproduction, secretion, growth, response to stimuli, ticking, classification of protozoa)-

Class: *Sarcodina*

Entamoeba histolytica

Entamoeba coli

Endolimax nana

Iodamoeba butschlii

Dientamoeba fragilis

Entamoeba gingivalis

free living amoeba

[*Naegleria fowleri*] [*Acanthamoeba spp.*] [*Balamuthia mandrillari*]

Class: *Mastigophora*

1- *Giardia intestinalis*

2-*Chiomastix mesnili*

3-*Trichomonas vaginalis*

4-*T.tenax*

5-*T. hominis*

6-*T. foetus*

Blood and tissue *Mastigophora*

2- *Leishmania tropica*

1- *L.donovani*

Trypanosoma gambianse

T. cruzi

Class: *sporozoa*

(*P. ovale* ,*P. malariae* , *P. falciparum* , *Plasmodium vivax*)

Toxoplasma gondii

Class: Ciliophora

Blantidium coli

All parasites mentioned above are studied in the form and composition of the parasite, life cycle, pathology, epidemiology, diagnosis, prevention

Phylum: Platyhelminthes

Characteristics of the Division of flatworms, body wall installation, gastrointestinal tract, urinary system, nervous system, reproductive system, life cycle

Class; Trematoda

(Characteristics of the class and Orders)

1- Liver flukes -1

Fasciola hepatic

Clonorchis sinensis

Intestinal flukes

Fasciolopsis buski

Heterophyes heterophyes

Blood flukes

Schistosomatidae

S. mansoni *Scistosoma haematobium*

S. japonicum

Lung flukes

Paragonimus westermani

Class: Cestoda

Characteristics of the class ,body wall installation, body system, life cycle

Order: Pseudophyllidae

Diphyllobothrium latum

Order : Cyclophyllidae

Taenia saginata

T. solium

Echinococcus granulosus

Dipylidium caninum

All parasites mentioned above are studied in the form and composition of the parasite, life cycle, pathology, epidemiology, diagnosis, prevention

Phylum : Nematoda

1- *Trichinella spiralis*

2-*Trichuris trichura*

3-*Ascaris lumbricoides*

4-*Ancylostoma duodenale*

5-*Strongyloides stercoralis*

All parasites mentioned above are studied in the form and composition of the parasite, life cycle, pathology, epidemiology, diagnosis, prevention

6-*Wuchereria bancrofti*

7-*Draculus medinesis*

All parasites mentioned above are studied in the form and composition of the parasite, life cycle, pathology, epidemiology, diagnosis, prevention

Phylum : Arthropda

Characteristics of the class ,body wall installation, body system, life cycle

Classification (INSECT : Class and order)

Musca domestica

Stomoxys calcitrans

Phlebotomus papata

Glossina

Sarchophagidae

Myiasis

Mosquitoes

Lice

Menopon gallinae

Menacanthus stramineus

Pulex irritans (Fleas)

Ctenocephalides

1- Class: Arachnida

Order: Acarina

A-Ticks

B-Mites

Order: Scorpionoidea

Order Arenea...

TEACHING METHODS

The course includes 120 hours of teaching between lessons and exercises. In particular it is provided 60 hours of lectures and 60 hours of guided exercises in the laboratory.

TEXTBOOKS

References

Atlas of medical Helminthology and protozoology-H.C.Jeffrey and R.M.Leach.third edition – 1993

Parasitology - v- medical microbiology-2005

COURSE: IMMUBOLOGY ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing

| | | |
|---|-------------|------------------------------|
| LECTURER: lecturer. Eqbal Awadh Gatea | | E-mail; eq_bio2013@mu.edu.iq |
| Language: Arabic | Exclusions: | Level: 4 |
| n. of hours in week: 2 of theoretical | | |
| n. of hours annually: 60 of lessons and 60 of tutorials | | |

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

Throughout the semester, students should be able to:

1. Describe how the immune system is able to discriminate self vs. non-self.
 2. Explain how the innate and adaptive immune systems work together to generate an effective immune response against a specific pathogen.
 3. Explain how the immune system is able to respond to so many diverse antigens.
 4. Describe the various steps and checkpoints involved in lymphocyte development.
 5. Explain how and why certain immune cells change their phenotype following activation.
 6. Given certain symptoms of a clinical disease or manipulation, predict the immunological cause of the disorder.
-

PRE-REQUIREMENTS

You 'must have acquired and assimilated the knowledge provided by course a microbiology and having taken and passed the exam because of preparation for the immunology course

SYLLABUS

Introduction, innate immunity, mechanical, chemical and cellular barrier, cytokines, complement,

phagocytosis, inflammatory response, primary and secondary lymphoid organs, Immune system cells, acquired immunity, Passive and active acquired immunity, primary and secondary response, antigen, Major histocompatibility complex, antibodies and types, *theory of antibody formation, Antigen-antibody interaction, Hypersensitivity, Autoimmune disease, Immunodeficiency*

TEACHING METHODS

The course includes 60 hours of teaching of lessons. In particular it is provided 60 hours of lectures.

TEXTBOOKS

Basic immunology for **Abul K. Abbas, Andrew H. Lichtman and Shiv Pillai**

Clinical Immunology: Principles and Practice for Robert R. for Rich, Thomas A. Fleisher, Benjamin D. Schwartz, William T. Shearer and Warren Strober

COURSE: ANIMAL PHYSIOLOGY ACADEMIC YEAR

TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing

LECTURER: Kadhem Mohamed Sabea

E-mail: dr.kadhemajalr@edu.mu.iq

Language: Arabic

Exclusions:

Level: 4

n. of hours in week: 4 (1 of theoretical and 2 of practice).

n. of hours annually: 12 (60 of lessons and 60 of tutorials/practice)

EDUCATIONAL GOALS AND EXPECTED LEARNINGOUT COMES

The main objective of the course is to provide students with the basis to face the study of the major fundamentals of Animal Physiology. The main knowledge provided will be:

- 1-Introduction to physiology
- 2- cell physiology
- 3- energy production
- 4- The blood
- 5- circulatory system
- 6-physiology of digestive system
- 7-physiology of muscular system
- 8- mechanism of muscular energy production
- 9- physiology of respiratory system
- 10- mechanism of inspiratory and expiratory
- 11- physiology of digestive system
- 12 -food digestion
- 13- The digestive in mouth and stomach
- 14- food absorption
- 15- physiology of urinary system
- 16- The nephron
- 17- Male reproductive system physiology
- 18- Female reproductive physiology
- 19- Fertilization and pregnancy physiology
- 20 -Endocrine system physiology
- 21- Pituitary gland
- 22- Adrenal gland
- 23- Thyroid gland
- 24- pancreas
- 25-The sensory organ

PRE-REQUIREMENTS

You must have acquired and assimilated the knowledge and the basic concepts provided by the course of the study of how plants work. The emphasis of this course is animal function at the level of the organism.

SYLLABUS

This course is intended to exemplify the important physiological processes occurring in animals by providing hands-on experience using a diversity of laboratory exercises. For each week we will complete a set of experiments that use current physiological methods to examine a specific part of animal physiology. We use a variety of humans, cockroaches, earthworms, including frogs, and animal models to conduct these experiments.

TEACHING METHODS

The course includes 120 hours of teaching between lessons and exercises. In particular it is provided 60 hours of lectures and 60 hours of guided exercises in the laboratory.

TEXTBOOKS

