برنامج درجة الماجستير المشتركة فى "الإدارة المستدامة للأراضي"

بنظام الساعات الأوروبية ECTS

وما يعادلها بنظام الساعات المعتمدة (ECH)

بين جامعات القاهرة-الإسكندرية-الزقازيق-دمنهور

ضمن الاطار العام

للائحة الدراسات العليا بالكليات المشاركة

المحتويات

مقدمة:

نشأت فكرة إنشاء درجة ماجستير بهدف إرساء وترسيخ أسس الإدارة المستدامة للأراضي بمفهومها الشامل المتكامل بين مختلف مجالات الإنتاج الزراعى بناءًا علي دراسة وافية لاحتياجات المجتمع والسوق على جميع مستوياته المحلية والإقليمية لتفعيل هذا المفهوم الذى يضمن استدامة الموارد لتفى باحتياجات الأجيال الحالية واللاحقة من الموارد الغذائية المتنوعة، بمبادرة من ممثلى بعض الجهات الأوروبية (مركز أبحاث التصحر- جامعة ساساري– ايطاليا، جامعة ليدز– المملكة المتحدة، جامعة أرسطو – اليونان، اتحاد جامعات البحر المتوسطية UNIMED، شركة نظم الحاسبات المتقدمة .A.C.S) وأربع جامعات مصرية (القاهرة، الإسكندرية، الزقازيق، دمنهور) لإعداد مقترح لمشروع انشاء درجة ماجستير مشتركة بعنوان:

"الإدارة المستدامة للأراضي" Sustainable Land Management

في إطار برنامج Erasmus Plus KA2 لدعم تطوير التعليم العالي والذى بدوره وافق على تمويل المشروع والذى كان من ثماره هذا المقترح الذي يهدف إلي إنشاء و تفعيل درجة ماجستير مشتركة بين الجامعات المصرية الأربعة تتميز بالخصائص والمردودات التالية:

1- يتيح هذا البرنامج فرصا لتبادل الخبرات العلمية والبحثية بين أعضاء هيئة التدريس والطلاب في الجامعات المصرية المشاركة وكذا الجامعات الأوروبية المشاركة فى المرحلة الحالية ومن جامعات أخري في مراحل لاحقة.

2- الاستفادة من وجود خبرات متميزة من جامعات أوروبية شاركت مع متخصصين متميزين من ممثلى الجامعات المصرية المشاركة فى إعداد محتوى درجة الماجستير والتى روعى فيها إدارة المقررات والأنشطة الدراسية بنظام الساعات المعتمدة الأوروبى (ECTS) وما يعادلها بنظام الساعات المعتمدة الأمريكية المعترف به بالجامعات المصرية (ECH)، وكذلك إستثمار الإمكانات المتنوعة التى تزخر بها الجامعات المشاركة لسد احتياجات السوق المحلية والإقليمية والعالمية.

3- زيادة الوعى المجتمعى حول أهمية الإدارة المستدامة المتكاملة للأراضي من خلال الممارسات البحثية والتطبيقية المدعومة بالخبرات الأكاديمية خلال تنفيذ مشروعات درجة الماجستير المقترحة (الإدارة المستدامة للأراضي).

4- إمكانية تطبيق وتفعيل أحدث التقنيات فى التي تؤمن الإدارة المستدامة للأراضي الزراعية وغير الزراعية بمشاركة خبراء ومتخصصين فى هذا المجال محليًا وأوروبيًا.

5- الخريجون من درجة الماجستير فى الإدارة المستدامه للموارد الأرضيه سوف يكونوا مؤهلين للعمل فى مواقع مختلفه مثل:

- إدارة وتخطيط الموارد الأرضيه وخاصة في التوسعات العمرانية والزراعية.
- مشروعات تنمية الأراضي.
- معالجة المشاكل الناشئة عن التوغل العمراني وتصحر الأراضي الزراعية.
- تقييم الأثر البيئي لمشروعات التنمية الزراعية.
- المشاركه فى وضع وتنفيذ سياسات استخدام الأراضي الزراعية وشؤون الأمن الغذائي.
- استصلاح الأراضي ومشروعات التنمية الزراعية المتخصصة.

- أخصائي إدارة خصوبة التربة.
- المحميات الطبيعية (المناطق المحمية).
- التوظيف مع وكالات إدارة الأراضي الزراعية مثل وزارة الزراعة ومنظمات التخطيط المحلية والإقليمية مثل وزارة الإسكان والتعمير والشركات الاستشمارية فى قطاع التنمية الزراعية.
- مجال الزراعة الدقيقة التي تتطلب مهنيين يمكنهم التعامل مع البيانات وتطبيقات الحاسوب ولتعامل مع نظم المعلومات الجغرافية GIS والاستشعار عن بعد.

وسوف يتم تدريس درجة الماجستير فى الادارة المستدامة للأراضي فى اربع جامعات مصرية فى نفس الوقت حيث ان المقررات الدراسية بها قد تم وضعها بصورة مشتركة بين الاربع جامعات المصرية بالتعاون مع الشركاء الاوروبيين ، وكذلك فإن توزيع هذه المقررات على الفصول الدراسية واحد فى الاربع جامعات كما تم وضع جدول يوضح كود هذه المقررات الدراسية فى الاربع جامعات.

الباب الأول: ادارة وتنسيق البرنامج

1) اللجنة العلمية للبرنامج على مستوى كل كلية من كليات الجامعات المشاركة بالبرنامج:

يتم تشكيل لجنة علمية للتنسيق للبرنامج برئاسة السيد الأستاذ الدكتور/ العميد أو وكيل الكلية لشؤون الدراسات العليا والبحوث، ويجوز تحديد أحد الأقسام العلمية بالكلية للتنسيق لبرنامج درجة الماجستير المقترحة طبقا لرؤية الجامعة المشاركة.

في حالة تشكيل لجنة علمية للتنسيق للبرنامج يجب مراعاة البنود التالية:

1- يتم تشكيل اللجنة بقرار من مجلس الكلية أو العميد يتضمن أسماء رئيس اللجنة وأعضائها بحد أقصى إجمالى سبعة (7) على أن يراعى أن تتضمن اللجنة عضو ممثل على الأقل من كل قسم علمى يقوم بالمشاركة فى تدريس مقررات البرنامج.

2- مدة سريان عمل اللجنة 3 سنوات دراسية متتالية.

3- تجتمع اللجنة بمقر يحدده عميد الكلية وترفع توصياتها لمجلس القسم المختص للاعتماد من عميد الكلية أو مجلس الكلية المختص لكل جامعة.

4- مهام اللجنة: تقوم اللجنة برفع توصياتها لمجلس القسم المختص / المعني بالموضوع على مستوى الكلية فيما يخص المهام المتضمنة التاليه:

أ- التوصية بتوزيع ملفات الطلاب المتقدمين على المشرفين الأكاديميين المقترحين بالأقسام العلمية المعنية بالكلية لاستكمال الملف واجراءات التسجيل.

ب- مراجعة المواضيع البحثية للتأكد من توافقها مع الخطة البحثية للكلية والجامعة وكذا مع أهداف ومخرجات البرنامج.

ج- مراجعة تقارير تقدم الطالب السنوية قبل إعتمادها من مجلس الكلية.

د- اقتراح أسماء القائمين بالتدريس لكل مقرر بالبرنامج على مستوى الكلية.

ه- مراجعة الإفادات بتقديرات المقررات التى درسها الطالب المنتسب من جامعات أخرى والأنشطة التى قام بها فى الجامعة المضيفة.

و- البت فى أى طلبات/ شكاوى...إلخ ورفع توصيتها لمجلس القسم المختص لرفعها لمجلس الكلية بالجامعة التى قام الطالب بالتسجيل فيها للإعتماد.

ز- الرد على استفسارات الراغبين فى الالتحاق بالبرنامج.

ح- متابعة الأداء وكتابة التقرير السنوي للبرنامج من خلال فحص تقارير المقررات وما تتضمنه من مقترحات التحسين والأفعال التصحيحية.

ط- التسويق للبرنامج على مستوى الكلية/الجامعة.

2) اللجنة التنسيقية للبرنامج (على مستوى الجامعات المشاركة بالبرنامج):

1- يتم تشكيل اللجنة من 8 اعضاء (عضوين من كل جامعة) علي أن يمثل الجامعة رؤساء اللجان العلمية بالبرنامج أو من تفوضه كل كلية من الجامعات المشاركة بالإضافة إلي عضو آخر من أحد الأقسام التي تقوم بالتدريس في البرنامج.

2- مدة سريان عمل اللجنة 4 سنوات دراسية متتالية.

3- يرأس اللجنة أحد أعضائها بالتناوب بين ممثلى الجامعات المشاركة كل عام على أن يكون الانتخاب فى الثلاث أعوام الأولى هو طريقة اختيار رئيس اللجنة مع استبعاد من تم اختياره مسبقًا لرئاسة اللجنة خلال العام الثانى والثالث.

4- مهام اللجنة التنسيقية:

أ- البت فى الأمور المتعلقة بتبادل الأساتذة واختيار الطلاب بين الجامعات المشاركة.

ب- البت في انضمام جامعات أخري (مصرية أو أوروبية أو غيرها) للبرنامج.

ج- النظر فى الأمور المتعلقة بتطوير وتحسين جودة البرنامج.

د- التسويق للبرنامج على جميع المستويات.

ه- النظر فى الشكاوى المقدمة للجنة التنسيقية عن المشاكل المحتملة بين الجامعات ورفع توصيات بالحلول المقترحة للقسم العلمي المختص / اللجان العلمية بكليات الجامعات المشاركة.

5- تنعقد اللجنة مرة على الأقل كل فصل دراسى لتمارس مهامها من القسم العلمي المختص / أحد مواقع اللجان العلمية للبرنامج على مستوى الكلية بالجامعات المختلفة وارسال توصياتها إلى القسم العلمي المختص / اللجنة العلمية للبرنامج والتى تقوم برفعها إلى عميد الكلية أو مجلس الكلية المعنى بكل جامعة للإعتماد والتفعيل.

3) الشروط العامة للتقدم للدرجة (التسجيل):

1- يتقدم الطالب للتسجيل بإدارة الدراسات العليا بالكلية التابعة لأحد الجامعات المشاركة فى البرنامج والتى يرغب فى الحصول على شهادته منها ووفقًا للشروط العامة والخاصة المعتمدة بالكلية.

2- يحق للطالب دراسة مقرر/فصل دراسى/عام كامل بأى من كليات الجامعات الأخرى المشاركة فى البرنامج بناء على رغبته بعد إعداد طلب رسمى (موقعا من المرشد الأكاديمي ومعتمدًا من إدارة الكلية) وبعد فحصه من قبل القسم العلمي المختص / اللجنة العلمية للبرنامج، ثم موافقة لجنة إدارة البرنامج / القسم العلمي المختص (بالكلية المضيفة)، وذلك بعد سداد الرسوم المقررة والتي تحددها الكلية المضيفة.

3- يسجل الطالب بالجامعة المضيفة كطالب منتسب المقرر/فصل دراسى/عام جامعى.

4- بعد انتهاء الطالب المنتسب من المقررات الدراسية / الفصل الدراسى / العام الجامعى يُمنح إفادة معتمدة من الكلية/ الجامعة المضيفة بتوصية من لجنة إدارة البرنامج بتقديرات المقررات والأنشطة التى قام بأدائها بالجامعة المضيفة لتعادل ما يناسبها بالجامعة المسجل بها، وتضاف إلى السجل الدراسي للطالب.

5- يتبع النظام الكودى للمقررات الدراسية نظام الكلية بكل جامعة مشاركة. ويدرج هذا داخل دليل يوزع علي الطلبة الراغبين في التسجيل وينشر علي الموقع الرسمي للبرنامج المشترك بين الجامعات المختلفة المشاركة، كما هو موضح بجدول (1).

6- تُطبق القواعد الواردة بقانون تنظيم الجامعات ولائحته التنفيذية المعدلة له، والقوانين الأخرى ذات الصلة والمعتمدة من الدولة فيما لم يرد فى شأنه نص خاص بهذه الشروط.

4) الشروط العامة لمنح الدرجة:

1. يراعى القواعد المنظمة والمنصوص عليها بلائحة الدراسات العليا بالكلية فيما يتعلق لمتطلبات منح الدرجة.
2. يتم تقييم الطالب بالمقررات التي درسها وفقا للنقاط والتقدير التي تتناسب وشروط وقواعد كل كلية من الجامعات المشاركة، ويوضح جدول (2) انموذجًا لها.

جدول (1): مقارنة كود المقررات الدراسية فى الجامعات المشاركة بالبرنامج

اسم المقرر	كود جامعة القاهرة	كود جامعة الاسكندرية	كود جامعة الزقازيق	كود جامعة دمنهور
النظام البيئى الزراعى	SLM 805	SLM 14730	SLM 701	SLM 27805
التنوع الحيوى وخدمات النظام البيئى	SLM 806	SLM 14731	SLM 702	SLM 27806
تدهور الاراضى متقدم	SLM 807	SLM 14732	SLM 703	SLM 27807
نظم المعلومات الجغرافية والتحليل المكانى	SLM 809	SLM 14733	SLM 704	SLM 27809
تحليل طيفى متقدم	SLM 808	SLM 14734	SLM 705	SLM 27808
اقتصاديات تدهور الاراضى	SLM 810	SLM 14760	SLM 707	SLM 27810
التحليل الاحصائى الزراعى	SLM 803	SLM 14761	SLM 724	SLM 27803
لغة انجليزية للباحثين وكتابة المشروعات البحثية	SLM 801	SLM 14762	SLM 790	SLM 27801
طرق البحث والتواصل العلمى	SLM 804	SLM 14763	SLM 794	SLM 27804
تدريب ميدانى	SLM 899	SLM 14799	SLM 791	SLM 27799
بحث علمى (الرسالة العلمية)	SLM 850	SLM 14700	SLM 793	SLM 27700
مناقشات فى الادارة المستدامة للأراضي	SLM 800	SLM 14701	SLM 792	SLM 27701
تخطيط استخدام الارض للتنمية المستدامة	SLM 851	SLM 14735	SLM 708	SLM 27851
تقييم اراضى منقدم	SLM 853	SLM 14736	SLM 709	SLM 27853
تغير المناخ والامن الغذائى	SLM 855	SLM 14737	SLM 710	SLM 27855
نمذجة تغيرات استخدام الارض	SLM 857	SLM 14738	SLM 711	SLM 27857
سياسات وتشريعات استخدام الارض	SLM 859	SLM 14739	SLM 712	SLM 27859
تلوث ومعالجة الاراضى والمياه متقدم	SLM 861	SLM 14740	SLM 713	SLM 27861
مدخل النظم لادارة الموارد المائية	SLM 863	SLM 14741	SLM 714	SLM 27863
الجوانب الاجتماعية والاقتصادية في إدارة الموارد المائية	SLM 865	SLM 14742	SLM 715	SLM 27865
الادارة المستدامة لخصوبة التربة	SLM 867	SLM 14743	SLM 716	SLM 27867
نظم الزراعة البديلة	SLM 869	SLM 14744	SLM 717	SLM 27869
نمذجة النظام النباتى فى ادارة الارض	SLM 871	SLM 14745	SLM 718	SLM 27871
نمذجة النظام الحيوانى فى ادارة الارض	SLM 873	SLM 14746	SLM 719	SLM 27873
الادارة (المكافحة) المتكاملة للافات	SLM 875	SLM 14747	SLM 720	SLM 27875
الاقتصاد الزراعى التطبيقى	SLM 877	SLM 14748	SLM 721	SLM 27877
ادارة المخلفات الزراعية متقدم	SLM 879	SLM 14749	SLM 722	SLM 27879

3. يُمنح الطالب شهادة درجة الماجستير المشتركة في الإدارة المستدامة للأراضي مشتملة علي رموز الجامعات المشاركة بالبرنامج (Participating Universities Logos) علي أن تُعتمد بتوقيع رئيس الجامعة (أو من ينوب عنه أو يفوضه) التي قام الطالب بالتسجيل فيها.

جدول رقم (2): تقييم الطالب بالنقاط والتقدير

التقدير	التقدير	النقاط	الدرجة
ممتاز	A	4.000	>- 90
	A-	3.666	85 < 90
جيد جدا	B+	3.333	80 < 85
	B	3.000	75 < 80
جيد	B-	2.666	70 < 75
	C+	2.333	65 < 70
مقبول	C	2.000	60 < 65
ضعيف	C-	1.666	55 < 60
	D+	1.333	50 < 55
	D	1.000	40 < 50
ضعيف جدا	F	0.000	< 40
يرصد للطالب المنسحب من مقرر	W	---	
يرصد للطالب المنسحب إجبارياً من المقرر	FW	---	
يرصد للطالب الذي لم يكمل متطلبات المقرر	I	---	
يرصد للطالب المنسحب لأداء الخدمة العسكرية	MW	---	
يرصد للطالب المسجل مستمع	L	---	
يرصد للطالب المسجل لساعات الرسالة العلمية ولم تكتمل بعد	IP	---	
يرصد للطالب تقدير مرضى عند مناقشة الرسالة العلمية بنجاح	S	---	
يرصد للطالب تقدير غير مرضى عند رسوبه في مناقشة الرسالة العلمية	U	---	

الباب الثاني: التوصيف الأكاديمى لبرنامج الماجستير

الرؤية Vision

نشر ثقافة راقية وممارسات سليمة للإدارة المستدامة للأراضي حفاظا على النظم البيئية وتحقيقا لتنمية زراعية ومجتمعية.

الرسالة Mission

اعداد كوادر متخصصة مؤهلة في مجال الإدارة المتكاملة والمستدامة للأراضي علي وعي بالمعلومات والتقنيات الحديثة ومزودة بالمهارات العامة والمتخصصة التي تمكنها من المنافسة في سوق العمل ومواجهة المشكلات الحالية والمستقبلية ومواكبة التطورات العالمية.

الأهداف Objectives

تهدف درجة الماجستير الجديدة إلى تزويد الخريجين بالمعرفة اللازمة والفهم العميق للنواحى العلمية والعملية والسياسات والأطر التشريعية وكذلك تزويدهم بالمهارات العاليه فى مجال الإدارة المستدامة للأراضي وذلك عن طريق:

- بناء القدرات وتحسين طرق وجودة التدريس بحيث تتجاوب مع الإحتياجات القوميه و تتواكب مع المرجعيات العالميه.
- بناء شبكة تواصل لدعم الشراكه الفعالة والتعاون مع مختلف الأطراف المعنية بمجال الإدارة المستدامة للأراضي محليا ودوليا.
- توفير الأسس العلميه لمنهجية الإدارة المستدامة للأراضي فى النظام البيئي الشامل والمتكامل.
- تعلم الطلاب كيفية التقييم النقدي للقضايا العملية وفهم السياسات المعقدة التي تنطوي عليها الإدارة المستدامة للأراضي وصولاً إلي حلول وإستراتيجيات تطوير سليمة.
- تتيح درجة الماجستير الجديده للطلاب التطرق والتعمق والتركيز على بعض قضايا التنمية الوطنية المختارة مثل الأمن الغذائي والزراعة المستدامة.
- سد متطلبات الدوله والشركات من الكوادر المتخصصة والمدربة تدريبًا عاليًا والقادرة على تنفيذ استراتيجيات الإدارة المستدامة للأراضي والمياة.
- تزويد الخريجين بقدرات تحليل المشاكل الحقيقية للأراضي من خلال العمل الميداني وصولا إلي حلول واقعية وناجزة. .
- تبنى منهجية التخصصات التعددية والبينية في مجال الإدارة المتكاملة للأراضي وصولا لتقييم أشمل وحلولا أنجح في مجابهة المشكلات المحلية والإقليمية من خلال النظرة المتكاملة الشاملة التى تستند على قاعدة واسعة من مجالات علمية شتى من العلوم البحتة والتطبيقية الزراعية والهندسية والعلوم الاجتماعية والقانونية والاقتصادية.

- التركيز على آليات حماية الأراضي في مصر العربية ودول المنطقة العربية والافريقية ومواجهة مشكلات تدهور الأراضي الزراعية وتراجع مساحاتها نتيجة للتصحر والزحف العمرانى مما يعقد قضية الامن الغذائى ويقلل من القدره على تحقيق التنمية المستدامة.

مخرجات التعلم المستهدفة Intended Learning Outcomes

أ) المعرفة والفهم Knowledge and Understanding

أ1- يُدرك النظريات والأسس العلمية الخاصة بإدارة وتخطيط الأراضي والمياه وتنميتها المستدامة.
أ2- يُعرِّف النظريات والظواهر العلمية لمجالات العلوم الأخرى (إحصاء– اقتصاد....) وثيقة الصلة بالإدارة المستدامة للأراضي.
أ3- يتعرف علي الجوانب السلبية والايجابية لممارسة المهنة في الحفاظ على البيئة.
أ4- يُدرك أهمية الاستخدام الآمن للمبيدات واضافاتها.
أ5- يُحدد اجراءات السلامة المهنية للعمل في مجالات الإدارة المستدامة للأراضي.
أ6- يُعد موضوعات علمية حديثة في أحد مجالات الإدارة المستدامة للأراضي.
أ7- يتعرف علي التقنيات الحديثة المتبعة في نمذجة أنظمة الإنتاج الزراعي المختلفة.
أ8- يُلم بالمبادئ والتشريعات القانونية والأخلاقية الخاصة بممارسة المهنة في مجال الإدارة المستدامة للأراضي.
أ9- يتعرف علي معايير ومواصفات جودة الأداء في مجال الإدارة المستدامة للأراضي.
أ10- يُلم بمبادئ وأخلاقيات البحث العلمي في مجال الإدارة المستدامة للأراضي.

ب) المهارات الذهنية والفكرية Intellectual Skills

ب1- يُناقش البيانات والمعلومات المتعلقة بمشاكل الإدارة المستدامة للأراضي.
ب2- يُقيم المعلومات والظواهر الخاصة بمشاكل الإدارة المستدامة للأراضي.
ب3- يُحدد المشاكل المتعلقة بمعوقات الإدارة المستدامة للأراضي تحت الظروف الطبيعية والمعاكسة.
ب4- يضع حلول للمشاكل في ضوء البيانات والمعلومات التي تم جمعها.
ب5- يربط المعارف والمفاهيم الخاصة بعلوم الإدارة المستدامة للأراضي مع العلوم الأخرى لحل مشاكل الإنتاج المختلفة.
ب6- يُصمم برنامج أو أنموذج لتعظيم انتاجية الأراضي.
ب7- يصف الأساليب العلمية الطرق الاحصائية المناسبة في تنفيذ المشروع البحثى.
ب8- يُصمم مشروع بحثي يتناول حل مشكلة متعلقة بمجال الإدارة المستدامة للأراضي.
ب9- يُحدد المخاطر ذات الصلة بعمليات الانتاج الزراعي (النقل – التداول – الذبح – التصنيع – التخزين .... ألخ).
ب10- يُخطط لتلافي المخاطر باستخدام وسائل وطرق الأمن والسلامة المناسبة.
ب11- يتخذ القرار المناسب للتعامل مع المشاكل المتعلقة بالإدارة المستدامة للأراضي.

ج) المهارات المهنية والعملية Professional Skills

ج1- يُحلل العينات معمليًا باستخدام الأجهزة المناسبة.
ج2- يُقيم نتائج التحليل ويستخدمها لتعظيم الإستفادة في اطار الإدارة المستدامة للأراضي.

ج3- يُطبق برامج الإدارة المناسبة لظروف الإنتاج المختلفة.
ج4- يستخدم التقنيات الحديثة في مجال الإدارة المستدامة للأراضي.
ج5- يُعد التقارير العلمية الفنية المتخصصة.
ج6- يكتب مقترح لمشروع بحثي في مجال التخصص.
ج7- يُطبق أساليب الانتاج المثلي في نطاق الإدارة المستدامة للأراضي.
ج8- يستخدم مستلزمات الانتاج المناسبة في مجال الإدارة المستدامة للأراضي.
ج9- يستخدم الطرق والحزم الاحصائية بكفاءة ويختار المناسب منها لمعالجة وتحليل وعرض البيانات وتفسير النتائج.

د) المهارات العامة General and Soft Skills

د1- يُشارك مع الآخرين فى المناقشات العلمية شفاهة وكتابة.
د2- يُقدم عروض الكترونية مرئية باللغتين العربية والانجليزية.
د3- يستخدم بكفاءة تكنولوجيا المعلومات وتقنيات الحاسب في مجال التخصص.
د4- يُحلل البيانات باستخدام برامج الحاسب الألي المناسبة.
د5- يُشارك في المشروعات البحثية والندوات والمؤتمرات وورش العمل بهدف تنمية مهاراته الشخصية والأكاديمية والمهنية.
د6- يستخدام قواعد البحث الالكترونية بكفاءة للحصول على المعلومات المتعلقة بمجال تخصصه.
د7- يُشارك في تقييم زملائة.
د8- يعمل بكفاءة ضمن فريق و يظهر مهارات قيادة فريق عمل بتحديد أهداف ومسئوليات المشاركين لانجاز مهمة في مجال التخصص.
د9- يُدير الوقت أثناء المناقشات العلمية بفاعلية ويعمل تحت ضغط لانجاز مهمة علمية.
د 10- يستخدم مدى واسع من المصادر المعلوماتية بشكل فعال ومستمر (شبكة المعلومات-المكتبة- النشرات الفنية- الدوريات والكتب المرجعية...).

<u>المحتوى العلمي لدرجة الماجستير:</u>

لكى يحصل الطالب على الماجستير في الإدارة المستدامة للموراد الارضية فيجب عليه أن يجتاز بنجاح المقررات الدراسية الخاصة بالبرنامج طبقاً لنظام الساعات المعتمدة الأوروبية European Credit Transfer System (ECTS)، وما يعادلها بنظام الساعات المعتمدة الأمريكية المعترف بها بالجامعات المصرية Egyptian Credit Hours (ECH) والتي تتوافق مع المعايير القومية الأكاديمية القياسية (NARS) لدرجة الماجستير والمعتمدة من الهيئة القومية لضمان جودة التعليم والإعتماد (NAQAAE)، والتي تتسق مع المخرجات التعليمية المستهدفة من البرنامج (الملحقات جدول أ) كما يلى:

1- يشتمل البرنامج على120 ساعة اوروبية معتمدة تعادل 38 ساعة معتمدة أمريكية يقوم الطالب بدراستها خلال عامين اكاديميين تنتهي بعد اجتيازها بنجاح بالاضافة الى إعداد الرسالة العلمية ومناقشتها بنجاح بالحصول على درجة الماجستير في الإدارة المستدامة للموراد الارضية، كما هو موضح بشكل (1) وجدولي (3، 4).

2- يتكون البرنامج من مجموعة من المقررات الدراسية الإجبارية والاختيارية يصل مجموعهما إلى 90 ساعات أوروبية (تعادل 30 ثلاثين ساعة معتمدة امريكية) بالإضافة إلى إعداد رسالة علمية بعدد 30 ساعة أوروبية (تعادل 8 ثمانية ساعات معتمدة امريكية) كما يلي:

أ- <u>المقررات الدراسية الاساسية:</u>

1) يتطلب البرنامج دراسة 24 ساعة معتمدة من المقررات الاساسية (الإجبارية العامة).
2) هذه المقررات الاجبارية تتبع 6 مجالات عامة بالإضافة للرسالة العلمية، كما هو موضح فى شكل (1) وجدول (3)، وتشتمل على 15 ساعة معتمدة مقررات اجبارية موزعة على 3 مجالات، 4 ساعات معتمدة للتدريب الميدانى، 3 ساعات ساعات معتمدة مناقشات، ساعتان معتمدتان للغة الإنجليزية وطرق البحث والتواصل.

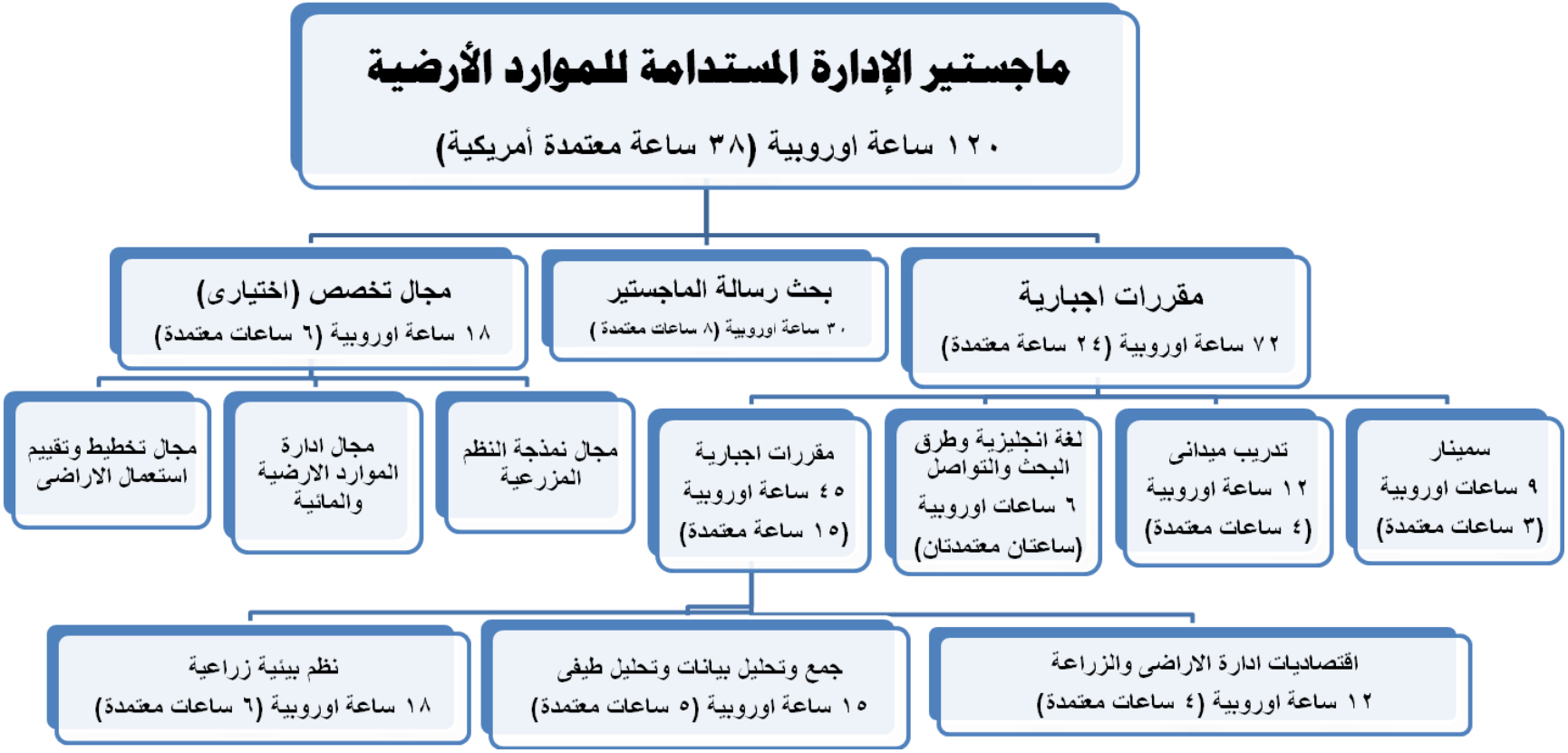
ب- <u>المقررات الدراسية التخصصية / الإختيارية:</u>

1) يقوم المرشد الأكاديمي الطلاب بتوجيه الطلاب الى كيفية اختيار المقررات التخصصية.
2) تزود هذه المقررات الطلاب بالمهارات المعرفية التخصصية وجميعها مقررات اختيارية تتطلب دراسة 18 ساعة أوروبية تعادل 6 ساعات معتمدة (3 مقررات) من احد المجالات التخصصية الموضحة فى شكل (1) وجدول (3).

ت- <u>البحث والرسالة العلمية:</u>

يشتمل برنامج الماجستير على عمل بحث وإعداد رسالة علمية بما يعادل 30 ساعة معتمدة أوروبية (8 ساعات معتمدة أمريكية معتمدة بالجامعات المصرية).

3- الطلاب من خارج التخصص: إذا تقدم الطالب للتسجيل فى غير مجال تخصصه فى درجة البكالوريوس فى العلوم الزراعية يكلف بدراسة عدد من الساعات المعتمدة التكميلية من مقررات مرحلة البكالوريوس والتى يحددها مجلس القسم العلمي المختص / اللجنة العلمية للبرنامج بالجامعة التي يسجل فيها الطالب، والتى لم يسبق له دراستها كمقررات مؤهلة لدراسة الماجستير على أن ينجح فيها بتقدير عام جيد مرتفع (75% فأعلى من درجة النهاية العظمي أو ما يعادلها +C) على الأقل حتى يمكن تسجيله لدرجة الماجستير.



شكل (1): توزيع المقررات الدراسية لدرجة الماجستير فى الادارة المستدامة للأراضي

جدول (3): مجالات ومقررات درجة الماجستير فى الادارة المستدامة للأراضي

أ- المقررات الاساسية (الاجبارية) 24 ساعة معتمدة تعادل 72 ساعة أوروبية			
المجال	المقررات اجبارية	ساعة اوروبية	ساعة معتمدة
الادارة المستدامة للنظم البيئية الزراعية	النظام البيئى الزراعى	6	2
	التنوع الحيوى وخدمات النظام البيئى	6	2
	تدهور الاراضى متقدم	6	2
جمع وتحليل بيانات الارض والتحليل الطيفى	نظم المعلومات الجغرافية والتحليل المكانى	9	3
	تحليل طيفى متقدم	6	2
اقتصاديات ادارة الارض والزراعة	اقتصاديات تدهو الاراضى	6	2
	التحليل الاحصائى الزراعى	6	2
لغة اجليزية علمية وكتابة المشروعات	لغة انجليزية للباحثين وكتابة المشروعات البحثية	3	1
	طرق البحث والتواصل العلمى	3	1
التدريب الطلابى	تدريب ميدانى	12	4
مناقشات	مناقشات فى الادارة المستدامة للأراضي	9	3
المجموع		72	24

رسالة الماجستير MSc Thesis	30	8

ب- المقررات التخصصية (اختيار مجال تخصص ثم دراسة 6 ساعات معتمدة تعادل 18 ساعة اوروبية)			
المجال	المقررات الدراسية التخصصية	ساعة اوروبية	ساعة معتمدة
تخطيط وتقييم استعمالات الارض	تخطيط استخدامات الاضى للتنمية المستدامة	6	2
	تقييم اراضى منقدم	6	2
	تغير المناخ والامن الغذائى	6	2
	نمذجة تغيرات التعمالات الاراضى	6	2
	سياسات وتشريعات اساتخدامات الاراضى	6	2
الادارة البيئية للأراضي والمياة	تلوث ومعالجة الاراضى والمياه متقدم	6	2
	مدخل النظم لادارة المياه	6	2
	الجوانب الاجتماعية والاقتصادية في إدارة الموارد المائية	6	2
	الادارة المستدامة لخصوبة التربة	6	2
	نظم الزراعة البديلة	6	2
نمذجة النظم الزراعية فى ادارة الارض	نمذجة النظام النباتى فى ادارة الارض	6	2
	نمذجة النظام الحيوانى فى ادارة الارض	6	2
	الادارة (المكافحة) المتكاملة للافات	6	2
	الاقتصاد الزراعى التطبيقى	6	2
	ادارة المخلفات الزراعية متقدم	6	2
المجموع		18	6

جدول (4): توزيع المقررات على الفصول الدراسية

السنة الاولى: الفصل الدراسي الأول

المقررات الدراسية	محاضرة	عملى	أنشطة	ساعة أوروبية	ساعة معتمدة
التحليل الاحصائى الزراعى	1	2	7	6	2
تدهور الاراضى متقدم	1	2	7	6	2
لغة انجليزية للباحثين وكتابة المشروعات البحثية	1	-	4	3	1
نظم المعلومات الجغرافية والتحليل المكانى	2	2	11	9	3
النظام البيئى الزراعى	1	2	7	6	2
مجموع الساعات				30	10

السنة الاولى: الفصل الدراسي الثاني

المقررات الدراسية	محاضرة	عملى	أنشطة	ساعة أوروبية	ساعة معتمدة
التحليل الطيفى متقدم	1	2	7	6	2
التنوع الحيوى وخدمات النظام البيئى	1	2	7	6	2
مناقشات فى الادارة المستدامة للأراضي	1	-	4	3	1
اقتصاديات تدهو الاراضى	1	-	9	6	2
طرق البحث والتواصل العلمى	1	-	4	3	1
مجموع الساعات				24	8

السنة الاولى: الفصل الدراسي الصيفي

المقررات الدراسية	محاضرة	عملى	أنشطة	ساعة أوروبية	ساعة معتمدة
تدريب ميدانى	-	8	12	12	4
مجموع الساعات				12	4

السنة الثانية: الفصل الدراسي الأول

المقررات الدراسية	محاضرة	عملى	أنشطة	ساعة اوروبية	ساعة معتمدة
مناقشات فى الادارة المستدامة للأراضي	1	-	4	3	1
من الوحدة التخصصية	1	2	7	6	2
من الوحدة التخصصية	1	2	7	6	2
من الوحدة التخصصية	1	2	7	6	2
مجموع الساعات				21	7

السنة الثانية: الفصل الدراسي الثاني

المقررات الدراسية	محاضرة	عملى	أنشطة	ساعة اوروبية	ساعة معتمدة
مناقشات فى الادارة المستدامة للأراضي	1	-	4	3	1
مجموع الساعات				3	1

رسالة الماجستير العلمية MSc Thesis	-	16	34	30	8
مجموع الساعات				30	8

- ساعة أوروبية معتمدة تساوي 25 ساعة فعلية طوال الفصل الدراسي. والفصل الدراسي يعادل 15 إسبوع. الأنشطة يقصد بها أي عملي تعليمي خارج الفصل يتعلق بالمقرر المذكور بما فيها ساعات العمل المنزلي والبحث علي شبكة الإنترنت والزيارات الميدانية وإعداد العروض.
- يجوز تدريس المقررات أو اجراء التدريب الميداني بأي الفصول الدراسية بما لا يتجاوز الحد الأقصى للساعات المعتمدة بالفصل الدراسي (30 وحدة أوروبية أو ما يعادلها) وتبعاً لما تقرره ادارة الكلية بناءًا على توصية اللجنة العلمية للبرنامج / القسم العلمي المختص.

الباب الثالث: محتوى المقررات الدراسية

أولاً: المجالات الإجبارية:

1) مجال الادارة المستدامة للنظم البيئية الزراعية

النظام البيئى الزراعى

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

النظم البيئية: مفاهيم وتعريفات - ديناميكية المغذيات فى النظام البيئيى الزراعى – العوامل المتحكمة فى ديناميكية المغذيات فى النظام البيئيى الزراعى – مادة الارض العضوية – الحشائش فى النظام البيئى الزراعى – دور كائنات التربة الحية فى النظام البيئى – النظم الحيوانية – تاثير نظم الرى – النظم المحصولية – جودة النظام البيئي – التحديات الادارية والسياسية.

التنوع الحيوى وخدمات النظام البيئى

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

مكونات ووظائف النظم البيئية الطبيعية – خدمات النظام البيئيى – الطرق المختلفة لقياس التنوع الحيوى – التنوع الحيوى واهميته فى النظم البيئية الزراعية – الضغوط والاستجابات الحالية على التنوع الحيوى – موضوعات الساعة فى التنوع الحيوى – استدامة التنوع الحيوى: طريقة الانواع – التنوع الحيوى ووظائف النظام البيئى – تاثير التنوع الحيوى على حفظ الكربون – اتفاقيات التنوع الحيوى الدولية – مستقبل التنوع الحيوى فى القرن الحادى والعشرين –التنمية المستدامة والتنوع الحيوي.

تدهور الاراضى متقدم

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

مفاهيم التصحر والجفاف والاستصلاح والصيانة – التعرية المائية – التعرية الهوائية – التدهور الكيميائى – الاراضى الملحية والقلوية – كبس وتكوين قشرة على سطح الارض – الاراضى وتغير المناخ – نمذجة تدهور الاراضى – استخدام نظم المعلومات الجغرافية والاستشعار عن بعد فى تحديد مدى تدهور الاراضى – تطبيق مفهوم MEADULS فى تقييم تدهور الاراضى

2) مجال جمع وتحليل بيانات الارض والتحليل الطيفى

نظم المعلومات الجغرافية والتحليل المكانى

(2 ساعة نظرى + 2 ساعة عملى +11 ساعة أنشطة = 9 ساعات اوروبية ECTS تعادل 3 ساعة معتمدة ECH)

المفاهيم الاساسية لنظم المعلومات الجغرافية – نظام تحديد الاحداثيات العالمى – طرق التحليل الرقمى للمرئيات الفضائية فى ادارة الموارد الزراعية – اساسيات الاحصاء الجيولوجية - التحليل المكانى – نمذجة منحنى الاختلافات – طريقة كريجنج فى الحسابات التقديرية - استخدام نظم المعلومات الجغرافية والاستشعار عن بعد فى ادارة الاراضى – الزراعة الدقيقة باستخدام نظم المعلومات الجغرافية والاستشعار عن بعد فى ادارة المحاصيل - استخدام نظم المعلومات الجغرافية والاستشعار عن بعد فى ادارة الموارد المائية للزراعة - استخدام نظم المعلومات الجغرافية والاستشعار عن بعد فى ادارة امراض النبات والافات - نظم المعلومات الجغرافية بالمشاركة.

تحليل طيفى متقدم

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

مقدمة للتحليل الطيفى – النحليل الطيفى الكتلى – النحليل الطيفى باستخدام الضوء المرئى والفوق بنفسجى – التحليل الطيفى باستخدام الاشعة تحت الحمراء - النحليل الطيفى البصرى - النحليل الطيفى باستخدام تحويل فورير - النحليل الطيفى باستخدام طريقة رامان - النحليل الطيفى باستخدام اللهب - النحليل الطيفى الفلوروسنسى - النحليل الطيفى الانبعاثى - النحليل الطيفى بالرنين النووى المغناطيسى.

3) مجال الاحصاء الحيوي وادارة الاراضى

اقتصاديات تدهور الارض

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

مقدمة للموارد واقتصاديات البيئة – كفاءة الفحص وانواعه – العرض والطلب فى اقتصاديات البيئية – حساب القيمة المتوقعة – هبوط الاسواق والبضائع العامة – الحلول الحكومية لهبوط الاسواق - التضارب بين النمو والحفاظ على البيئة – التنوع الحيوى والتثمين وقيمة الارض – حساب افتصاديات تدهور الارض.

التحليل الإحصاء الحيوي

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

المفاهيم الاحصائية – القياسات الاحصائية الوصفية – نظرية الاحتمالات – اختبار ت ومقارنة المتوسطات – تحليل التباين وتصميم التجارب: التصميم العشوائى الكامل – المربع اللاتينى – العاملى – المتداخل – اقل فرق معنوى – الارتباط والانحدار – تحليل التباين متعدد المتغيرات – تحليل المكونات الرئيسية – التجمعات.

4) مجال اللغة الانجليزية العلمية وكتابة المقترحات البحثية

لغة انجليزية علمية وكتابة المقترحات

(1 ساعة نظرى + (-) ساعة عملى + 4 ساعة أنشطة = 3 ساعات اوروبية ECTS يعادل 1 ساعة معتمدة ECH)

مقدمة – بعض مصطلحات الإدارة المستدامة للأراضي باللغة الإنجليزية – فرص تمويل المقترحات البحثية – الكتابة العلمية - اعداد وكتابة المقترح البحثى – تكوين فريق كتابة المقترح – مكونات المقترح – تنفيذ ومتابعة وتقييم المشروع البحثى – ادارة المخاطر وتحليل نقاط القوة والضعف والفرص والتحديات – مصفوفة الاطار المنطقى والجدول الزمنى لانشطة المشروع – مناقشة المشروعات المصصمة بواسطة الطلبة.

طرق البحث والتواصل العلمى

(1 ساعة نظرى + (-) ساعة عملى + 4 ساعة أنشطة = 3 ساعات اوروبية ECTS يعادل 1 ساعة معتمدة ECH)

التعبير عن المشكلة البحثية – فرضيات التصميم البحثى – بناء وادوات جمع البيانات – اختيار العينة – كتابة المقترح البحثى – جمع البيانات – تحليل وعرض البيانات – كتابة التقرير البحثى.

5) المناقشات فى الادارة المستدامة للأراضي

(1 ساعة نظرى + (-) ساعة عملى + 4 ساعة أنشطة = 3 ساعات اوروبية ECTS يعادل 1 ساعة معتمدة ECH)

مناقشة موضوعات متعلقة بالادارة المستدامة للأراضي.

6) التدريب الميدانى

(-) ساعة نظرى + 8 ساعة عملى +12 ساعة أنشطة = 12 ساعات اوروبية ECTS 4 ساعة معتمدة ECH)

تدريب ميدانى خلال فصل الصيف فى احد الشركات الزراعية الخاصة او المزارع الخاصة على نظم الادارة المستدامة للأراضي.

7) بحث رسالة الماجستير فى الادارة المستدامة للأراضي

(-) ساعة نظرى + 16 ساعة عملى + 34 ساعة أنشطة = 30 ساعات اوروبية ECTS تعادل 8 ساعة معتمدة ECH)

بحث الرسالة، وبقتضاه يتم اعداد الرسالة العلمية للمناقشة.

ثانياً: المجالات التخصصية الإختيارية:

1) مجال تخطيط وتقييم استخدام الارض

تخطيط استعمالات الارض للتنمية المستدامة

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

طبيعة ومدى تخطيط استعمالات الارض – نظرة شاملة على عملية التخطيط – خطوات تنفيذ تخطيط استعمالات الارض – اهداف التنمية المستدامة – دلائل التنمية المستدامة – دارسات حالة متنوعة.

تقييم الاراضى متقدم

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

اهداف وانواع تقييم الارضى – صفات وجودة الارض – طرق تقييم القدرة الانتاجية – طرق حساب صلاحية الارض لزراعة المحاصيل المختلفة – نماذج الحاسب الالى المستخدمة فى تقييم الارض – تقييم الاراضى لمختلف النظم البيئية الزراعية (اراضى مروية – اراضى الزراعة الجافة – اراضى الزراعة المطرية – اراضى المراعى) – استخدام نظم المعلومات الجغرافية والاستشعار عن بعد فى تقييم ورسم خرائط الاراضى .

تغير المناخ والامن الغذائى

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

مقدمة للمناخ – تاريخ مناخ الارض – اسباب تغير المناخ – نماذج دورة المناخ العالمية وكيفية التنبؤ – استجابة المناخ للمتغيرات البشرية – تاثير تغير المناخ على الزراعة – محددات الزراعة والغذاء من وجهة نظر تغير المناخ – تقييم المخاطر وادارة تاثير تغير المناخ – تحديات النظم انتاج الغذاء – الوقود الحيوى - المحاصيل المعدلة وراثيا – تقليل مخاطر الامن الغذائى الناتجة من تغير المناخ.

نمذجة تغيير استعمالات الاراضى

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

نظرة عامة – نظم تقسيم استخدامات الاراضى والغطاء الارضى – طرق جمع البيانات – طرق تحليل البيانات – التاثيرات المتعددة لتغيرات استخدام الارض والغطاء الارضى – نماذج وافتراضات تغير استخدام الارض – الدلائل الطيفية للنبات – الدلائل الطيفية العمرانية – نماذج استخدام الارض وكيفية اختيار المناسب منها – نمذجة اساتخدام الارض – التوقعات المستقبلية لاستخدام الارض – حالات دراسة متنوعة.

سياسات وتشريعات استخدام الارض

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

مقدمة عن السياسات الزراعية – استراتيجية مصر للتنمية المستدامة حتى عام 2030 – استراتيجية مصر للتنمية الزراعية المستدامة حتى عام 2030 – قانون البيئة رقم 4 لسنة 1994 – استراتيجية مصر لاستصلاح الاراضى – استراتيجية مصر لادارة الموارد المائية – الاصلاح الزراعى فى مصر – استخدام المبيدات وقوانين تنظيمه – قوانين الزراعة والمشاتل لمختلف المحاصيل - حالات دراسة متنوعة.

2) مجال الادارة البيئية للأراضي والمياة

تلوث ومعالجة الاراضى والمياه متقدم

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

الانواع الرئيسة لملوثات التربة – العناصر الثقيلة فى النظام الارضى – ميكانيكيات التلوث والتفاعل بين الارض والمادة الملوثة – العمليات الطبيعية – تغير الملوثات وتحولها وبدء التحولات الكيميائية فى التربة – مراقبة تلوث التربة – تخطيط ةفهم معلجة التربة – مراجعة نظم الماء الجوفى – مفهوم جودة الماء الجوفى – الملوثات فى بيئة الماء الجوفى – تقييم تعرض الماء الجوفى للتلوث باستخدام النماذج ونظم المعلومات الجغرافية – تقييم مخاطر تلوث الماء الجوفى – معالجة تلوث الماء الجوفى باستخدام الطرق المباشرة والغير مباشرة – عروض تقديمية للطلاب.

تحليل النظم فى ادارة المياه

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

مقدمة لادارة الموارد المائية – نظرة عامة لمشاكل ادارة الموارد المائية السطحية والجوفية - الامطار والورافد المائية – الماء التخيلى والماء الحلو – الانشاءات الهديرولوجية – تحليل النظم التطبيقى – طرق ادارة الموارد المائية (نمذجة ، التحسين ، التحليل متعدد الاهداف) – ادارة الموارد المائية تحت ظروف عدم اليقين (نماذج عم اليقين Fuzzy) – طرق ادارة الموارد المائية للتنمية المستدامة – تنفيذ ادارة الموارد

المائية باستخدام النمذجة والتحسين والاهداف المتعددة – حالة دراسة 1: حصاد مياه الامطار فى الساحل الشمالى – حالة دراسة 2: ادارة الموارد المائية فى دلتا النيل – مناقشة مفتوحة.

الاعتبارات الاقتصادية والاجتماعية فى ادارة الموارد المائية
(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

مقدمة لاقتصاديات وقوانين الموارد المائية – مراجعة اساسيات الاقتصاد الجزئى المطبقة على الموارد المائية – مشاكل جودة المياه – تسعير المياه ومعدلات الاستهلاك المنزلى – الزراعة والمياه – عدم اليقين والمخاطر فى عرض وطلب الموراد المائية – الماء الجوفى – استخدام المياه: الاستخدام البيئى والترفيهى – الفياضانات والجفاف ودور السدود – مشاكل المياه لى الدول النامية – ملخص - مقترحات العمل المستقبلى.

الادارة المستدامة لخصوبة التربة
(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

مقدمة لخصوبة التربة – العناصر المغذية الاساسية – علاقات النبات والارض والعنصر المغذى – الطرق التشخيصية لمعلجة مشاكل الخصوبة (تقييم خصوبة التربة) – رحلة حقلية لجمع عينات الارض والنبات – توصيات التسميد المبنية على اسس علمية - المدخلات الزراعية المتقدمة والبسيطة – الادارة المتكاملة للمغذيات وافضل الممارسات الادارية الزراعية – التغذية المعدنية وعلاقتها بصحة الانسان والمخاطر البيئية – نمذجة استجابة المحصول لاضافة العناصر المغذية – ادوات الحاسب الالى المستخدمة فى تشخيص خصوبة التربة.

نظم الزراعة البديلة
(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

مفهوم ونشاة وتطور الزراعة فى العالم – انماط واسس الزراعة التقليدية – تطوير نظم زراعية مستدامة – الزراعة التقليدية مقابل الزراعة المحمية – الزراعة العضوية – الزراعة الديناميكية الحيوية – الزراعة الملحية العضوية – نظم زراعة اسطح المنازل -نظم الزراعة فى المدن الزراعة المعمرة – – الزراعة الدقيقة – الزراعة الذكية مناخيًا – الصفات الكيميائية والفيزيائية والحيوية للارض – نظم الادارة للزراعة المستدامة – ادارة المياه والتسميد للتكثيف الزراعى.

3) مجال نمذجة النظم المزرعية فى ادارة الاراضى

نمذجة النظم النباتية فى ادارة الاراضى
(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

مقدمة لنمو وتطور النبات – العوامل المتحكمة فى نمو النبات: المناخ – العوامل المتحكمة فى نمو النبات: التربة – الاجهلد الحيوى وغير الحيوى – اسس وطرق وتغير النمذجة الرياضية – تقريب النموذج وتحقيقه وتصحيحه – انواع المعادلات المستخدمة فى النماذج – اتخاذ القرار – تقسيم النماذج الرياضية والحلول العددية – نمذجة نمو النبات – التمثيل الضوئى وامتصاص الكربون – نمو ونشاط الجذور وعلاقات الارض – التربة - النبات – جهد نمو النبات – مفاهيم نمذجة ديناميكيات النظم – أمثلة لانواع نظم نمذجة النبات – تطبيق نمذجة النبات على انتاج المحاصيل.

نمذجة النظم الحيوانية فى ادارة الاراضى

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

مقدمه فى نظم الانتاج الحيوانى – مقدمة فى نظم الانتاج النباتى – نظم الانتاج الزراعى مقابل نمذجة النظم الزراعية – احتياجات بناء نظام النمذجة (النموذج المتكامل – النموذج العضوى – النموذج الاقتصادى – النموذج الانتاجى) – امثلة على نمذجة النظم المتكاملة – معايير تقييم النماذج المتكاملة – مكونات مصفوفة الاطار المنطقى – تقييم المخاطر – كود التتبع والتوثيق.

المكافحة المتكاملة للافات

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

تاريخ المكافحة المتكاملة للافات والتعريفات المصاحبة – العلاقات بين الكائنات الممرضة والنبات والتفاعل مع البيئة - مقاومة النبات العائل – الدورة الزراعية والممارسات الزراعية – اسس ادارة الحشائش و الحشرات والامراض والنيماتودا – مصير المبيدات البيئى – ادارة الافات فى الزراعة العضوية – استخدام نماذج محصولية لتوضيح اسس المكافحة المتكاملة للافات - امثلة على برامج الادارة الكيبرة – الحشائش ومحاصيل المشاتل – الحيوانات وافات المراعى (الرعى و اماكن التغذية)- المكافحة المتكاملة للافات فى الحضر (حشرات وقوارض) – تداول الخضر والفاكهة والمحاصيل بعد الحصاد وادارة الإمراض – استشارات وارشادات.

الاقتصاد الزراعى التطبيقى

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

مقدمة – سلوك المستهلك والطلب – اتخاذ القرار بواسطة المنتج: مدخلات احادية المتغير ومدخلات ثنائية المتغير واختيار الشركة – تكاليف الانتاج والعرض وتحديد السعر - تكاليف الانتاج والعرض وتحديد السعر تحت ظروف عدم اليقين – التنافس والسيادة فى الاسواق – التنافس المنقوص ودور الحكومات وضبط الاسواق المرتبطة بالأراضي – الموارد الطبيعية وتحليل الرفاهية.

ادارة المخلفات الزراعية متقدم

(1 ساعة نظرى + 2 ساعة عملى + 7 ساعة أنشطة= 6 ساعات اوروبية ECTS يعادل 2 ساعة معتمدة ECH)

المخلفات الزراعية والمياه والهواء والموارد الحيوانية – خواص المخلفات الزراعية – دور الاراضى فى ادارة المخلفات – دور البناتات فى ادارة المخلفات – اضافة المخلفات الزراعية للتربة – نظم ادارة المخلفات الزراعية – تخطيط نظام ادارة المخلفات الزراعية – الانتفاع بالمخلفات – معدات ادارة المخلفات.

الباب الرابع: أحكام و ترتيبات إنتقالية

خلال العام الأول والثاني من تطبيق / تفعيل درجة الماجستير يُراعى تطبيق الاحكام الإنتقالية التالية:

1. يقوم الطالب بالتسجيل لدرجة الماجستير فى الادارة المستدامة للأراضي فى واحدة من الاربع جامعات المشاركة فى المشروع (القاهرة – الاسكندرية – الزقازرق – دمنهور).
2. يتم تدريس مقررات درجة الماجستير الإجبارية فى السنة الاولى (الفصلين الدراسين الأول والثاني) فى نقطتى تجمع هما جامعة القاهرة (لطلاب القاهرة والزقازيق) وجامعة الاسكندرية (لطلاب الاسكندرية ودمنهور).
3. يقوم الطالب بسداد رسوم أو مصروفات الدراسة فى الجامعة المسجل بها ومصروفات الساعات المعتمدة للمقررات الدراسية فى الكلية المضيفة بأحد نقطتي التجمع التى سوف يدرس بها هذه المقررات وذلك طبقا لجدول توزيع المقررات على الفصول الدراسية (جدول 4).
4. يتم اعتماد المقررات الدراسية الاجبارية التى اجتازها الطالب خارج جامعته بأحد نقطتي التجمع وتضمينها فى سجله الدراسى طبقا لجدول مقارنة أكواد المقررات الدراسية (جدول 1).
5. يقوم الطالب بدراسة مقررات التخصص الذى اختاره وإجراء بحث رسالة الماجستير تحت اشراف المشرف المباشر بالجامعة التى قام بالتسجيل فيها.

ويجوز الإلتزام بتطبيقها لمدد أخرى فى حالة الرغبة فى ذلك، وتبعًا لما يتم الاتفاق عليه بين كل من كليتى كل نقطة تجمع (الاسكندرية – دمنهور) أو (القاهرة – الزقازيق).

الملاحق Appendices

ملحق (1): جدول (أ): مدى استيفاء البرنامج للمعايير الأكاديمية القياسية القومية (NARS)

ومدي اتساق المخرجات التعليمية المستهدفة من البرنامج مع المقررات الدراسية

المعايير الأكاديمية القياسية القومية (NARS)	المخرجات التعليمية المستهدفة للبرنامج التي تحقق المعايير القياسية القومية	المفررات الدراسية والأنشطة العلمية الأساسية والإجبارية التي تحقق النتائج المستهدفة للبرنامج	المقررات التخصصية الإختيارية التي تحقق النتائج المستهدفة للبرنامج
أولاً: المعرفة والفهم: **باستكمال دراسة البرنامج يجب أن يكون الخريج قادرا على:**			
1. النظريات والأساسيات المتعلقة بمجال التعلم وكذا المجالات ذات العلاقة	أ1- يُـــدرك النظريـــات والأسس العلمية الخاصة بإدارة وتخطيط الأراضي والمياه وتنميتها المستدامة	• النظام البيئى الزراعى • مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • تقييم اراضى منقدم • تخطيط استخدامات الاضى للتنمية المستدامة • مدخل النظم لادارة المياه • الادارة المستدامة لخصوبة التربة • نظم الزراعة البديلة • ادارة المخلفات الزراعية متقدم • تغير المناخ والامن الغذائى • تلوث ومعالجة الاراضى والمياه متقدم
	أ2- يُعـــرِّف النظريـــات والظـــواهر العلميـــة لمجـالات العلـوم الأخـرى (إحصـــاء– اقتصـــاد....) وثيقــة الصــلة بــالإدارة المستدامة للأراضي	• نظم المعلومات الجغرافية والتحليل المكانى • اقتصاديات تدهو الاراضى • التحليل الاحصائى الزراعى • مناقشات فى الادارة المستدامة للأراضي	• الادارة (المكافحة) المتكاملة للافات • الاقتصاد الزراعى التطبيقى • تغير المناخ والامن الغذائى • تلوث ومعالجة الاراضى والمياه متقدم

2. التأثير المتبادل بين الممارسة المهنية وانعكاسها على البيئة	أ3- يتعرف علي الجوانب السلبية والايجابية لممارسة المهنة في الحفاظ على البيئة	• النظام البيئى الزراعى • التنوع الحيوى وخدمات النظام البيئى • مناقشات فى الادارة المستدامة للأراضي	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • الادارة (المكافحة) المتكاملة للافات • الاقتصاد الزراعى التطبيقى • تقييم اراضى منقدم • تغير المناخ والامن الغذائى • تلوث ومعالجة الاراضى والمياه متقدم
	أ4- يُدرك أهمية الاستخدام الآمن للمبيدات واضافاتها	• مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	• الادارة (المكافحة) المتكاملة للافات • تقييم اراضى منقدم • تلوث ومعالجة الاراضى والمياه متقدم • تخطيط استخدامات الاضى للتنمية المستدامة • الادارة المستدامة لخصوبة التربة • نظم الزراعة البديلة • ادارة المخلفات الزراعية متقدم
	أ5- يُحدد اجراءات السلامة المهنية للعمل في مجالات الإدارة المستدامة للأراضي	• التنوع الحيوى وخدمات النظام البيئى • نظم المعلومات الجغرافية والتحليل المكانى • تدهور الاراضى متقدم	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • الادارة (المكافحة) المتكاملة للافات • تقييم اراضى منقدم • تغير المناخ والامن الغذائى • تلوث ومعالجة الاراضى والمياه متقدم
3. التطورات العلمية في مجال التخصص	أ6- يُعد موضوعات علمية حديثة في أحد مجالات الإدارة المستدامة للأراضي	• تدهور الاراضى متقدم • نظم المعلومات الجغرافية والتحليل المكانى • تحليل طيفى متقدم • لغة انجليزية للباحثين وكتابة المشروعات البحثية • طرق البحث والتواصل العلمى • مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض

	أ7- يتعرف علي التقنيات الحديثة المتبعة في نمذجة أنظمة الإنتاج الزراعي المختلفة	• نظم المعلومات الجغرافية والتحليل المكانى • تحليل طيفى متقدم • طرق البحث والتواصل العلمى • تدريب ميدانى • مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • تخطيط استخدامات الاراضى للتنمية المستدامة • مدخل النظم لادارة المياه • الادارة المستدامة لخصوبة التربة • نظم الزراعة البديلة • ادارة المخلفات الزراعية متقدم • تقييم اراضى منقدم • تغير المناخ والامن الغذائى • تلوث ومعالجة الاراضى والمياه متقدم
4. المبادئ الأخلاقية والقانونية للممارسة المهنية في مجال التخصص	أ8- يُلـــم بالمبـــادئ والتشـــريعات القانونيـــة والأخلاقيـــة الخاصـــة بممارسة المهنة في مجال الإدارة المســـــتدامة للأراضي	• مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	• الادارة (المكافحة) المتكاملة للافات • الجوانب الاجتماعية والاقتصادية في إدارة الموارد المائية • سياسات وتشريعات استخدامات الاراضى
5- مبادئ وأساسيات الجودة في الممارسة المهنية في مجال التخصص	أ9- يتعـرف علـي معـايير ومواصـفات جـودة الأداء فـــي مجـــال الإدارة المستدامة للأراضي	• النظام البيئى الزراعى • التنوع الحيوى وخدمات النظام البيئى • تدهور الاراضى متقدم • طرق البحث والتواصل العلمى • تدريب ميدانى • مناقشات فى الادارة المستدامة للأراضي الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • الادارة (المكافحة) المتكاملة للافات • الجوانب الاجتماعية والاقتصادية في إدارة الموارد المائية • سياسات وتشريعات استخدامات الاراضى
6- اساسيات وأخلاقيات البحث العلمي	أ10- يُلم بمبادئ وأخلاقيات البحث العلمي في مجال الإدارة المستدامة للأراضي	• طرق البحث والتواصل العلمى • مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	• الادارة (المكافحة) المتكاملة للافات • الجوانب الاجتماعية والاقتصادية في إدارة الموارد المائية • سياسات وتشريعات استخدامات الاراضى
ثانيا: المهارات الذهنية: **بانتهاء البرنامج يجب أن يكون الخريج قادرا علي:**			
1- تحليـــل وتقيـــيم المعلومـــات فـــي مجـــال التخصص والقياس عليها لحل المشاكل	ب1- يُناقش البيانات والمعلومات المتعلقة بمشاكل الإدارة المستدامة للأراضي	• التنوع الحيوى وخدمات النظام البيئى • تدهور الاراضى متقدم • نظم المعلومات الجغرافية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة

		والتحليل المكانى • تحليل طيفى متقدم • اقتصاديات تدهو الاراضى • التحليل الاحصائى الزراعى • تدريب ميدانى	الارض • تقييم اراضى منقدم • تغير المناخ والامن الغذائى • تلوث ومعالجة الاراضى والمياه متقدم
	ب2- يُقيم المعلومات والظواهر الخاصة بمشاكل الإدارة المستدامة للأراضي	• النظام البيئى الزراعى • التنوع الحيوى وخدمات النظام البيئى • تدهور الاراضى متقدم • نظم المعلومات الجغرافية والتحليل المكانى • تحليل طيفى متقدم • اقتصاديات تدهو الاراضى • التحليل الاحصائى الزراعى • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • تقييم اراضى منقدم • تغير المناخ والامن الغذائى • تلوث ومعالجة الاراضى والمياه متقدم
2- حل المشاكل المتخصصة مع توفر بعض المعطيات	ب3- يُحدد المشاكل المتعلقة بمعوقات الإدارة المستدامة للأراضي تحت الظروف الطبيعية والمعاكسة	• التنوع الحيوى وخدمات النظام البيئى • تدهور الاراضى متقدم • نظم المعلومات الجغرافية والتحليل المكانى • تحليل طيفى متقدم • طرق البحث والتواصل العلمى • تدريب ميدانى • مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	• الادارة (المكافحة) المتكاملة للافات • الجوانب الاجتماعية والاقتصادية في إدارة الموارد المائية • تقييم اراضى منقدم • تغير المناخ والامن الغذائى • تلوث ومعالجة الاراضى والمياه متقدم
	ب4- يضع حلول للمشاكل في ضوء البيانات والمعلومات التي تم جمعها	• تدهور الاراضى متقدم • طرق البحث والتواصل العلمى • تدريب ميدانى • مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الأرض
3- الربط بين المعارف المختلفة لحل المشاكل المهنية	ب5- يربط المعارف والمفاهيم الخاصة بعلوم الإدارة المستدامة للأراضي مع العلوم الأخرى لحل مشاكل	• النظام البيئى الزراعى • نظم المعلومات الجغرافية والتحليل المكانى • طرق البحث والتواصل	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة

	الإنتاج المختلفة	العلمى • تدريب ميدانى • مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	الأرض
	ب6- يُصـمم برنـامج أو أنمـوذج لتعظـيم انتاجيـة الأراضي	• تدريب ميدانى • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • الاقتصاد الزراعى التطبيقى
4- إجـراء دراسـة بحثيـة/ أو كتابـة دراسـة علميـة منهجيـة حـول مشـكلة بحثية	ب7- يصـف الأسـاليب العلمية الطرق الاحصائية المناسـبة فـي تنفيـذ المشروع البحثى	• اقتصاديات تدهو الاراضى • التحليل الاحصائى الزراعى • لغة انجليزية للباحثين وكتابة المشروعات البحثية • طرق البحث والتواصل العلمى • تدريب ميدانى • مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	• الاقتصاد الزراعى التطبيقى
	ب8- يُصـمم مشـروع بحثـي يتنـاول حـل مشـكلة متعلقـة بمجـال الإدارة المستدامة للأراضي	• اقتصاديات تدهو الاراضى • التحليل الاحصائى الزراعى • لغة انجليزية للباحثين وكتابة المشروعات البحثية • طرق البحث والتواصل العلمى • تدريب ميدانى • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • الاقتصاد الزراعى التطبيقى

5- تقيـيم المخـاطر فـي الممارسـات المهنيـة فـي مجال التخصص	ب9- يُحدد المخاطر ذات الصـلة بعمليـات الانتـاج الزراعـــي (النقـــل – التـــداول – التصـــنيع – التخزين .... ألخ)	• النظام البيئى الزراعى • التنوع الحيوى وخدمات النظام البيئى • طرق البحث والتواصل العلمى • تدريب ميدانى • مناقشات فى الادارة المستدامة للأراضي	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • تخطيط استخدامات الاراضى للتنمية المستدامة • مدخل النظم لادارة المياه • الادارة المستدامة لخصوبة التربة • نظم الزراعة البديلة • ادارة المخلفات الزراعية متقدم • الجوانب الاجتماعية والاقتصادية في إدارة الموارد المائية • سياسات وتشريعات استخدامات الاراضى
	ب10- يُخطـــط لتلافـــي المخاطر باستخدام وسائل وطـرق الأمـن والسـلامة المناسبة	• طرق البحث والتواصل العلمى • تدريب ميدانى • مناقشات فى الادارة المستدامة للأراضي	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • سياسات وتشريعات استخدامات الاراضى
6- اتخاذ القرارات المهنية في سياقات مهنية متنوعة	ب11- يتخذ القرار المناسب للتعامل مع المشاكل المتعلقة بالإدارة المستدامة للأراضي	• تدهور الاراضى متقدم • اقتصاديات تدهو الاراضى • التحليل الاحصائى الزراعى • طرق البحث والتواصل العلمى • تدريب ميدانى • مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • الجوانب الاجتماعية والاقتصادية في إدارة الموارد المائية • سياسات وتشريعات استخدامات الاراضى • تخطيط استخدامات الاراضى للتنمية المستدامة • مدخل النظم لادارة المياه • الادارة المستدامة لخصوبة التربة • نظم الزراعة البديلة • ادارة المخلفات الزراعية متقدم
ثالثا: المهارات المهنية: **بانتهاء البرنامج يجب أن يكون الخريج قادرا علي أن:**			

1- اتقـــان المهـــارات المهنية الأساسية والحديثة في مجال التخصص	ج1- يُحلل العينات معمليًا باستخدام الأجهزة المناسبة	• تدهور الاراضى متقدم • نظم المعلومات الجغرافية والتحليل المكانى • تحليل طيفى متقدم • تدريب ميدانى • الرسالة العلمية	• تقييم اراضى منقدم • تلوث ومعالجة الاراضى والمياه متقدم
	ج2- يُقيم نتائج التحليل ويستخدمها لتعظيم الإستفادة في اطار الإدارة المستدامة للأراضي	• تدهور الاراضى متقدم • اقتصاديات تدهو الاراضى • التحليل الاحصائى الزراعى • طرق البحث والتواصل العلمى • تدريب ميدانى • مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	• الاقتصاد الزراعى التطبيقى • تقييم اراضى منقدم • تلوث ومعالجة الاراضى والمياه متقدم
	ج3- يُطبق برامج الإدارة المناسبة لظروف الإنتاج المختلفة	• النظام البيئى الزراعى • تدريب ميدانى • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • تخطيط استخدامات الاراضى للتنمية المستدامة • مدخل النظم لادارة المياه • الادارة المستدامة لخصوبة التربة • نظم الزراعة البديلة • ادارة المخلفات الزراعية متقدم
	ج4- يســـتخدم التقنيـــات الحديثـة فـي مجـال الإدارة المستدامة للأراضي	• نظم المعلومات الجغرافية والتحليل المكانى • تحليل طيفى متقدم • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • تقييم اراضى منقدم • تغير المناخ والامن الغذائى • تلوث ومعالجة الاراضى والمياه متقدم
2- كتابة وتقييم التقارير المهنية	ج5- يُعد التقارير العلمية الفنية المتخصصة	• تدهور الاراضى متقدم • نظم المعلومات الجغرافية والتحليل المكانى • تحليل طيفى متقدم • اقتصاديات تدهو	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض

		الاراضى • التحليل الاحصائى الزراعى • تدريب ميدانى • مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	• تقييم اراضى منقدم • تغير المناخ والامن الغذائى • تلوث ومعالجة الاراضى والمياه متقدم
	ج6- يكتب مقترح لمشروع بحثي في مجال التخصص	• لغة انجليزية للباحثين وكتابة المشروعات البحثية • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الأرض
3- تقييم الطرق والأدوات المستخدمة في مجال التخصص	ج7- يُطبق أساليب الانتاج المثلي في نطاق الإدارة المستدامة للأراضي	• النظام البيئى الزراعى	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • تخطيط استخدامات الاضى للتنمية المستدامة • مدخل النظم لادارة المياه • الادارة المستدامة لخصوبة التربة • نظم الزراعة البديلة • ادارة المخلفات الزراعية متقدم
	ج8- يستخدم مستلزمات الانتاج المناسبة في مجال الإدارة المستدامة للأراضي	• التنوع الحيوى وخدمات النظام البيئى	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • تخطيط استخدامات الاضى للتنمية المستدامة • مدخل النظم لادارة المياه • الادارة المستدامة لخصوبة التربة • نظم الزراعة البديلة • ادارة المخلفات الزراعية متقدم • تقييم اراضى منقدم • تغير المناخ والامن الغذائى • تلوث ومعالجة الاراضى والمياه متقدم

	ج9- يستخدم الطرق والحزم الاحصائية بكفاءة ويختار المناسب منها لمعالجة وتحليل وعرض البيانات وتفسير النتائج	• اقتصاديات تدهو الاراضى • التحليل الاحصائى الزراعى	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الأرض
رابعا: المهارات العامة والمنقولة: **بانتهاء البرنامج يجب أن يكون الخريج قادرا علي:**			
1- التواصل الفعال بأنواعه المختلفة	د1- يُشارك مع الآخرين فى المناقشات العلمية شفاهة وكتابة	• طرق البحث والتواصل العلمى • مناقشات فى الادارة المستدامة للأراضي	يمكن تغطيتها من السيمنارات الموجودة بكل المقررات الدراسية
	د2- يُقدم عروض الكترونية مرئية باللغتين العربية والانجليزية	• لغة انجليزية للباحثين وكتابة المشروعات البحثية • طرق البحث والتواصل العلمى • مناقشات فى الادارة المستدامة للأراضي	يمكن تغطيتها من السيمنارات الموجودة بكل المقررات الدراسية
2- استخدام تكنولوجيا المعلومات بما يخدم الممارسة المهنية	د3- يستخدم بكفاءة تكنولوجيا المعلومات وتقنيات الحاسب في مجال التخصص	• نظم المعلومات الجغرافية والتحليل المكانى • اقتصاديات تدهو الاراضى • التحليل الاحصائى الزراعى • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • سياسات وتشريعات استخدامات الاراضى • الاقتصاد الزراعى التطبيقى • الجوانب الاجتماعية والاقتصادية في إدارة الموارد المائية
	د4- يُحلل البيانات باستخدام برامج الحاسب الألي المناسبة	• اقتصاديات تدهو الاراضى • التحليل الاحصائى الزراعى • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الارض • الاقتصاد الزراعى التطبيقى
3- التقييم الذاتي وتحديد الاحتياجات التعليمية الشخصية	د5- يُشارك في المشروعات البحثية والندوات والمؤتمرات وورش العمل بهدف تنمية مهاراته الشخصية والأكاديمية والمهنية	• لغة انجليزية للباحثين وكتابة المشروعات البحثية • طرق البحث والتواصل العلمى	

		• تدريب ميدانى • الرسالة العلمية	
4- استخدام المصادر المختلفة للحصول على المعلومات والمعارف	د6- يستخدام قواعد البحث الالكترونية بكفاءة للحصول على المعلومات المتعلقة بمجال تخصصه	• لغة انجليزية للباحثين وكتابة المشروعات البحثية • طرق البحث والتواصل العلمى • مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	يمكن تغطيتها من السيمنارات الموجودة بكل المقررات الدراسية
5- وضع قواعد ومؤشرات تقييم الآخرين	د7- يُشارك في تقييم زملائة	• طرق البحث والتواصل العلمى • تدريب ميدانى • مناقشات فى الادارة المستدامة للأراضي	يمكن تغطيتها من السيمنارات الموجودة بكل المقررات الدراسية
6- العمل في فريق وقيادة فرق في سياقات مهنية مختلفة	د8- يعمل بكفاءة ضمن فريق و يظهر مهارات قيادة فريق عمل بتحديد أهداف ومسئوليات المشاركين لانجاز مهمة في مجال التخصص	• لغة انجليزية للباحثين وكتابة المشروعات البحثية • طرق البحث والتواصل العلمى • الرسالة العلمية	• نمذجة تغيرات معاملات الاراضى • نمذجة النظام النباتى فى ادارة الارض • نمذجة النظام الحيوانى فى ادارة الأرض
7- ادارة الوقت بكفاءة	د9- يُدير الوقت أثناء المناقشات العلمية بفاعلية ويعمل تحت ضغط لانجاز مهمة علمية	• لغة انجليزية للباحثين وكتابة المشروعات البحثية • طرق البحث والتواصل العلمى • مناقشات فى الادارة المستدامة للأراضي	يمكن تغطيتها من السيمنارات الموجودة بكل المقررات الدراسية
8- التعلم الذاتي والمستمر	د 10- يستخدم مدى واسع من المصادر المعلوماتية بشكل فعال ومستمر (شبكة المعلومات- المكتبة-النشرات الفنية- الدوريات والكتب المرجعية...)	• نظم المعلومات الجغرافية والتحليل المكانى • لغة انجليزية للباحثين وكتابة المشروعات البحثية • طرق البحث والتواصل العلمى • مناقشات فى الادارة المستدامة للأراضي • الرسالة العلمية	يمكن تغطيتها من السيمنارات الموجودة بكل المقررات الدراسية

ملحق (2): توصيف المقررات الدراسية

(أكواد المقررات بالجامعات المشاركة
موضحة بجدول رقم (1) صفحة (8)

Mandatory Module: Sustainable agro-ecosystem management

Mandatory Course: Agroecosystems

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Sustainable Agroecosystem Management

Department offering the program: Soil and Water Sciences

Department offering the course: Environmental Science (Faculty of Science)

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Agroecosystems **Code:** SLM 14730

Credit Hours/ECTS: 2/6

Lecture: 2 **Tutorial/Practical:** **Total:** 2

B- Professional Information

1 – Overall aims of course

Agroecosystems that we have inherited and as we perceive them today are actually marvels created on earth's surface through human endeavor over a few millenniums. We have understood and accrued a large body of knowledge about them. Yet, we have too many things to investigate and perhaps control to our own advantage, of course, without deteriorating natural resources and our environment. Today, an entire posse of agroecosystems on the globe feeds over 7 billion human species and innumerable farm animals. We have to strive to manage these agroecosystems to feed a larger populace in the future.

This course aims at providing advanced information on:

- **a.** The ingredients, nutrient dynamics, and factors that affect productivity and ecosystematic functions in different agroecosystems,
- **b.** Agroecosystem Quality: Policy and Management Challenges
- **c.** Policy and strategies for designing sustainable farming systems

.2 – Intended learning outcomes of course (ILOs)

a- Knowledge and understanding:

a1- Identifying Ingredients of Agroecosystems
a2- Understanding Nutrient Dynamics of Agroecosystems
a3- Understand livestock system components
a4- Exploring the role of soil microorganisms in agroecosystems.

b. Intellectual skills:

b1- Infers Factors Influences Nutrient Dynamics in Agroecosystems.
b2. Relates soil microorganisms and nutrient dynamics.
B3- Explore the difference between different trends in nutrient supply and soil fertility management practices in Agroecosystems.
b4- Classifying cropping systems
b5- Designs methods to control weeds in different cropping zones

c. Professional and practical skills:

c1- Interpret data to draw conclusions about types of cropping systems and nutrient dynamics.
c2- Judges the Influence of irrigation systems on nutrient dynamic.
c3- Justifies policy and strategies for designing sustainable farming systems
c4-Verifies quality indicators of agroecosystems

d- General and transferable skills:

d1- Communication skills, covering both written and oral communication
d2- Prepare reports for evaluating influence of irrigation systems on nutrient dynamic
d3- Practice the acquired skills for problem-solving.
d4- Work effectively both in a team and independently .

3- Contents

Topic
Week 1: Ecosystems: concepts and definitions • Ecosystems and agroecosystems • Definition and Ingredients of Agroecosystems • Recognizing agroecosystems services
Week 2: Nutrient Dynamics of Agroecosystems • Nutrient Inputs to Agroecosystems • Trends in Nutrient Supply and Soil Fertility Management Practices o Nutrient Supply Through Natural Factors o Nitrogen Supplied Through Chemical Fertilizers o Nitrogen Supply to a Legume Agroecosystem o Nitrogen Supplied Through Crop Residue and Green Manures
Week 3: Factors Influences Nutrient Dynamics in Agroecosystems • Tillage and Soil Organic Carbon • Organic Mulches and Nutrient Dynamics
Week 4: Soil Organic Matter • Crop Residue Recycling • Green Manures and Nutrient Dynamics in Agroecosystems • Organic Manures

• Industrial By-Products
Week 5: Weeds in Agroecosystems • Methods to Control Weeds in Different Cropping Zones Pest management • Chemical pest control • non-traditional pest control
Week 6: Midterm Exam
Week 7: Exploring the role of Soil Microorganisms in agroecosystems. • Biological Nitrogen Fixation • Mycorrhizas • Plant Growth Promoting Rhizobacteria • Azolla and Blue Green Algae
Week 8: Site visit to the experimental farm
Week 9: Animal husbandry system • Cattle, sheep/ goat systems management • Animal nutrition
Week 10: Influence of Irrigation Systems • Precipitation Pattern • Methods of Irrigation Adopted in Various agroecosystems • Water Resource and Mode of Irrigation • Water Requirements of Crops • Irrigation And Cropping Zones in Different Continents.
Week 11: Cropping Systems • Mono-cropping • Crop Rotations ,Inter-Cropping and Mixed Crops • Strip Cropping, Fallows and Cover Crops
Week 12: Group Discussion Examples of agroecosystems::arid agroecosystems, wetlands, dry rangeland, aquatic ecosystems, and tree ecosystems.
Week 13: Group Discussion Agroecosystem Quality: Policy and Management Challenges for New Technologies and Diversity • Challenges to agroecosystems management • Quality Indicators • Biodiversity of agroecosystems • Strategies for designing sustainable farming systems.

4– Teaching and learning methods

4.1 Lectures
4.2- Group Discussion & Field Trips
4.3- Assignments & Reports

5- Student assessment methods

5.1 Group discussion and oral exam to assess Communication skills and Working effectively both in a team and independently
5.2- Written Exams to assess the understanding and scientific background
5.3- Field visits report to assess the intellectual & professional skills

Assessment schedule

Assessment 1:	Assignments – Week: 2-5
Assessment 2:	Mid-term written exam – week: 6
Assessment 3:	Reports discussion: 12-13
Assessment 4:	Oral exam – Week: 14
Assessment 5:	Final written exam – Week: 15

Weighing of assessments

Mid-term examination:	10%
Final-term examination:	40%
Oral examination:	20%
Assignments:	15%
Reports:	15%
Total =	100%

Additional Information (Assessment)

Report (15% of total mark) on a topic chosen by the student, but which is of relevance to the course and agreed in discussion with the teaching staff.
Beside frontal lectures, work in small groups is intended. Groups will be field handled with various causes related to biodiversity themes. Case studies will be discussed during the course, using a multistakeholders processes approach.
Results of field observations and analysis will be presented in the form of seminar papers. Visit to field sites will be also organized during the course

6- List of references

1- AGROECOSYSTEMS
1- KrishnaK. R. (2014) Soils, Climate, Crops, Nutrient Dynamics, and Productivity. Apple Academic Press , Toronto, New York.

2- Vandermeer, J. H. (2011)The Ecology of Agroecosystems. Jones and Bartlett Publishers, LLC
3- Collins, W. W. and Qualset, C. O. (1998) Biodiversity in Agroecosystems. Lewis. Poka Raton, New York.

7- Facilities required for teaching and learning

1. Computer
2. Data Show
3. White board and white board markers

Course coordinator: Prof. Fawzy Kisk & Prof. Manal Fawzy

Head of Department:

Date: / /

Mandatory Module: Sustainable agro-ecosystem management

Mandatory Course: Biodiversity and Ecosystem Services

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: : Sustainable Agroecosystem Management

Department offering the program: Soil and Water Sciences

Department offering the course: Environmental Science (Faculty of Science)

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Biodiversity and Ecosystem services **Code:** SLM 14731

Credit Hours / ECTS: 2 / 6

Lecture: 2 **Tutorial/Practical:** **Total:** 2

B- Professional Information

1 – Overall aims of course

Ecosystem services are the benefits humankind derives from the workings of the natural world. The delivery of ecosystem services depends in many cases on the maintenance of biodiversity. However, in many instances we do not well understand the mechanism by which biodiversity enhances the delivery of ecosystem services.

One of the key insights from this course is to explore current understanding of the relationships between biodiversity, the structure and functioning of ecosystems, and the provision of ecosystem services.

It aims specifically at providing advanced information on:

a- Giving an insight on ecosystem types, functions, components and services.

b- Providing comprehensive information about biodiversity and its critical importance to ecosystem functioning and human wellbeing.

2 – Intended learning outcomes of course (ILOs)

a- Knowledge and understanding:

On the completion of this course the student will be able to:

a.1 - Identify biodiversity and major components of our global ecosystem

a.2 - Define different components, functions and services of different ecosystems.

a.3- Understand the relationship between biodiversity and ecosystems services.

a.4- Recognize levels and role of biodiversity in ecosystem functioning

a.5- Summarize types and categories of ecosystems services.

a.6- Describe human impacts on the biodiversity and biodiversity hotspots

b- Intellectual skills:

b.1- Differentiate between different levels of biodiversity.
b.2- Evaluate the causes of biodiversity loss and human activities causing this loss
b.3- Explore how can we place value on ecosystem services.
b.4- Design Methods to control biodiversity loss.
b.5- Estimate sensitivity of different services to variation in biodiversity.

c- Professional and practical skills:

c.1- Interpret data to draw conclusions about management of ecosystem services
c.2- Criticize the on-going measures of dealing with biodiversity impoverishment
c.3- Justifies the link between biodiversity, ecosystem services and human well-being
c.4- Infer solutions to solve biodiversity problems and achieve sustainability

d- General and transferable skills:

d.1- Communication skills, covering both written and oral communication
d.2- Prepare reports for evaluating human impacts on biodiversity and ecosystem services.
d.3- Practice the acquired skills for problem-solving.
d.4- Work effectively both in a team and independently .

3- Contents

Topic

Week 1: Biodiversity and Ecosystems :
• Theory & definitions
• Role of biodiversity in ecosystem functioning
  ○ Terrestrial systems
  ○ Marine systems
• Finding quantitative links between biodiversity and ecosystem services

Week 2: The links between biodiversity, ecosystem functions and ecosystem services. • Provisioning services
Week 3: The links between biodiversity, ecosystem functions and ecosystem services. • Regulating services
Week 4: The links between biodiversity, ecosystem functions and ecosystem services • Supporting • Cultural services
Week 5: Current pressures on biodiversity and responses • Direct & indirect causes of biodiversity loss • Biodiversity hot spots.

Week 6: Midterm Exam
Week 7: Sustaining biodiversity : species approach Biodiversity conventions • The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) • The RAMSAR Convention • Convention on Migratory Species (Bonn Convention) • Convention on Biological Diversity(CBD)
Week 8: Site visit to protected area
Week 9: Open discussion & brain storming • Judging the on-going measures of dealing with biodiversity impoverishment • Infer solutions to solve biodiversity problems and achieve sustainability
Week 10: Management of ecosystem services • Ecosystem services and resilience • Resilience thinking in policy and practice
Week 11: biodiversity, ecosystem services and human well- being
Week 12: Reports discussion on: • Biodiversity futures for the 21st century. • Towards a strategy for reducing biodiversity loss
Week 13: Reports discussion on: • Biodiversity Futures for the 21st Century. • Towards a Strategy for Reducing Biodiversity Loss

4– Teaching and learning methods

4.1 Lectures
4.2- Group Discussion & Field Trips
4.3- Assignments & Reports

5- Student assessment methods

5.1 Group discussion and oral exam to assess Communication skills
And Working effectively both in a team and independently
5.2- Written Exams to assess the understanding and scientific background
5.3- Field visits report to assess the intellectual & professional skills

Assessment schedule

Assessment 1:	Assignments – Week: 5
Assessment 2:	Mid-term written exam – week: 6

Assessment 3:	Reports discussion: 12-13
Assessment 4:	Oral exam – Week: 14
Assessment 5:	Final written exam – Week: 15

Weighing of assessments

Mid-term examination:	15%
Final-term examination:	40%
Oral examination:	15%
Reports, assignments and semester work:	30%
Total	100%

Additional Information (Assessment)

Report (15% of total mark) on a topic chosen by the student, but which is of relevance to the course and agreed in discussion with the teaching staff.
Beside frontal lectures, work in small groups is intended. Groups will be field handled with various causes related to biodiversity themes. Case studies will be discussed during the course, using a multistakeholders processes approach.
Results of field observations and analysis will be presented in the form of seminar papers. With regard to selected topics of seminars additional lectures are provided by visiting academic staff or researchers. Visit to field sites will be also organized during the course

6- List of references

1- Robert Kaufman: Global Biodiversity 1st ed ; (2007) McGraw-Hill.
2- Shahid Naeem,Daniel E. Bunker, Andy Hector, Michel Loreau& Charles Perrings: Biodiversity, Ecosystem Functioning, and Human Wellbeing ; (2009) Oxford University Press.
3- Pushpam Kumar: The Economics of Ecosystems and Biodiversity (TEEB) Ecological and Economic Foundations (2010) Earthscan, London and Washington.

Periodicals, Web Sites, ..., etc.

WWW. CBD. Org WWW. UNESCO/mab.org WWW. IUCN.org

7- Facilities required for teaching and learning

Computer Data Show White board and white board markers

Course coordinator: Prof. Manal Fawzy

Head of Department:

Date: / /

Mandatory Module: Sustainable agro-ecosystem management

Mandatory Course: Advanced Land Degradation

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Sustainable Agroecosystem Management

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Advanced Land Degradation **Code:** SLM 14732

Credit Hours / ECTS: 2 / 6

Lecture: 2 **Tutorial/Practical:** Total: 2

B- Professional Information

1 – Overall aims of course

The course is aimed to shed the light on the problem of land degradation, and determine the different types of land degradation and how to prevent, overcome and solve the problems associated with such degradation.

2 – Intended learning outcomes of course (ILOs)

a- Knowledge and understanding:

a1- Define land degradation and its causes and effects
a2- Describe and distinguish the different types of land degradation
a3- Identify different indicators used to quantify land degradation
a4- Identify the management practices used to overcome the different types of land degradation
a5- Explain how land degradation would impact conservation practices

b- Intellectual skills:

b1- Determine the different types of land degradation
b2- Detect causes and effects of land degradation
b3- Calculate the land degradation indicators
b4- Select the appropriate indicators for local, national, and regional scales
b5- Determine the proper management practices to overcome different land degradations

b6- Report the important conservation practices relevant to each type of land degradation

c- Professional and practical skills:

c1- Distinguish different types of land degradation
c2- Explain the harmful effects of land degradation
c3- Compare the different management practices to overcome land degradation

d- General and transferable skills:

d1- Use the modern technology in land degradation.
d2- Develop the team work concept in land degradation.
d3- Improve the creative thinking and communication skills in land degradation issues.
d4 - Develop the holistic approach in land degradation studies.

3- Contents

Topic
Week 1: Definitions : desertification, aridification ,remediation, conservation,
Week 2: Global land resources - Extent of land degradation - Causes of land degradation
Week 3: Erosion: Erosion hazards - Mechanism of erosion-
Week 4: Water Erosion- Methods of quantifying soil losses by water erosion –
Week 5: Conservation and management of water eroded soils by 1- crop management 2 - agriculture practices
Week 5: Wind Erosion - Estimating soil loss by wind
Week 6: Desertification: causes of desertification - Desert conservation and reclamation
Week 7-8: Land degradation due chemical deterioration
1 - Salt-affected soils: Characterization, hazard effects, managing and reclaiming
2 – Alkalinity: Causes - characterization, hazard effects, managing and reclaiming
Week 9: Land degradation due physical deterioration: Soil compaction and crusting: Causes of compaction- Effects of compaction- Management of soil crusting and compaction
Week 10: Land degradation due biological deterioration: soil organic matter – loss

of microorganism Week 11: Soil and climatic change: EFFECTS OF GLOBAL WARMING ON SOILS - Plant growth and carbon sequestration in soils Week 12: Modern techniques for assessing land degradation

4– Teaching and learning methods

4.1- Lectures
4.2- Seminars
4.3- Case studies and problems
4.4- Internet search

5- Student assessment methods

5.1 Quizzes
5.2 Mid-term Exam
5.3 Oral Examination
5.4 Final-term theoretical Examination

Assessment schedule

Assessment 1: Quizzes	Weeks: 3 - 10
Assessment 2: Mid-term Exam	Week: 8
Assessment 3: Oral Examination	Week: 12
Assessment 4: Final-term theoretical Examinatio	Week: 13

Weighing of assessments

Mid-term examination	10%
Final-term examination	70%
Oral examination	10%
Quizzes	10%
Total	100%

Any formative only assessments

6- List of references

6.1- Course notes

Power point presentation

6.2- Essential books (text books)

Lal, R. , Blum, W.H., Valentine, C. and B.A. Stewart.(1998). Methods for assessment of soil degradation. CRC Press. New York.
Fullen, M.A. and Catt, J.A. (2004). Soil Management: Problems and Solutions . Arnold Pub.

6.3- Recommended books

Lal, R., Sobecki, T. M., Livari, T., and J. M. Kimble. 2004. Soil degradation in the United States: Extent, Severity, and Trends. Lewis Publishers. NY, London, Boca Raton.
Pimentl,D. (Ed.) (1993) . World Soil Erosion and Conservation .Cambridge Univ. Press .
Hudson, N. (1971) . Soil Conservation. B T Batsford Limited .
R.P.C. Morgan, 2005, Soil Erosion and Conservation, 3rd edition. Blackwell Publishing Ltd. Oxford
FAO 2015. Status of the World's Soil Resources, FAO.
Liniger, H.P., R. Mekdaschi Studer, C. Hauert and M. Gurtner. 2011. Sustainable Land Management in Practice – Guidelines and Best Practices for Sub-Saharan Africa. TerrAfrica, World Overview of Conservation Approaches and Technologies (WOCAT) and Food and Agriculture Organization of the United Nations (FAO)
Liniger, H.P. and W. Critchly. 2011. WOCAT 2007: where the land is greener. Casestudies and analysis of soil and water conservation initiatives worldwide. CTA, FAO,UNEP, CDE.

6.4- Periodicals, Web sites, … etc

Soil Sci. Soc. Amer. J.
Geoderma
J.Soil and Water Conservation
J. Soil Sci.
J. Env. Quality
www. FAO.org

GLASOD (Global Assessment of Soil Degradation) publications (ISRIC, Wageningen):
http://www.isric.org/projects/global-assessment-human-induced-soil-degradation-glasod

(G)LADA (Land Degradation Assessment in Drylands) publications, FAO & ISRIC:
http://www.isric.org/projects/land-degradation-assessment-drylands-glada

7- Facilities required for teaching and learning

Computer, Data show, Field trips

Course coordinator:

Head of Department:

Date: / /

Mandatory Module: Geomatics and Spectroscopy

Mandatory Course: GIS and Spatial Analysis

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Geomatics and Spectroscopy

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: GIS and Spatial Analysis **Code:** SLM 14733

Credit Hours / ECTS: 3 / 9

Lecture: 2 **Tutorial/Practical:** 2 **Total:** 3

B- Professional Information

1 – Overall aims of course

For optimum utilization of available agricultural land resources on a sustainable basis, timely and reliable information regarding their nature, extent and spatial distribution along with their potential and limitations is very important.

The efficiency and accuracy of data are improved when remote sensing data products and GIS are used. Spatial tools such as the Global Positioning System (GPS), Geographic Information Systems (GIS) and Remote Sensing (RS) for storing and analyzing spatial data can help us make better decisions in agriculture, land development, environmental protection and restoration. Specifically this decision making tools can be used in the context of agriculture in assessment of crop area extent, management of water resources, identification of pest attacks and diseases, yield assessment studies, land suitability assessment for agriculture disaster management and precision agriculture.

Geostatistical analysis is vital in creating maps of different soil characteristics, taking into account the spatial as well as directional variability of soil properties. The semivariogram and kriging are the heart of geostatistics and will be introduced to the students with their different types of estimation.

Students will apply their new skills to one of several case studies in topics on agriculture, pest management, crop monitoring, water and land resource management and risk assessment among others. This course will offer a mixture of lectures, demonstrations and hands-on exercises using open source GIS and RS software.

2 – Intended learning outcomes of course (ILOs)

a- Knowledge and understanding:

- Understand the basic concepts of geographic information systems
- Understand the principles of remote sensing
- Know the various sources and types of remote sensing and GIS data
- Understand spatial variability of the biophysical environment and how it affects the sustainable use of land resources.
- Understand the role and scope of GIS/RS in environmental analysis

b- Intellectual skills:

- Make rational, scientific judgments on the validity and use of particular datasets for a range of environmental problems;
- Make informed and critical judgments when faced with an issue concerning geographic information management
- Analyse, synthesis and summarise geographic information requirement for a project;
- Apply knowledge and understanding to address a wide range of spatial issues
- Recognise the moral and ethical, as well as scientific issues that relate to geographic information and address these issues in context with current spatial data policies and strategies.
- Develop the students' capacity to make informed and critical judgments between alternative solutions to specific problems using GIS/RS
- Demonstrated ability to conceptualize, plan and conduct project in the area of land resource management.

c- Professional and practical skills:

- Synthesise information from a variety of sources
- Gain experience in the applications of remote sensing and GIS to solving problems related to natural resources management
- Knowledge of the GIS and RS tools that are available for natural resources management.
- Skill to use GIS/RS software for spatial data preparation, interpretation, analysis and visualization.
- In-depth skills of vector and raster processing.
- Show proficiency in integrating GIS data analysis with simple statistical analysis.
- Provide a critical evaluation of new and existing approaches to the remote sensing of the environment and the role of GIS
- Develop students' abilities in the practical procedures of GIS/RS from data acquisition and processing through to effective display of results
- Understand the complexity of spatial data and their relationships with non-spatial information
- Perform spatial analysis on a varied range of spatial data
- Gain complete understanding of spatial data acquisition procedures

- Assess the quality of acquired spatial data
- Design, develop and evaluate methodologies and develop critics of them, and where appropriate, propose new techniques for research.

d- General and transferable skills:

- The ability to reflect on the significance and inter-relationships of knowledge acquired both by study and from the professional experience of the student
- The ability, on the basis of such reflection, to formulate original ideas and innovative proposals
- The ability to initiate change on the basis of informed ideas and proposals, within the context of the student's personal professional activity

3- Contents

Topic
<u>Week 1: Introduction and key concepts of GIS.</u> • Introduction concepts of GIS and remotesensing in agricultural resource management • Planning for a GIS system installation • Introduction GIS data collection using GPS • Gathering data using mobile phones using (ODK) • Integrating GPS data into GIS • GIS Data sources and types for agriculture • Working with data from different sources • Geo database creation and maintenance for agricultural resources • Attributes manipulation in GIS • Facilitated practical exercises in working with tabular data in excel format <u>Week 2: Global Positioning Systems (GPS).</u> • What is GPS • How GPS works • Types of GPS • GPS data accuracy • GPS signal errors • What's WAAS • Limitations to GPS <u>Week 3: Digital image processing techniques in agriculture resource management.</u> • Obtaining satellite imagery for agriculture resource management • Satellite Image processing and calibration for agricultural resources • Land use classification using supervised classification • Land use classification using unsupervised classification

- Accuracy assessment and ground truthing technique
- Agricultural resource planning and monitoring
- Agro-Ecological zone mapping
- Agricultural resource mapping and updating
- Mapping crop
- Mapping soil variability
- Mapping condition that affects plant health, yield, or quality of a crop e.g. weed infestation
- Land suitability assessment for agriculture

Week 4: Basics of Geostatistics
- Overview of Geostatistics - stationarity – anisotropy - directionality
- Geostatistics versus normal interpolation

Week 5: Spatial Analysis
- Spatial analysis (non-geostatistical)
- Spatial continuity analysis (geostatistical)

Week 6: Variogram modeling
- Basic models
- Model fitting

Week 7: Estimation
- Deterministic estimation
- Estimation criteria
- Probabilistic (Geostatistical) estimation and Types of Kriging

Week 8: GIS and RS in soil management.
- Characterizing soil spatial variability
- Site-specific soil management prescription maps
- Soil Mapping and Capability Assessment
- Mapping Soil Erosion Risk Using RUSLE
- Case study: GIS and Remote Sensing in Drought Monitoring

Week 9: Precision farming using GIS and RS for crop management.
- Yield monitoring and mapping
- Grid sampling, management zones
- Crop health analysis using NDVI
- Remote sensing (RS) for precision agriculture
- Crop stress detection
- Crop modeling for yield estimation and production

Week 10: GIS and RS for water management in agriculture:
- Multi criteria analysis in determining potential ground water zones

- Mapping and monitoring irrigated land.
- Flood monitoring;
- Hydrological modeling and its application in agriculture
- Statistical analysis procedures on historical series of rainfall data to produce agro climatic classification
- Land suitability assessment for agriculture

Week 11: GIS AND RS disease/pest management.

- Using remote sensing and GIS to identify breeding areas
- Determining spatial patterns of the disease and pathway
- Crop damage assessment using change detection
- Determine the spatial extent of a disease
- Monitoring weather and ecological conditions favorable for crop pests and disease
- Case study: Remote Sensing for grazing management

Week 12: Participatory GIS.

- Public participation in agricultural resource management
- Using Google earth in agricultural resource management

Web based Publishing for interactive and dynamic agricultural maps

4– Teaching and learning methods

Lecture
Directed Learning
Independent Learning
Exam preparation
Exam taking

5- Student assessment methods

Weighing of assessments

Mid-term examination	10%
Final-term examination	40%
Oral examination	10 %
Practical examination	20%
Semester work	20%
Total	100%

Any formative only assessments

- Essay (75% of continuous assessment mark) on a topic chosen by the student, but which is of relevance to the course and agreed in discussion with the teaching staff.

- Beside frontal lectures, work in small groups is intended. Groups will be field handled with various applied examples, case studies, and hand-on exercises.
- Results of field observations and analysis will be presented in the form of seminar papers. With regard to selected topics of seminars additional lectures are provided by visiting academic staff or researchers.

6- List of references

1- Wilson, J. P. and A. S. Fotheringham. 2008. The handbook of geographic information science. Blackwell Publishing Ltd. USA.
2- Longley, P.A, Goodchild, M.F., Maguire, D.J, and D.W. Rhind. 2005. Geographical Information systems and Science, 2nd edition. John Wiley and Sons. London.
3- Burrough, P.A., and R.A. McDonnell. 1998. Principles of Geographic Information Systems. OxfordUniversity Press.
4- Star, J., and J. Estes. 1990. Geographic Information Systems: An Introduction. Prentice Hall.
5- Aronoff, S. 1989. Geographic Information Systems: A management perspective. WDL Publications, Ottawa, Canada.
6- Sabins, F. 1997.Remote Sensing: Principles and Interpretations. 3rd edition. W.H. Freeman and Company, New York. (This is the main textbook)
7- Lillesand, T. and R.W. Kiefer. 1987. Remote Sensing and Image Interpretation. John Wiley and Sons.
8- Jensen, J.R. (2005). Introductory Digital Image Processing: A Remote Sensing Perspective. 3rd Edition. Prentice-Hall, Upper Saddle River, NJ.
9- Isaaks, E.H. and R. M.Srivastava. 1989. Applied Geostatistics. Oxford University Press,
10- Chandra, A.M., and Ghosh, S.K., (2006). Remote sensing and geographical information system. Alpha Science International Ltd, Oxford, U.K.

6.1- Periodicals, Web sites, … etc

The GIS Primer: http://www.innovativegis.com/basis/primer/primer.html An Introduction to Geographic Information Systems. David J. Buckley, Pacific Meridian Resources, Inc. accessed December 2016.

GIS.Com 'What is a GIS?' http://www.gis.com/whatisgis/index.html accessed December 2016.
About GIS (GIS Lounge) http://gislounge.com/library/what-is-gis/ accessed December 2016.
Natural Resources Canada: Fundamentals of Remote Sensing. accessed December 2016.
http://www.nrcan.gc.ca/node/9309

7- Facilities required for teaching and learning

Computer lab equipped with suitable GIS / RS / Geostatistics software, printers, scanners, plotters, …. etc

Course coordinator: Prof. Dr. Mohamed Bahnassy

Head of Department:

Date: / /

Mandatory Module: Geomatics and Spectroscopy

Mandatory Course: Advanced Sepctroscopy

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Geomatics and Spectroscopy

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences – Pesticides Chemistry

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Advanced Spectroscopy **Code:** SLM 14734

Credit Hours / ECTS: 2 / 6

Lecture: 1 **Tutorial/Practical:** 2 Total: 2

B- Professional Information

1 – Overall aims of course

The aim of this course is to provide the students with the principles of spectral methods of analysis (Uv-Vis, Ir, Raman, emission, flame photometry, atomic, fluorescence spectroscopy) of chemical substances through spectroscopy education that would enable the student to work in the different related fields of analysis and research (water analysis, environmental analysis for detection of pollutants,…..etc) in a communicative team work. After successful completion of this course, students should be able to understand the techniques of separation and the concepts of spectroscopy analytical methods, identify and treat analytical data for quantitative and qualitative characterizations and apply the techniques to analysis of compounds

2 – Intended learning outcomes of course (ILOs)

e- Knowledge and understanding:

1. Define the theories of instrumental methods of spectroscopic analysis
2. Identify the theories of instrumental methods of spectroscopic analysis
3. Discuss the theories of instrumental methods of spectroscopic analysis
4. Recognize the theories of instrumental methods of spectroscopic analysis
5. List the principles of spectroscopy.
6. Write the different methods of spectroscopic analysis
7. Mention methods of spectroscopic analysis depending on the type of the samples

f- Intellectual skills:

1. Choose suitable spectroscopy methods of analysis of the substance to be analyzed
2. Have analytical thinking
3. Distinguishes between different techniques of spectral analysis.
4. Conclude the theory of every technique of spectral analysis Professional and

g- Practical skills

1. Use instruments in analytical laboratories.
2. Use the sheets of spectroscopic analysis.
3. Detect the quality of analyzed sample.
4. Write full report justifying his judgment.
5. Apply FTIR spectroscopy to obtain structural information
6. Apply safety measures in practice

h- General and transferable skills:

1. Interact efficiently with others.
2. Work effectively in a team.
3. Manage time effectively.
4. Make appropriate decisions depending on studying situations.
5. Collect the gained experiences in certain spectroscopy activities.
6. Write effectively a scientific report in English.

3- Contents

Topic	Lecture	Tutorial/Practical
1	Introduction to Spectroscopy	Introduction to Spectroscopy
2	Mass Spectrometry	Determination of Iron in water by Spectrophotometric method
3	Ultraviolet-Visible Spectroscopy	UV/VIS Spectroscopy and Spectrophotometry: Spectrophotometric Analysis of Potassium Permanganate Solutions
4	Infrared Spectroscopy	Determination of chromium and manganese in a mixture I
5	Optical Spectroscopy	Determination of chromium and manganese in a mixture II
6	Midterm Exam	
7	FTIR (Fourier transform infrared spectroscopy)	FTIR: Comparison of Sample Preparation Techniques and Interpretation of Spectra of an Unknown
8	Raman Spectroscopy	FTIR: Comparison of Sample Preparation Techniques and Interpretation of Spectra of an Unknown
9	Flame Spectroscopy	Quantitative Analysis of Aspirin Tablets by an Absorption Spectrophotometry
10	Fluorescence Spectroscopy	Determination of conc of Potassium Permenganate (KMNO4) sample .

11	Emission Spectroscopy	Effect of PH on the absorption Spectrum of Methyl Red (MR)
12	Nuclear Magnetic Resonance Spectroscopy	Revision
13	Final Exam	

4– Teaching and learning methods

4.1. Lectures.
4.2. Practical sessions.
4.3. Group discussions.
4.4. Data analysis.
4.5. Problem solving.
4.6. Seminars.
4.7. Reports
4.8. self-study

5- Student assessment methods

5.1. Mid-term exam
5.2. Oral exam
5.3. Practical exam
5.4. Final written exam
5.5. Writing on a subject related to the **course**

Assessment schedule

Assessment 1: Mid-term exam	Week 6
Assessment 2: Practical exam	Week 13
Assessment 3: Oral exam	Week 13
Assessment 4: Final written exam	Week 14
Assessment 5: report	Week 11, 12

Weighing of assessments

Mid-Term Examination	5%
Oral exam	5%
Practical exam	20%
Final report	10%
Final-Term Examination	60%
Total	100%

6- List of References

6.1- Course notes

6.2- Essential books (text books)

- J. Mendham, R.C. Denney, J. D. Barnes & M.J.K. Thomas, Vogel's Quantitative Chemical Analysis (6th Edition), Prentice Hall, Upper Saddle
- Douglas A. Skoog, F. James Holler, Stanley R. Crouch, Principles of Instrumental Analysis, (6th Edition) ,Stanford University, University of Kentucky, Stanley R. Crouch, (2007)
- Daniel C. Harris, Quantitative Chemical Analysis, 8th Edition, W.H. Freeman and Company,W. H., New York, 2010

7- Facilities Required for Teaching and Learning

Personal Computer, Data Show Projector

Course coordinator: Hend El-akkad / M. Abohashem/ Sameh Shaddad

Head of Department:

Date: / /

Mandatory Module: Bioeconomics of land management

Mandatory Course: Economics of Land Degradation

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Bioeconomics of land management

Department offering the program: Soil and Water Sciences

Department offering the course: Agricultural Economics

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Economics of Land Degradation **Code:** SLM 14760

Credit Hours / ECTS: 2 / 6

Lecture: 2 **Tutorial/Practical:** **Total:** 2

B- Professional Information

1 – Overall aims of course

This course provides students with the economic background needed in understanding the true meaning of land resources, an assessment of the economic benefits and costs of land degradation, determination of optimal pollution rates, the obstacles encountered in land resources preservation, externalities and public goods and their role in degrading land resources, and roles of governmental policies in mitigating land degradation. Course participants will learn about a range of economic approaches and methods explicitly designed to solving land degradation issues. Upon completion, students will gain theoretical and applied knowledge about different methods which bring together economic, the environment, and social dimensions associated with land resources.

Course Keywords: *Land Resources, Market Failure, Environmental Degradation, Sustainability, Economic Growth, Biodiversity and Valuation, Cost-Benefit Analysis, Policy Measures, Economic Efficiency, Social Costs and Benefits, Expected Value, Land Value, Degradation Assessment, Externalities, Public Goods.*

The course is structured into three main phases:

1. Introduction to Environmental Economics and Land Resources. This part is confined to the issues related to land resources as perceived in the science of economics, economic efficiency, optimal rates of land degradation, externalities and public goods issues, and the supply of and demand for land and other natural resources.

2. Economic Assessment of Benefits and Costs of Land Resources. This part curbs policy measures adopted by governments to mitigate land degradation and the assessment of social costs and benefits, as opposed to those of private costs and benefits.
3. Project Appraisal. This part is a practice for students to do their own calculation of costs and benefits associated with preventing land from being degraded.

2 – Intended learning outcomes of course (ILOs)

C- Knowledge and understanding:

a1- Explain why economic analysis can be a useful tool for decision-makers.
a2- Discuss the important scientific terms commonly used in environmental economics as a field of specialty in economics.
a3- Identify the different aspects that lead to land resources degradation.
a4- Describe the steps behind each valuation method, the underlying assumptions and methods, along with empirical limitations.

D- Intellectual skills:

b1- Contrast how theory might look relatively easy comparing to applying the theoretical principles to issues related to land degradation incidents in reality. Past and present examples encountered all over the world will be presented to students.
b2- Compose a suitable method for valuation of a non-marketed good or service, depending on the type of good or service in question.
b3- Assess critically the choice of valuation method, its application, and results for an existing valuation study.

E- Professional and practical skills:

c1- Examine and develop simple research designs for economic assessment of land degradation.

F- General and transferable skills:

d1- Complete running of a simple cost-benefit-analysis.

3- Contents

Contents
Week 1: Introduction to Resource and Environmental Economics: - Market Failure - Waste and Recycling - Sustainable Development - Environmental Degradation - Alternative Energy Sources - Population & Economic Growth - Natural Resource Management - Environmental Ethics
Week 2: Important Concepts and Calculations in Environmental Economics:

- Scrutinizing efficiency
- Cost-benefit analysis
- Types of efficiency
- What goods and services should be produced?
- With what resources should goods and services be produced?
- Who will receive the final products?
- Supply and demand
- Expected-value calculations

Week 3: Market Failure:

- Imperfect competition
- Imperfect information
- Externalities
- Public Goods

Week 4: The Role of Government:

- The Meaning and Purpose of Government
- What is government
- Is government necessary
- The Role of Government
- Historical Ideologies
- Modern Problems with private solutions
- Government Solutions to Market Failure
- Enforcement of property rights
- Provision of public goods
- Liability
- Regulations
- Education and Moral Leadership
- Dispute Resolution

Week 5: Trade-offs and the Economy:

Trade-offs between present and future

- Why discount future benefits
- Why discount future costs
- Dynamic efficiency
- Present-Value calculation
- Discount Rates –who's got the number
- What's your number?

•Trade-offs between growth and the environment

- Growth versus Welfare
- Is "green" growth and Oxymoron
- Treading Lightly

Week 6: Water Quality and Valuation:

- The Value of Clean Water
- Policy
- Education
- Market-Based Incentives

Week 7: Environmental Quality and Valuation:

What is quality of the environment?

- Terms of trade

Where do we go from here? A brief look
- Policy
- Education
- Market-based Incentives

Week 8: Energy:

Energy Terminology
- Fossil Fuels
- Nuclear Energy
- Alternative Fuels

Energy Policy
- Efficient Source Selection
- Market Structure and Price Control
- Deregulation
- Policy and Automobiles
- CAFÉ Standards

Week 9: Sustainability:

Sustainability Criteria
- Weak Sustainability
- Strong Sustainability
- The Downside of Mistaken Judgment
- Other Types of Sustainability

Sustainability and Efficiency

Walking the walk
- Recycling
- Current Trend
- Is It Efficient?
- Recycling Policy

Week 10: Biodiversity and Valuation:
- Biodiversity Loss
- Cost-Benefit Applications
- The Noah Ark Model
- Valuing Costs and Benefits
- Types of Values

Measures of Value
- Market Prices
- Contingent Valuation
- Hedonic Pricing

Week 11: Water Resource Management:
- Water Rights
- Water Pricing
- Water Use Sustainability

Week 12: Perspectives on Environmental Policy:
- Command-and-Control Regulations
- Incentive-Based Solutions
- Punishment and Deterrence

Week 13: Project Presentation and Oral Exams

Week 14: Final written Exam

4– Teaching and learning methods

4.1- Lectures using PowerPoint Presentations.

4.2- Assignments including case-study analysis and formulation of small-scale projects which show economic thinking of land degradation issues. Assignments are to be made in groups.

4.3- Searching scientific articles which handle the economics of land degradation in different parts of the world. Critical analysis of some articles is to be made.

5- Student assessment methods

5.1 Oral to assess the skills of analyses and discussion. This is made in project presentations.
5.2 Case study analysis to judge the skills of problem solving and data presentation and discussion.
5.3 Assignments to measure students' ability to working in groups.

5.4 A written final exam to weigh the student's overall understanding of the main concepts of the course.

Assessment schedule

Assessment 1: Project Presentation and Oral Exam – Week 13
Assessment 2: Case Studies - Weeks 6 to 9
Assessment 3: Group assignments – Weeks from 5 to 10
Assessment 4: Final Exam - Week 14

Weighing of assessments

Final-term examination:	50%
Oral examination and project presentation	20%
Semester work:	30%
Total:	100%

6- List of references

6.1- Course notes

- All of the course materials are of the electronic type. These materials are to be sent to students by e-mails or through the creation of a website to the students on Facebook or any other website venue.

6.2- Essential books (textbooks)

David A. Anderson. 2010. "Environmental Economics and Natural Resource Management", 4th Edition, Routledge. ISBN-13: 978-0415640961
ISBN-10: 0415640962.

6.3- Recommended books

Molly Espey. Workbook APEC 257. Natural Resources, the Environment and Economics. Department of Agricultural and Applied Economics Clemson University.
https://www.sc.edu/sustainableu/Espey257test.pdf

S Callan and J Thomas. 2000. Environmental Economics and Management: Theory, Policy and Applications. 2nd edition. Fort Worth: Dryden Press.

G.Carlson., D Zilberman and J Miranowski. 1993. Agricultural and Environmental Resource Economics. 1st edition only. Oxford: Oxford University Press.

6.4- Periodicals, Web sites, … etc.

Determination of a number of research articles written on economics of land degradation is to be made. Research articles are mostly on the following link: http://ageconsearch.umn.edu/. This is a scientific research link associated with the University of Minnesota, Twin Cities, USA, Department of Applied Economics.

7- Facilities required for teaching and learning

- Computer
- Field visits to some locations.
- Data Show.

Course coordinator: Professor Sherin Ahmed Sherif

Head of Department:

Date: / /

Mandatory Module: Bioeconomics of land management

Mandatory Course: Biostatictical Analysis

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Bioeconomics of land management

Department offering the program: Soil and Water Sciences

Department offering the course: Agronomy

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Biostatistical Analysis **Code:** SLM 14761

Credit Hours / ECTS: 2 / 6

Lecture: 1 **Tutorial/Practical:** 2 **Total:** 2

B- Professional Information

1 – Overall aims of course

Statistics is the study of using theory and methods for the analysis of data arising from random processes or phenomena, i.e. the study of how to make sense of data.
The field of statistics provides some of the most fundamental tools and techniques of the scientific method:

- Formulating a hypothesis
- Designing experiments and observational studies
- Data collection
- Summarizing data
- Statistical inference

Biostatistics is the branch of applied statistics directed toward application in biological sciences. The course is intended to provide the students with conceptual overview of statistical methods with emphasis on applications commonly used in the biological research. The course will briefly cover the topics of descriptive statistics and probability followed by a detailed description of the widely used experimental designs. The goal is to provide the student with the information needed to be able to statistically design an experiment, perform analysis and interpret the results.

2 – Intended learning outcomes of course (ILOs)

1. Outline the functions and principles of biological statistics
2. Distinguish between the measures of location and measures of variation
3. Choose the best statistical design for a given biological experiment

4. Formulate the tested hypothesis
5. Analyze the data statistically according to the proper chosen experimental design
6. Conclude a statistical inference

3- Contents

Contents
Week 1: Introduction and concepts: - Functions of biological statistics - Definitions of data, variable, population and sample - Principles of statistics (repetition, randomization and local control) - Sampling (sources of samples, types of samples and factors determining sample size)
Week 2: Descriptive measures: - Measures of location - Measures of variation
Week 3: Probability theory and data distribution - Theories of probability - Normal distribution and data transformation
Week 4: t-test and F-test: - T-test in pairs comparison of means - T-test in groups comparison of means - F-test comparison of variance of two populations
Week 5: ANOVA and experimental designs: - Analysis of variance (ANOVA) - Complete randomized design (CRD) - Randomized complete block design (RCBD)
Week 6-8: ANOVA and experimental designs: - Latin square - Split and split-split - Factorial 2 and 3 factors - Nested design - Combined analysis (homogeneity of error)

- Least significant difference (L.S.D.) - Regression analysis - Correlation analysis
Week 9: Chi square distribution - Non-parametric (categorical) statistics
Week 10: Multivariate analysis of variance (MANOVA)
Week 11: Principal component analysis (PCA)
Week 12: Clustering

4– Teaching and learning methods

Lecture
Directed Learning
Independent Learning
Exam preparation
Exam taking

5- Student assessment methods

Weighing of assessments

Mid-term written exam	20%
Final written exam	40%
Oral exam and/or final report	20%
Coursework and continuous assessment	20%
Total	100%

6- List of references

1. Gomez, K.A., and Gomez, A.A. (1984). Statistical procedures for agricultural research. Second edition. A Wiley-Interscience Publication. John Wiley and Sons.
2. Steel, R.G.D., and Torrie, J.H. (1980). Principles and procedures of statistics. Second edition. New York: McGraw-Hill.
3. John, P.W.M. (1971). Statistical design and analysis of experiments. New York: Macmillan.
4. Winner, L. (2004). Introduction to Biostatistics. University of Florida. *web.stat.ufl.edu/~winner/sta6934/st4170_int.pdf*

Course coordinator:

Head of Department:

Date: / /

Mandatory Module: Scientific English and Proposal Writing

Mandatory Course: English for Scientists and Proposal Writing

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Scientific English and project proposal Writing

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: English for Scientists and Proposal Writing **Code:** SLM 14762

Credit Hours / ECTS: 1 / 3

Lecture: 1 **Tutorial/Practical:** **Total:** 1

B- Professional Information

1 – Overall aims of the course

English is the language of science. Since the end of WWII, English has become the established language of scholarly communication, but not without controversy. The overwhelming majority of communication in the natural sciences today takes place in English; in print and at conferences; in E-mails and in Skype-mediated collaborations, confirmable by wandering through the halls of any scientific research facility worldwide. The adoption of English as the universal language of science is due in part to historical, political, and economic factors which favored English over other potential candidate languages such as Chinese, French, German, Russian, or Spanish. English is therefore well positioned to become the default language of science in the wake of the disruptive wars of the first half of the 20th century. The use of English as the scholarly ***lingua franca*** has become self-reinforcing, with academic reward schemes in many countries, placing great emphasis on publication in international (mostly English-language) journals. Roughly 80% of all the journals indexed in Scopus are published in English. It is, therefore, mandatory for scientists and researchers, in particular, to meet a certain level of English language proficiency. English for Scientists will develop the learners' language skills with practical reading and writing skills, to be utilized in writing proposals and applying for research funding. This is since the write-up of proposals is both a science and an art. A significant number of researchers do not either know it as a science or not gifted with it as an art. This course aims at equipping students with the scientific component, leaving the rest to the individual talents of the students.

2 – Intended learning outcomes of course (ILOs)

i- Knowledge and understanding:

a1- Describe the scientific thinking and the scientific ideology.

a2- Outline the concept of “research problem” and hypothesis testing.

a3- Locate the significance of literature review.

j- Intellectual skills:

b1- Identify attractive research objectives.

b2- Distinguish between outcomes and outputs.

b3- Arrange the research methodologies.

b4- Create a timeframe for his/her research project.

k- Professional and practical skills:

c1- Adjust the research activities to the specified timeframe.

c2- Justify the needed budget.

c3- Design a good and fund-raising research proposal.

3- Contents

Contents
Week 1: Introduction and Expectations: - Why English is the language of science? - Principles of writing scientific English. - Logical thinking, analysis and synthesis
Week 2-3: Research proposal: - What is a proposal? - Why write a proposal? - How to prepare for writing a proposal? - The concept notes - Communicating in science - Making good arguments
Week 4: Build a proposal writing team: - Introducing the role and responsibilities of the principle investigator (PI) in the project, as well as, the role of the Co-PI and the other team members - Introducing the IMRAD Format
Week 5: Explaining the different components of a proposal: - Title - Abstract - Keywords - Introduction and Review of Literature - The Problem - Objectives - Data and Methods - Analysis - Results - Conclusions and Recommendations
Week 6: Explaining the different components of a proposal:

- Determining the problem and formulating the research hypothesis - Stating the objectives - Outcomes and outputs
Week 7: Explaining the different components of a proposal: - Description of methodology and activities - Time plan - Budget and budget justification
Week 8: Project implementation, monitoring, evaluation, and follow up.
Week 9: Project risk management and SWOT analysis
Week 10: Logical framework matrix and Gantt chart
Week 11: Presenting research results
Week 12: Discussion of projects designed by the students' groups

4– Teaching and learning methods

4.1- Lectures
4.2- Practical sessions
4.3- Group assignments

5- Student assessment methods

5.1- Oral to assess the communication skills
5.2- Written to assess the understanding and scientific background
5.3- Practical to assess the intellectual skills
5.4- Assignments to assess the professional skills and team work skills

Assessment schedule

Assessment 1: Assignments – Week: 4th
Assessment 3: Practical exam – Week: 13th
Assessment 4: Oral exam – Week: 13th
Assessment 5: Final written exam – Week: 14th

Weighing of assessments

Final-term examination	40%
Oral examination	20%
Practical examination	20%
Group assignment and semester work	20%
Total	100%

6- List of references

5. How to Write a Research Proposal, http://www.ic.daad.de/accra, Accessed on December 24th, 2016.
6. Ellman, Patricia. 2014. English Grammar for Economics and Business. For students and professors with English as a foreign language. 2nd edition, ISBN 978-87-403-0653-8 and www.bookboon.com, Accessed on December 23rd, 2016.

7. National Science Foundation. A Guide for Proposal Writing. Directorate for Education and Human Resources. Catalog of Federal Domestic Assistance: CFDA 47.076. https://www.nsf.gov/pubs/1998/nsf9891/nsf9891.htm, Accessed on December 22nd, 2016.
8. Greener, Sue and Joe Martelli. An Introduction to Business Research Methods. 2nd edition. ISBN 978-87-403-0820-4 and www.bookboon.com
9. Stapleton, Paul. Writing for research, presentation and project proposals. Online Draft Copy

7- Facilities required for teaching and learning

4. Computer 2. Data Show

Course coordinator:

Head of Department:

Date: / /

Mandatory Module: Scientific English and Proposal Writing

Mandatory Course: Research Methods and Scientific Communications

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Scientific English and project proposal Writing

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Research Methods and Scientific Communications **Code:** SLM 14763

Credit Hours / ECTS: 1 / 3

Lecture: 1 **Tutorial/Practical:** **Total:** 1

B- Professional Information

1 – Overall aims of course:

The course aims at introducing the student with different ways to construct an academic concept in basic scientific methods and communication, as well as gaining awareness and skill in adapting writing and oral presentation style and technique to different audiences and formats and diagnose the numeracy and literacy skills for the students relevant to their discipline of study.

2 – Intended learning outcomes of course (ILOs)

l- Knowledge and understanding:

a1- Explain the differences between a conceptual and a technical research design;
a2- Describe features of an experimental, cross-sectional, and longitudinal design;
a3- Describe the pros and cons of different data collection methods;
a4- Discuss what random and non-random sampling is about;
a5- Discuss the reliability and validity of measurements;
a6- Discuss key research methodologies relating to communication in environmental sciences and
a7- Outline an experimental design and data analysis.

m- Intellectual skills:

b1- Determine elaborated research designs in the environmental sciences;
b2- Determine appropriate approaches to particular research questions;

b3- Develop skills in drafting and editing of texts and
b4- Develop skills in oral presentation.

n- Professional and practical skills:

c1- Illustrate and begin to apply the practical skills required in professional research, from question formulation to publication and
C2- Examine texts presenting the same content for different audiences, and reflect critically on the editing process and audience engagement.

o- General and transferable skills:

d1- Show findings orally in a group session.

3- Contents

Topic	No. of Hours	Lecture	Practical/Tutorial
A- Research methodology	**4**	**4**	**-**
B- Scientific writing	**8**	**8**	**-**

3.1- Tentative Timetable for the course:

Types	Topic
Topic A:	Week 1: FORMULATING A RESEARCH PROBLEM 1 Research: a way of thinking 2 The research process: a quick glance 3 Reviewing the literature 4 Formulating a research problem 5 Identifying variables 6 Constructing hypotheses
	Week 2: CONCEPTUALISING A RESEARCH DESIGN 7 The research design 8 Selecting a study design CONSTRUCTING AN INSTRUMENT FOR DATA COLLECTION 9 Selecting a method of data collection 10 Collecting data using attitudinal scales 11 Establishing the validity and reliability of a research instrument
	Week 3-4: SELECTING A SAMPLE 12 Selecting a sample
	Week 5-6: WRITING A RESEARCH PROPOSAL 13 How to write a research proposal

Topic B:	Week 7-9: COLLECTING DATA 14 Considering ethical issues in data collection
	Week 9-10: STEP VII PROCESSING AND DISPLAYING DATA 15 Processing data 16 Displaying data
	Week 11-12: STEP VIII WRITING A RESEARCH REPORT 17 Writing a research report 18 Research methodology and practice evaluation

4– Teaching and learning methods

4.1- Class Participation
4.2- Frontal lectures
4.3- Microteaching
4.4- Home reading and assignments
4.5- Discussion sessions
4.6- Course website

5- Student assessment methods

5.1 Exercises are useful to assess the skills of solving problems and presenting data and discussion;
5.2 Midterm exam is useful to assess the skills of understanding the scientific background of the material studied in the program;
5.3 5-minute research summary is important to assess the skills of ensuring academic integrity;
5.4 Research proposal is useful to point out what you hope to accomplish and your desired outcomes from the research. and
5.5. Final exam is useful to test the students' knowledge and understanding of a topic, as well as their ability for application, analysis, integration and synthesis.

Assessment schedule

Assessment 1 Exercises	Every 2 weeks
Assessment 2 Midterm exam	week: 7th
Assessment 3 Case study presentation	Week: 12th
Assessment 4 Oral exam	Week: 13th
Assessment 5 Final exam	Week 14th

Weighing of assessments

Exercises	10%
Midterm exam	10%
5-minute research summary	20%
Research proposal	20%
Final exam	40%
Total	100%

6- List of references

6.1- Course notes

Course handouts in a PDF format for different topics will be available for students.

6.2- Essential books (text books)

- **Kumar, R.** (2014). Research Methodology: A Step-by-Step Guide for Beginners. Sage Publications Ltd., ISBN 978-1-4462-6996-1.

6.3- Recommended books

- **Barnard**, C.F. and McGregor P., 2011. Asking questions in biology. A guide to hypothesis-testing, experimental design and presentation in practical work and research projects. Fourth edition. Benjamin Cummings.

6.4- Periodicals, Web sites, … etc

A course web site that will be initiated in the near future is the main website for the class

7- Facilities required for teaching and learning

- Computers and internet
- Video films
- Field visits
- Data-show

Course coordinator: Gaber M. Hassan, Ph. D.

Head of Department:

Date: / /

Specialization Module: Land Use Planning and Assessment

Elective Course: Land Use Planning & Sustainable Development

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Land Use Planning and Assessment

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Land Use Planning for Sustainable Development **Code:** SLM 14735

Credit Hours / ECTS: 2 / 6

Lecture: 2 **Tutorial/Practical:** **Total:** 2

B- Professional Information

1 – Overall aims of course

This course aim at bridging the relationship between land use planning and social and environmental aspects of sustainability, exploring both dynamic drivers of land use plans and its societal and environmental consequences. Topics covered will include the planning process, as well as the sustainable development goals SDG's. Students will be encouraged to think critically and creatively about the role of land use change within broader sustainability agendas, such as those outlined in the Sustainable Development Goals

2 – Intended learning outcomes of course (ILOs)

1. Analyze the complex land use change dynamics,
2. Find cause/effect relationships across scales
3. Compare different land use planning techniques
4. Understand the effect of land use planning process on the sustainability
5. Calculate the environmental performance using different qualities

3- Contents

Topic
Week 1: Nature and scope of land use planning What is land-use planning? When is land-use planning useful? Making the best use of limited resources

Goals
The focus of land-use planning
Planning at different levels

Week 2: Overview of planning process
The need for flexibility
Planning and implementation
Planning as an iterative process
The land-use plan

Week 3-5: Steps in land use planning
Step 1. Establish goals and terms of reference
Step 2. Organize the work
Step 3. Analyze the problems
Step 4. Identify opportunities for change
Step 5. Evaluate land suitability
Step 6. Appraise the alternatives: environmental, economic and social analysis
Step 7. Choose the best option
Step 8. Prepare the land-use plan
Step 9. Implement the plan
Step 10. Monitor and revise the plan

Week 6-8: Sustainable Development Goals

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace, Justice and Strong Institutions
17. Partnerships for the Goals

Week 9-10: Sustainable development indicators

1. Economic Prosperity
2. Long Term Unemployment
3. Poverty
4. Knowledge and Skills
5. Healthy Life Expectancy
6. Social Capital
7. Social Mobility in Adulthood
8. Housing Provision
9. Greenhouse Gas Emissions
10. Natural Resource Use
11. Wildlife
12. Water Use
13. Population Demographics
14. Debt
15. Pension Provision
16. Physical Infrastructure
17. Research and Development
18. Environmental Goods and Services Sector
19. Avoidable Mortality
20. Obesity
21. Lifestyles
22. Infant Health
23. Air Quality
24. Noise
25. Fuel Poverty
26. CO2 Emissions by Sector
27. Energy from Renewable Sources
28. Housing Energy Efficiency
29. Waste Disposal and Recycling
30. Land Use
31. Water Quality
33. Sustainable Fisheries
34. Priority Species and Habitats

Week 11-12: Student case study

Students will select one of these dimensions for further independent research, and will present an assignment in which they apply theoretical concepts to critically examining the societal/environmental challenges of land use change.

4– Teaching and learning methods

4.1-Lectures
4.2-Seminars
4.3- Internet search
4.4-Turorials

5- Student assessment methods

5.1 Exams	to assess student comprehension of the subject
5.2 tutorials	to assess student ability to think critically

Assessment schedule

Assessment 1 Midterm exam	Week 7
Assessment 2 Tutorials	Week 2, 4, 8
Assessment 3 Oral exam	Week 13
Assessment 4 Final exam	Week 14

Weighing of assessments

Mid-term examination	10%
Final-term examination	60%
Oral examination	10%
Semester work	20%
Total	100%

Any formative only assessments

6- List of references

Adger, W. N. et al. Advancing a political ecology of global environmental discourses . Centre for Social and Economic Research on the Global Environment, 2000. Available online:http://www.cserge.ac.uk/sites/default/files/gec_2000_10.pdf

Borrass Jr., S.; Franco, J. (2012). Global land grabbing and trajectories of agrarian change: a preliminary analysis. Journal of Agrarian Change, 12 (1), 34-59.

Cline-Cole, R. (1996) Dryland forestry: manufacturing forests & farming trees in Nigeria in Leach, M. & Mearns, R (eds). The lie of the land: challenging received wisdom on the African environment.

Foley, J. A., DeFries, R., et al. (2005). Global consequences of land use. Science.. , 309 (5734), 570-574.

Geist, H.J. and Lambin, E.F. (2002) Proximate Causes and Underlying Driving Forces of Tropical Deforestation.Bioscience. 52(2): 143-150

Lambin, E. F., et al. (2001). The causes of land-use and land-cover change: moving beyond the myths. Global environmental change: human and policy dimensions, 11 (4), 261-269.

Leach, M., & Mearns, R. (1996). The lie of the land: challenging received wisdom on the African environment. James Currey Ltd.

Meadows, D. H., Meadows, D. L., Randers, J., & Behrens, W. W. (1972). The limits to growth. New York, 102.

Mol, A.P.J., and Sonnenfeld, D.A., (eds.) 2000, Ecological modernisation around the world: persectives and critical debates, London Routledge.

Nelson, D. R., Adger, W. N., & Brown, K. (2007). Adaptation to environmental change: contributions of a resilience framework. Annual review of environment and resources, 32 (1), 395.

Raworth, K. (2012) “A Safe and Just Operating Space for Humanity: Can we live within the Doughnut? " Oxfam Discussion Paper Available online: https://www.oxfam.org/sites/www.oxfam.org/files/dp-a-safe-and-just-space-for-humanity-130212-en.pdf

Rockström, J., et al. (2009) "Planetary boundaries: exploring the safe operating space for humanity." Ecology and society [electronic resource]. 14.2

Scoones, I. (1998). Sustainable rural livelihoods: a framework for analysis. IDS Working Paper 72. Brighton: IDS

Course coordinator: Prof. Dr. Mohamed Bahnassy

Head of Department:

Date: / /

Specialization Module: Land Use Planning and Assessment

Elective Course: Advanced Land Evaluation

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Land Use Planning and Assessment

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Advance Land Evaluation **Code:** SLM 14736

Credit Hours / ECTS: 2 / 6

Lecture: 2 **Tutorial/Practical:** **Total:** 2

B- Professional Information

1 – Overall aims of course

The course aim to provide the students with the types and methods of land evaluation, either land capability or suitability for different crops and determine the limitations of its productivity.

2 – Intended learning outcomes of course (ILOs)

p- Knowledge and understanding:

a1- Understand the different systems of land evaluation.
a2- Identify the limitations of soil productivity.
a3- Demonstrate how to use the different programmes of land evaluation.

q- Intellectual skills:

At the end of this course , the students will be able to:
b1 – Apply the land capability and suitability evaluation.
b2 – Determine the different attributes which the land capability and suitability for different crops.
b 3 – Select the proper system for land evaluation.
b4 – Develop the computer skills in relation to land evaluation.

r- Professional and practical skills:

c1-– Predict the land capability and suitability for different crops in different agroecosystems.

c2- Compare and assessed the different programs of land evaluation.

s- General and transferable skills:

d1- Use the modern technology in land evaluation.

d2- Develop the team work concept in land evaluation.

d3- Improve the creative thinking and communication skills in land evaluation issues.

d4 - Develop the holistic approach in land evaluation studies.

3- Contents

Topic
Week 1-3: Introduction to the aims and principles of land evaluation Types of land evaluation Some definition used in land evaluation
Week 4-5: Land capability evaluation: Concepts and assumption Structure of the classification Survey procedures and presentation of the results.
Week 6-7: Land suitability for different crops : Structure of the classification Procedures of Land suitability classification
Week 8-9: Parametric methods for calculating suitability indices Examples of software used in land evaluation GIS and RS techniques
Week 10-12: Land evaluation in different agroecosystems Irrigated land Dry land Rain-fed agriculture

Extensive grazing.

4– Teaching and learning methods

4.1- Lectures
4.2- Seminars
4.3- Case studies and problems
4.4- Internet search

5- Student assessment methods

5.1 Quizzes
5.2 Mid-term Exam
5.3 Oral Examination
5.4 Final-term theoretical Examination

Assessment schedule

Assessment 1 Quizzes	Week: (week 3 & week 10)
Assessment 2 Mid-term Exam	Week: (week 8)
Assessment 3 Oral Exam	Week: (week 12)
Assessment 4 Final-term Exam	Week: (week 13)

Weighing of assessments

Mid-term examination	10%
Final-term examination	70%
Oral examination	10 %
Quizzes	10%
Total	100%

6- List of references

6.1- Course notes

. PowerPoint presentation

6.2- Essential books (text books)

Dent ,D. and Young ,A. (1981):Soil Survey and Land Evaluation. George Allen &Unvrin Ltd.,London U.K.

FAO (1976) :A Framework for Land Evaluation. Bulletin No.32.

6.3- Recommended books

FAO (1985) :Guidelines : Land Evaluation for Irrigated Agric. Bulletin No.55.

FAO (1985) :Guidelines : Land Evaluation for Rainfed Agric. Bulletin No.52.
FAO (1991) :Guidelines : Land Evaluation for extensive grazing Bulletin No.58.

6.4- Periodicals, Web sites, … etc

Soil Sci. Soc. Amer. J.
Geoderma
J. Soil and Water Conservation
J. Soil Sci.
J. Env. Quality
FAO.org

7- Facilities required for teaching and learning

Computer --- Data show

Course coordinator:

Head of Department:

Date: / /

Specialization Module: Land Use Planning and Assessment

Elective Course: Climate Change and Food Security

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Land Use Planning and Assessment

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Climate Change and Food Security **Code:** SLM 14737

Credit Hours / ECTS: 2 / 6

Lecture: 2 **Tutorial/Practical:** **Total:** 2

B- Professional Information

1 – Overall aims of course

This course presents Earth's climate system and explores the science of global climate change. Course topics include the greenhouse effect, El Niño, ocean circulation, the science of global warming and climate change impacts on agricultural production. Students will learn: how the climate system works; what factors cause climate to change across different time scales and how those factors interact; how climate has changed in the past; how scientists use models, observations and theory to make predictions about future climate; and the possible consequences of climate change for our planet. The course explores evidence for changes in ocean temperature, sea level and acidity due to global warming. Students will learn how climate change today is different from past climate cycles and how satellites and other technologies are revealing the global signals of a changing climate. The course looks at the connection between human activity and the current warming trend and considers some of the potential social, economic and environmental consequences of climate change. Students will explore the concept of food security in all of its dimensions including production, storage, distribution, access and stability. We will place special emphasis on challenges to global food security, constraints on the modern "conventional" farming system, and sustainable strategies to increase global food production. Topics of food production systems, population growth, food production in developing countries, and novel strategies to address food security. Students will describe potential impacts of climate change on food security; and understand how climate change effects fit into the array of food security determinants at local and global level.

2 – Intended learning outcomes of course (ILOs)

a- Knowledge and understanding: At the end of this course will be able to:

1. Demonstrate a solid understanding of the climate system.
2. Explore the concept of energy balance and the greenhouse effect and How does climate works?

3. Evaluate the various factors that shape climate.
4. Describe changes in the Earth's climate through time, with special emphasis on the Ice Ages and the last 1000 years.
5. Describe how past climates contribute to our current understanding of climate change.
6. Illustrate components of the Earth's carbon cycle and quantitatively describe how addition of CO2 to the atmosphere through burning fossil fuels will influence the climate.
7. Describe the character of climate models (GCM) and how they are constructed
8. Examine the drivers and forcing's of climate change and What causes the climate to change
9. Gain the historical perspective necessary to assess our recent changes in climate (i.e. global warming over the last 100 years)
10. Explain the consequences, risks, and uncertainties of climate change.
11. Address What is food security and how is it measured?
12. Outline challenges to global food security,
13. Describe potential impacts of climate change on food security; and understand how climate change effects fit into the array of food security determinants at local and global level
14. How are food systems being transformed by globalization and climate change?,

b- Intellectual skills

b1 Identify causes for climate change and to classify causes based on time-scales.
b2-… Analyze circulation in the atmosphere and ocean.
b3-… Criticizes study of ocean acidification and marine life
b4- Compare among the different scenarios of IPCC for climate change with an evaluation of their environmental impacts
b5- Differentiate between adaptation and mitigation of climate changes
b6- Analyze the risk assessment and management plans for climate change
b7- Choose the appropriate physical equation for expressing earth's temperature
b8- Assess the character of climate models and how they are constructed.
b9- Evaluate the current food system in the context of climate change
b10- Synthesis of several key trends in the food and climate systems
b11- Suggest measures for achieving food security in the face of climate change

c- Professional and practical skills

c1- Identify basic methods for determining past climates.
c2- Calculate earth temperature with changing CO2, Albedo, emmisivity
c3- Use the climate change interactive models
c4- Solve simple mathematical models og climate change
c5- Measure and Monitor GHG emissions
c4- Implement measures to reduce emissions of GHGs to the atmosphere

d- General and transferable skills

d1-1. Develop effective communication skills — Written, oral, interpersonal, group.
d2. Develop higher cognitive skills — Critical thinking, creativity, analytical ability.
d3. Cultivate the virtues — Ethics, responsibility, honor, tolerance, respect for others, empathy.
d4. Develop focus and depth in one or more disciplines.

d5. Develop leadership skills — Ability to stimulate and direct collaborative learning and collaborative action.
d6. Develop a global perspective — Broad intellectual and cultural experience through active
d7. Engagement, an understanding of the interactions among the individual, society, and the natural world.
d8. Prepare for lifelong learning — Independent thinking and learning, learning to find information, asking the right questions..

3- Contents

Week	Topic	Lectures	Assignment
1	Introduction to climate : How Does Climate Work?	• Review the course orientation. • Explore the concept of energy balance and the greenhouse effect. • Analyze circulation in the atmosphere and ocean.	Exercise 1: climate trend of home town Essay 1: 10 years of Climate records (Hometown) Readings: http://www.grida.no/climate/ipcc_tar/wg1/pdf/TAR-01.pdf
2	History of Earth's climate	• Discover how ice cores are used to decipher past climate • Ice Age Climate Cycles - Milankovitch Theory	Exercise 2: Climate trends Through the Last 1000 Years Essay 2, Ice core Science
3	What Causes Climate to Change?	• Explore early climate science with the Keeling Curve. • Global warming: An Overview, -The Role of Carbon Dioxide, / Methane, • The Earth's Carbon Reservoirs	Exercise 3, Calculate GHG footprint of your country. Essay 3, Reduce your footprint
4	GCMs & predictions	• Examine the drivers of climate change. • Understand the relationship between drivers and forcing's.	Exercise 4, Critically read and summarize a scientific article on a GCM. Exercise 4: Test Typical GCM Essay 4, Your GCM
5	How Does the Climate System Respond to Input?	• Climate feedbacks. • How feedbacks can amplify or damp the temperature response. • Temperature response with feedbacks.	Exercise 5, feedbacks https://www.futurelearn.com/courses/causes-of-climate-change/0/steps/13593
6	Climate change impact on agriculture	• Predicted Changes for Agricultural Production Systems Across Regions	Exercise 6 Analyze data http://www.agritrade.org/events/documents/JKEANEweb_FINAL.pdf
7	Constraints on	• Climate change impacts and	Essay 6:

	Food and Farming from Climate Change	consequences for food systems • Indirect consequences of climate change impacts on the different dimensions of food security	http://environ.andrew.cmu.edu/m3/s2/subsect/predict.htm
8	Risk assessment & management of CC impacts	Mitigation Strategies Adaptation strategies Examples of Success stories Climate change adaptation and food security	Exercise 5, Essay 6,
9	Challenges for food systems: Biofuels & GM crops	How will biofuel production affect food security and poverty? GMO and food security http://economia.unipv.it/naf/otherNAFPUBL/Master/GMO/GMOs.pdf	Reading: http://www.fao.org/docrep/017/i3126e/i3126e.pdf
10	Reducing risks to food security from climate change	Disaster risk reduction www.preventionweb.net/files/31093_carloscaramella.pptx	Reading: http://www.sciencedirect.com/science/article/pii/S2211912415300262

4– Teaching and learning methods

Lectures	are used to provide basic information about key concepts and important characteristics of agricultural systems.
Tutorials	serve to reinforce and extend some of the ideas raised in the lectures and practical. They are also designed to require students to find information and interpret it.
Practical demonstrations	are used to illustrate some of the production practices described in the lectures and to in traduce students to some of the terminology used in agriculture. The students work as a group and many of the demonstrations also help to build teamwork and to foster the relationships between students. Aspects of these demonstrations are assessed in a practical exam.
The formal practical classes	are used to (a) introduce students to terms commonly used in agricultural science ('the language of the discipline'), The practicals are interactive with periods of discussion interspersed during the practical exercises. The activities of the practical exercises are assessed in a practical exam at the end of the semester as well as a short report on two practicals.

The essay	is used to develop written communication skills and to encourage critical evaluation if information. Students have the choice to resubmit the essay after it is marked after responding to the comments on the essay from the marker. Students are also required to find primary sources of information and are encouraged to use the library data bases to find relevant information.

Workload

The information below is provided as a guide to assist students in engaging appropriately with the course requirements.

The work load is 6 contact hours per week, which will be based on 2-3 hours of lectures, a 1-hour tutorial and 2-3 hours of practical work or practical demonstrations. The amount of contact time will vary from week to week depending on the nature of the practicals. For example, in a number of weeks at Roseworthy there will not be any lectures but there will be demonstrations and practical exercises in the morning and afternoon.

It is expected that students will spend an average of approximately 5 hours per week in addition to the formal contact time on assignments,

5- Student assessment methods

5.1. Assignment	To assess the ability to work independently and discussion
5.2.Homework	To assess understanding
5.3.Term paper	To assess the ability to work in group to form subject from pieces
5.4.Presentation	To assess the ability to communicate and discuss
5.5.Essay report	To assess IT skills
5.6.Case study	To assess the skills of Solve problems, Present data
5.7 Mid-Term Exam	To monitor the learning outcomes
5.8.Oral exam	To assess skill of analysis and discussion
5.9.Practical exam	To assess the professional skills
5.10.Final written exam	To assess the ability to remember, understand, analysis, problem solving skills

Assessment Schedule

	Week No.	%
1. Assignment	Every week	3
2.Homework	Every week	3
3.Term paper	Week 5, 9	5
4.Presentation	10	5
5.Essay report	2, 5, 8	6
6.Case study	6	3
7 Mid-Term Exam	7	10
8.Oral exam	11	10

9.Practical exam	12	15
10.Final written exam		40
Total		100%

Any formative only assessments

6- List of references

6.1- Course notes

Handout and hard copy of PP-presentations

6.2- Essential books (text books)

1- Climate change: Impacts, vulnerabilities And adaptation In developing countries
https://unfccc.int/resource/docs/publications/impacts.pdf
2- Climate Change: Current Issues
https://www.ifw-kiel.de/pub/e-books/climate_change.pdf
3- Food security and global security
http://www.ieee.es/Galerias/fichero/cuadernos/CE_161_B.pdf
3- Chicago Council on Global Affairs, Advancing Global Food Security in the Face of a Changing Climate, 2014. Download at:
http://www.thechicagocouncil.org/files/Studies_Publications/TaskForcesandStudies/GADI/advancing_global_foodsecurity_in_face_climate_change.aspx

6.3- Recommended Readings

Required Text Reading	Optional Supplemental Reading
Intro to Climate Change Research	*The Discovery of Global Warming* by Spencer Weart *Global Climate Change Research Explorer*
History of Earth's Climate	*What is Paleoclimatology?* by US NOAA *Earth's Climatic History* by Pidwirny
Causes of Climate	*Global Warming Facts and Our Future* *Causes of Climate Change* by US EPA Encyclopedia of Earth: *GH effect*
World of Tomorrow: Computer Simulation Models	*Simple Models of Climate Change* by Weart *GCMs* by Weart IPCC *Chapter on GCMs*
Plants & CO_2 Climate Change & Biosphere	*Food Quality* by Bloom Encyclopedia of Earth: *Biosphere, Ecosystem Disturbance, Species Shifts*
Mitigation	IPCC Mitigation of Climate Change Report, *Transportation*
Mitigation	IPCC Mitigation of Climate Change Report, *Energy Supply* IPCC Mitigation of Climate Change Report, *Buildings* IPCC Mitigation of Climate Change Report, *Industry* IPCC Mitigation of Climate Change Report, *Agriculture, Forestry, and Other Land Use*

6.4- Periodicals, Web sites, … etc

7- Facilities required for teaching and learning

Course coordinator:

Head of Department:

Date: / /

Specialization Module: Land Use Planning and Assessment

Elective Course: Modeling of Land Use Changes

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Land Use Planning and Assessment

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Modeling land Use Changes **Code:** SLM 14738

Credit Hours / ECTS: 2 / 6

Lecture: 1 **Tutorial/Practical:** 2 **Total:** 2

B- Professional Information

1 – Overall aims of course

Continual, historical, and precise information about land use/cover changes of Earth's surface is extremely important for any kind of sustainable development program, where land use/cover serves as one of the major input criteria. As a result, the importance of analyzing, monitoring, and mapping of land use/cover and its change as well as updating it through time has been acknowledged by various research workers.

Modeling of land use/cover change is an advanced course on the use of satellite remote sensing to monitor land use and land cover change. The course emphasizes digital image processing techniques to detect landscape dynamics using remote sensing data. Topics include pre-processing data for change detection, accuracy assessment of change maps, and methodologies to detect changes such as urban expansion, desertification, deforestation, seasonal variations in vegetation, agricultural expansion, and vegetation health.

2 – Intended learning outcomes of course (ILOs)

- Understand the main Remote Sensing Systems and programs (sensors, platforms, etc.) and assess their potential to land use/cover change monitoring.
- Demonstrate an understanding of how satellite data can provide spatial information for land use/cover change modeling and consequently for sustainable land management.
- Design and implement methods of digital image processing ranging from preprocessing to image classification, and accuracy assessment for the identification of land use inventories.
- Skill to use change detection techniques for land use/cover change modeling.

- Demonstrated ability to plan and conduct projects in the area of land use/cover change modeling for sustainable land management

Keywords: Land use change detection, land use and land cover classification systems, satellite image classification, land use models

3- Contents

Topic
Week 1: Introduction to land use/cover change analysis Week 2: Land use and land cover classification systems (Anderson 1967, FAO LCCS 2015, CLUE 2010, ect. …) Week 3: Analytic Hierarchy Process (AHP) Week 4: Remote sensing Data collection tools, handling and manipulation Week 5 : Top-down and bottom-up dynamics in land use Week 6: Impacts of land use and land cover changes Week 7: Vegetation spectral indices Week 8: Urban (non-vegetation) and water spectral indices Week 9: Image classification and change detection techniques Week 9: Land use models and how to select suitable one Week 10: GIS as a land use modeling tool Week 11-12: Case Studies and students discussions

4– Teaching and learning methods

- Discussion
- Presentation
- Midterm exam
- Problem Assignment
- Project Assignment
- Final exam

5- Student assessment methods

Weighing of assessments

Mid-term examination	10%
Final-term examination	60%
Oral examination	10%
Practical examination	15%
Semester work	5%
Total	100%

6- List of references

Natural Resources Canada: Fundamentals of Remote Sensing. accessed December 2016. http://www.nrcan.gc.ca/node/9309

Coppin, P., Jonckheere, I., Nackaerts, K., Muys, B., and Lambin, E. (2004). Digital change detection methods in ecosystem monitoring: A review. International Journal of Remote Sensing 25 (9), 1565–1596.

Eastman, R. J. (2006). IDRISI Andes: Guide to GIS and image processing. Worcester,MA: Clark Labs, Clark University.

ERDAS. (2007). ERDAS imagine professional: Tour Guides. Norcross, GA: Leica Geosystems Geospatial Imaging, LLC.

Singh, A. (1989). Digital change detection techniques using remotely-sensed data. International Journal of Remote Sensing, 10(6), 989e1003.

Lu, D., Mausel, P., Brondizio, E., & Moran, E. (2004). Change detection techniques. International Journal of Remote Sensing, 25(12), 2365e2407.

Jensen, J.R. (2005). Introductory Digital Image Processing: A Remote Sensing Perspective. 3rd Edition. Prentice-Hall, Upper Saddle River, NJ.

Abd El-Kawy, O.R., J.K. Rød., H.A. Ismail and A.S.Suliman (2011). Land Use and Land Cover Change Detection in the Western Nile Delta of Egypt using Remote Sensing Data. Applied Geography, 31; 483-494.

European Communities. 2001. Manual of concepts on land cover and land use information systems. Luxembourg: Office for Official Publications of the European Communities

European Communities. 2007. INSPIRE - Infrastructure for Spatial Information in Europe - Data Specification on Land Use – Technical Guidelines. European Commission Joint Research Centre.

FAO. 2016. Land Cover Classification System – software V3. FAO, Rome.

Course coordinator:

Head of Department:

Date: / /

Specialization Module: Land Use Planning and Assessment

Elective Course: Land Use Policies and Legislations

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Land Use Planning and Assessment

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences – Civil Law (Faculty of Law)

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Land Use Policies and Legislations **Code:** SLM 14739

Credit Hours / ECTS: 2 / 6

Lecture: 2 **Tutorial/Practical:** **Total:** 2

B- Professional Information

1 – Overall aims of course

This course outlines the relationship between land use policies and legislations as affects the social and environmental aspects of the community. Topics covered in the course will include Egypt environment law, national laws related to pesticides use, farming, water use in agriculture, Agricultural incentive, and use of wastewater in agriculture. Students will be encouraged to think critically and creatively about the applications of these laws and their role in orchestrating the different uses of agricultural practices.

2 – Intended learning outcomes of course (ILOs)

The student will be introduced to the different laws and policies related to different agricultural activities and practices, as well as the water crisis in the world.

3- Contents

Topic
Week 1: introductory note about agricultural policies Week 2: Egypt Sustainable development strategy until 2030 Week 3-4: Egypt sustainable agricultural development strategy until 2030 Week 5-6 : Egypt environment law 4 – 1994 and its amendments Week 7: Egypt land reclamation strategy Week 8: Egypt water resource management strategy Week 9: Agricultural reform in Egypt

Week 10: Pesticides use and regulation laws Week 11: Farming and nursery laws Week 12: Case Studies

4– Teaching and learning methods

4.1-Discussions
4.2-Seminars
4.3-Case studies
4.4-Presentations

5- Student assessment methods

2000 word essay – 'critically examine the relationship between different agricultural policies and legislations

Weighing of assessments

Mid-term examination	20%
Final-term examination	70%
Oral examination	10%
Total	100%

Any formative only assessments

6- List of references

6.1- Course notes

Hand-outs will be distributed weekly to the sdudents

6.2- Essential books (text books)

Local laws related to agriculture and water use in Egypt.

7- Facilities required for teaching and learning

Computer lab – Internet -

Course coordinator:

Head of Department:

Date: / /

Specialization Module: Environmental Soil and Water Resources Management

Elective Course: Advanced Soil and Water Pollution and Remediation

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Environmental Soil and Water Resources Management

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Advanced Soil and Water Pollution and Remediation **Code:** SLM 14740

Credit Hours / ECTS: 2 / 6

Lecture: 1 **Tutorial/Practical:** 2 **Total:** 2

B- Professional Information

1 – Overall aims of course

This course will examine current interdisciplinary topics on soil and groundwater pollution and their remediation. Topics include: environmental pollutants and their types and sources in the environment, pathways to contaminate soils and groundwater, impacts on the environment, fates and transport in soils, and remediation, vulnerability and risk assessment of soil and groundwater pollution, and selected case studies on soil and groundwater pollution with various pollutants. Development and application of new remediation technologies of contaminated soils and groundwater will be the focus of this course.

2 – Intended learning outcomes of course (ILOs)

t- Knowledge and understanding:

a1- Know different types and sources of pollutants in soils and groundwater.

a2- Identify different environmental impacts of soils and groundwater pollution.

a3- Explain pathways of different pollutants in the environment.

u- Intellectual skills:

b1-Classify remediation techniques of polluted soil and groundwater resources.

b2-Design a strategic monitoring plan of soil and water resources.

b3-Assess the vulnerability and risk of groundwater to pollution with different pollutants.

v- Professional and practical skills:

c1-Show the behavior and dynamics of different pollutants in soils and groundwater.

c2-Illustrate the governing processes and factors controlling transport and fate of pollutants in soil and groundwater.

c3-Examine the obtained data of groundwater pollution risk assessment.

c4- Calculate parameters related to sorption, degradation and transport of pollutants in soils

w- General and transferable skills:

d1-Use the computer capabilities of editing reports, presentations and calculations.

d2- Communicate with different agencies and labs concerned with environmental soil and water issues.

3- Contents

Week No.	Topic
1	Review of types, sources and environmental impacts of contaminants of soils and groundwater resources.
2	Heavy metals and radionuclides in the soil system: Speciation, biochemical effects and bioavailability and uptake by plants.
3	Pollution mechanisms and soil-pollutants interaction: Physical processes and mechanisms of pollution (Adsorptive & Non-adsorptive)- pollutants transport (Microscopic & Macroscopic dispersion)- Behavior of Non-Aqueous Phase Liquids (NAPLs) in Soils.
4	Pollutants' alteration, transformation, and initiation of chemical changes within the soil: Chemical mobility, Dissolution-precipitation, Chemical transformation processes, Biodegradation, enzymatic and biologically supported transformations.
5	Monitoring of soil pollution: monitoring procedures and plans, Field and laboratory investigations, Biological monitoring.
6	Planning and realization of soil remediation- Categories of pollutants- scale of pollution- Risk level- Soil remediation technologies (Chemical and physical remedial techniques, Biological treatment, Solidification/Stabilization methods & Thermal treatment).
7	Review of groundwater systems- Physical properties- Different types of groundwater systems- Geological, Physical and hydraulic properties of different types of aquifers Chemical properties, redox geochemistry, microbiology.
8	The concept of groundwater quality- Natural degradation of groundwater quality- Point and nonpoint sources of pollution- Contaminants in groundwater (Heavy metals, veterinary drugs and hormones, pesticides).
9	Pollutants in groundwater environments: Phase partitioning, sorption, evaporation, Plumes in groundwater, Dispersion & retardation, Understanding transport and dissolution, Redox reactions and

	biodegradation, Monitored natural attenuation, Quantification and degradation pathways of pollutants using stable isotopes
10	Evaluation of groundwater vulnerability to pollution using DRASIC model: Hydrologic settings, Factors affecting pollution potential, Assignment of factor weightings, Testing the model and displaying the system, Coupling of GIS and DRASTIC model- Problems.
11	Risk assessment of groundwater pollution: Fundamental concept of pollution risk, Organizational basis for risk assessment, Characterization of subsurface contaminant load, Estimation of point and nonpoint-source pollution, implementation of risk assessment- Demonstration of a study case.
12	Groundwater remediation using active and passive processes: The basics of pump-and-treat systems, The basics of permeable reactive barrier (PRB) systems, Cost comparison between pump-and-treat and PRB systems, Engineering of permeable reactive barriers- Case studies.
13	Oral and Practical Exams
14	Final Exam

4– Teaching and learning methods

4.1. Lectures.
4.2. Group discussion.
4.3. Assignments.
4.4. Seminars.
4.5. Case study.

5- Student assessment methods

5.1. Case study report **to assess** comprehensive thinking and criticism.
5.2. Oral exam **to assess** self confidence, interaction and presentation skills.
5.3. Practical exam **to assess** connecting theoretical with application and practices.
5.4. Written exam **to assess** understanding of key concepts and relationships.

Assessment schedule

Assessment 1: Case study report	Week: 7
Assessment 2: Oral exam	week: 13
Assessment 3: Practical exam	Week: 13
Assessment 4: Written exam	Week: 14

Weighing of assessments

Mid-term examination	10%
Final-term examination	40%
Oral examination	10 %
Practical examination	20%
Semester work	10%
Other types of assessment	10%

Total	100%

Any formative only assessments

6- List of references

6.1- Course notes

Handouts and electronic lecture notes and power point presentation will be provided.

6.2- Essential books (text books)

Mirsal, I. A. (2008) Soil Pollution: Origin, Monitoring & Remediation. 2nd Ed. Springer-Verlag Berlin Heidelberg, Germany.

Berkowitz, B., I. Dror, and B. Yaron (2008) Contaminant Geochemistry: Interactions and Transport in the Subsurface Environment. Springer-Verlag Berlin Heidelberg, Germany.

6.3- Recommended books

Foster, S. and R. Hirata (1995) Groundwater Pollution Risk Assessment. Pan Am. Center Sanitary Eng. Lima, Peru.

6.4- Periodicals, Web sites, … etc

Aisopou, A., P. J. Binning, H. Albrechtsen and P. L. Bjerg (2015) Modeling the Factors Impacting Pesticide Concentrations in Groundwater Wells. GROUNDWATER. 53: 722–736

Baloch, M. A. and L. Sahar (2014) Development of a Watershed-Based Geospatial Groundwater Specific Vulnerability Assessment Tool. GROUNDWATER. 52: 137–147.

Evaluation Report TE-97-01. Carnegie Mellon University, Department of Civil and Environmental Engineering. Pittsburgh, PA

Kim, Y.-J., C.J.G. Darnault, N.O. Bailey, J.-Y. Parlange, and T.S. Steenhuis. (2005) An equation for describing solute transport in field soils with preferential flow paths. Soil Sci. Soc. Am. J. 69, no. 2: 291–300.

Sims, J.L., R.C. Sims, and J.E. Matthews (1989) Bioremediation of Contaminated Surface Soils. EPA Environmental Research Laboratory. Report No. 800/9-89/0/3

Trisha B. Johnson, Larry D. McKay, Alice C. Layton, Sidney W. Jones, Greg C. Johnson, Jennifer L. Cashdollar, Daniel R. Dahling, L., F. Villegas, G. S. Fout, D. E. Williams and G. Sayler (2011) Viruses and Bacteria in Karst and Fractured Rock Aquifers in East Tennessee, USA. GROUNDWATER. 49: 98–110.

7- Facilities required for teaching and learning

Laptop - Data show - VIS/UV Spectrometer- Various chemical analysis lab facilities.

Course coordinator:

Head of Department:

Date: / /

Specialization Module: Environmental Soil and Water Resources Management

Elective Course: systems Approach to Water Resource Management

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Environmental Soil and Water Resources Management

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Systems Approach to Water Management **Code:** SLM 14741

Credit Hours / ECTS: 2 / 6

Lecture: 1 **Tutorial/Practical:** 2 **Total:** 2

B- Professional Information

1 – Overall aims of course: By the end of this course the student should be able to:

- Diagnose surface and ground water resources at different spatial and temporal scales;
- Construct water resources protection plans and
- Plan sustainable water resources management strategies.

2 – Intended learning outcomes of course (ILOs)

x- Knowledge and understanding:

a1- Describe the hydrological water cycle;
a2- Identify surface and ground water resources characteristics and
a3- Discuss the appropriate technical measures to improve water management at different spatial and temporal scales.

y- Intellectual skills:

b1- Investigate the expected performance of the proposed water management measures and analyze these at (i) field/farm level and (ii) watershed level and
b2- Compose water management issues into research topics that are conceptually and methodologically grounded.

z- Professional and practical skills:

c1- Design intervention water management plans in a professional manner.

aa- General and transferable skills:

d1-Provide an education suitable for a wide variety of careers in the environment following graduation

3- Contents

In comparison with other natural resources, water resources are a very special nature and essentially unique, as they do not have any substitute and their presence is a necessary condition for human existence and the development of any kind of life on earth. Therefore, Understanding the character, occurrence, and movement of water recourses to achieve sustainable management strategies at spatial and temporal scales is the main goal of this course “System approach to water management ". Students must have some background in all aspects of the hydrologic cycle. They are concerned with precipitation, evaporation from open surfaces, evapotranspiration from ground, surface water, seepage, infiltration, ground water, aquifers and saltwater encroachment. Readers interested in one of these topics will find a comprehensive treatment of the subjects in the literature. Although we have attempted to provide a broad interdisciplinary coverage of the interaction between surface water and ground water principles taking into consideration the different historical background of the attendants; Agronomy, Engineering, environment, and soil and water sciences. Thus the course is designed to be accessible to a variety of attended graduate students. From the practicality point of view, it was not possible to include detailed information on the technical aspects of ground water such topics as well pumps, ground water sampling methods, procedures for chemical analysis of ground water and also the simulation models of ground water. The principles of these practical and important techniques and different models are discussed in detailed in the relevant literature. The objective of this course lectures is to provide a brief presentation on the general topics associated with water management. An appropriate conjugated connected illustrative figures with numerical examples are also presented, in hopes of reducing stress and panic the first few times performing a new task.

Topic	No. of Hours	Lecture	Practical/Tutorial
A- Water resources	**8**	**4**	**-**
B- Hydrological structures	**4**	**2**	**-**
C- Modeling of water resources systems management	**8**	**4**	**-**
D- Case studies of on system approach of water resources	**4**	**2**	**-**

3.1- Tentative Timetable for the course:

Topic No.	Subjects
Topic A	**Week 1: Introduction in water resources management. An overview of water management issues.** **Surface water:** Hydrological cycle; precipitation; surface water bodies such as rivers, lakes and reservoirs; infiltration; evapotranspiration; recharge; and surface runoff.
	Week 2-3: Ground water: Ground water occurrences; source of ground water; factors controlling ground water; water bearing properties of soils and rocks; type of aquifers; ground water flow; functions of ground water systems; ground water exploration; aquifer performance test; saltwater encroachment ; well-acceptance tests and well efficiency. Application of Darcy's law in ground water flow: Case1: horizontal flow; Case2: horizontal flow.
Topic B	**Week 4: Precipitation and conveying system:** Measurement of rainfall; rainfall harvesting; roof water harvesting; water harvesting by ponds. Conveying system network; designing open channels; measuring devices for water quantities. **Virtual and sweet water:** The concepts of water footprint and virtual water; Strategic issues; Specific water demand per crop type per country; Global trade in virtual water. Sweet water: Artificial rain; affordable desalinization.
	Week 5-6: Hydrological structures: Percolation tanks; Check dams; Aquifer storage recovery wells.
Topic C	**Week 7: Applied system analysis:** What is system approach? Types of models (mathematical and simulation) **Methods of water resources system management:** Simulation- optimization- multi-objective analysis
	Week 8-9: Water management under uncertainty approach (Fuzzy models) **Water resource system management for sustainable development** Principle, fairness, risk and reversibility of sustainable water resource decision-making
	Week 10: Implementation of water resource management tools using simulation, optimization and multi-objective
	Week 11: Case study 1. rain water harvesting in North West Coast: Open discussions and conclusion

Topic D	**Week 12: Case study 2**. Irrigation water management in the Nile Delta: Open discussions and conclusion

4– Teaching and learning methods

4.1- Class Participation
4.2- Frontal lectures
4.3- Microteaching
4.4- Home reading and assignments
4.5- Discussion sessions
4.6- Course website

5- Student assessment methods

5.1 Exercises are useful to assess the skills of solving problems and presenting data and discussion;
5.2 Midterm exam is useful to assess the skills of understanding the scientific background of the material studied in the program;
5.3 Case study presentation is important to assess the skills of ensuring academic integrity;
5.4 Oral exam is useful to assess the skills of engaging in oral communication on a familiar topic covered by the class syllabus and probing of the students' knowledge and
5.5. Final exam is useful to test the students' knowledge and understanding of a topic, as well as their ability for application, analysis, integration and synthesis.

Assessment schedule

Assessment 1 Exercises	Weeks: 2nd ,5th ,7th ,9th ,11th , and 12th .
Assessment 2 Midterm exam	week: 7th
Assessment 3 Case study presentation	Week: 12th
Assessment 4 Oral exam	Week: 13th
Assessment 5 Final exam	Week 14th

Weighing of assessments

Exercises	% 15
Midterm exam	% 15
Case study presentation	%15
Oral exam	% 15
Final exam	% 40
Total	% 100

6- List of references

6.1- Course notes

Course handouts in a PDF format for different topics will be available for students.

6.2- Essential books (text books)

Patel, A.S. and Shah, D.L.2008. Water management. New Age International Limited, New York, USA, 2008.

6.3- Recommended books

- **Anderson**, M.P., and Woessner, W.W.1992. Applied Ground water Modeling: Simulation of
- flow and advective Transport. Academic Press, San Diego, CA.
- **Arora,** K.R. 2002. Irrigation, Water Power and Water Resources Engineering. Standard Publishers Distributors. NAISARAK, DEIHI.
- **Ghosh,** S.N., and Desai, V.R. 2006. Environmental Hydrology and Hydraulics. Published by Science publishers, Enfield, NH, USA.
- **Glover**, J., and Mc Culloch, J.S.G. 1968. The empirical relationship between Solar radiation and hours of sunshine. Q.J.R. Meteorol. Soc. 82: 172 – 175

6.4- Periodicals, Web sites, … etc

A course web site that will be constructed in the near future is the main website for the class

7- Facilities required for teaching and learning

- **Computers and internet**
- **Video films**
- **Field visits**
- **Data-show**

Course coordinators: Gaber M. Hassan, Ph. D.

Rasha M. Badr, Ph. D.

Head of Department:

Date: / /

Specialization Module: Environmental Soil and Water Resources Management

Elective Course: Socioeconomic Aspects of Water Resource Management

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Environmental Soil and Water Resources Management

Department offering the program: Soil and Water Sciences

Department offering the course: Agricultural Economics

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Socioeconomic Aspects of Water Resource Management **Code:** SLM 14742

Credit Hours / ECTS: 2 / 6

Lecture: 2 **Tutorial/Practical:** **Total:** 2

B- Professional Information

1 – Overall aims of course

This course is designed to offer materials that can be applied in assessing water resource allocation problems and the socioeconomic aspects of water resource management. It displays an economist's perspective about the allocation of water resources, and other related topics. In this course, the prospective graduate student heading for a Master's degree in sustainable land management (SLM) is introduced to water resources, law, and resource economics concepts. Economics is of critical importance in determining the allocation of water; namely, where water flows and how and when it is stored. The course also introduces the student to solving the problem of how society can try to make water move from one place to the another, especially when this another place is not a natural place for water to end up. This course also shows how economics also plays a role in determining existing level of water quality for many water bodies, because society engages in certain economic activities that are polluting, and then must decide whether and how much of this pollution to clean up, given the cost of doing so. The course of is a special significance to the Master's degree in SLM as water constitutes the largest portions of land resources.

Course Keywords: *Physical Scarcity, Water Flows and Stocks, Water Balance Models, Water Supply, Water Law, The Water Market, Market Failures and Externalities, Discounting and Uncertainty, Transactions Costs, Water Quality, Control Cost Analysis, Benefits Analysis, Water Prices and Rates, Elasticities, Water Factor Demand, Water Values, Modelling Irrigation Technologies, Market-Based Incentives, Supply and Demand Uncertainties for Water, Groundwater, Environmental and Recreational Values.*

2 – Intended learning outcomes of course (ILOs)

bb- Knowledge and understanding:

a1- Identify the roles each entity in the economy plays within the water institutional, economic, and social framework and settings.
a2- Explain how and why economists perceive water as a matter of peculiar nature.
a3- Describe how economics can affect the allocation, movement, and utilization of water resources.

cc- Intellectual skills:

b1- Decide on policies within the water institutional, economic, and social setting.
b2- Investigate how to analyze the different utilization of water resources in a socioeconomic framework.
b3- Assess the socioeconomic factors impacting water-quality management practices.

dd- Professional and practical skills:

c1- Examine designs implemented for economic assessment of water resources policies.
c2- Illustrate issues related to water management and its sustainability.

3. Course Contents

Contents
Week 1: Introduction to water resources economics and law - Earth's water supply, physical scarcity, water flows and stocks, water balance models, water supply and runoff, types of human water use, unnatural moving of surface water, water law, Economics, markets, and water resources.
Week 2: Review of basic microeconomics applied to water resources - Part 1 - consumer theory, price-elasticity of demand, production, cost functions, constrained optimization.
Week 3: Review of basic microeconomics applied to water resources - Part 2 - consumer's surplus, supply side of water, producer's surplus and shadow prices, water markets, efficient allocations, Pareto criterion, market failure and water, externalities in consumption, discounting: the farmer, water value, and uncertainty, water markets and transactions laws.
Week 4: Water quality issues - valuation of water quality improvement, assessing economic success or failure of water quality legislation, control cost analysis, benefits analysis.

Week 5: Water prices and rates for residential use - The supply side, the water utility as regulated monopolist, the natural monopoly, rates and residential water supply, purpose and types of rates, embedded cost rate structure, rating alternatives, the demand side, elasticities, municipal water supply.
Week 6: Water and agriculture - Water as factor demand, approaches to finding the value of water, uncertainty, government intervention, modeling production and irrigation technologies, empirical application of agricultural production models, estimated value of water in agriculture, water quality in agriculture, economic solutions and market-based alternatives, market failures, uncertainty and agriculture, uncertainty and expected profit, the farmer as speculator or investor.
Week 7: Uncertainty and risk in supply and demand of water resources - Demand and supply under uncertainty, consumer demand, the expected utility model, demand for water in the context of risk, factor demand under uncertainty, supply under uncertainty, risk premiums, futures markets and forward contracting, water's allocative efficiency under risk.
Week 8: Groundwater - Meaning of groundwater, managing or mining groundwater, groundwater as a common property resource, valuing groundwater, groundwater's future.
Week 9: In situ uses of water: Environmental and recreational uses - Water-based recreation, quality changes and recreation, non-market valuation applied to water, water-based values and recreation, *In situ* or instream flow value estimates. Case studies.
Week 10: Floods and droughts and the role of dams - economic damages of floods, costs and benefits of flood control, market failure and the optimal provision of flood control, drought impacts, the water bank game, case studies
Week 11: Water issues in the developing countries - Economic problems in developing and low-income countries, violent conflicts and the potential for more in the future, economic reform, water markets and water pricing.
Week 12: Summary, suggestions for future work, and conclusions - Water transfers, markets, and water law, uncertainties, economic analysis in developing countries.

4– Teaching and learning methods

4.1- Lectures using PowerPoint Presentations.

4.2- Comparative Case Study Analysis for water management in the developed and the developing world.

4.2- Homework Assignments

4.3- Searching scientific articles which handle the socioeconomics aspects of water resources in different parts of the world. Critical analysis of some articles is to be made.

5- Student assessment methods

5.1 Oral to assess the skills of analyses and discussion.
5.2 Case study analysis to assess the skills of problem solving and data presentation and discussion.
5.3 A midterm exam to evaluate the progress of students in the middle of the semester.
5.4 A written final exam to assess the student's overall understanding of the main concepts of the course.

Assessment schedule

Assessment 1: Midterm Exam – Week 7
Assessment 2: Oral Exam – Week 13
Assessment 3: Case Study - Week 6 till 10
Assessment 4: Final Exam - Week 14

Weighing of assessments

Mid-term examination:	10%
Final-term examination:	50%
Oral examination:	10%
Homework and case study analysis:	30%
Total:	100%

6- List of references

6.1- Course notes

- All electronic notes are to be sent to students by e-mails or through the creation of a website to the students on Facebook or any other website.

6.2- Essential books (textbooks)

Shaw, Douglas W. Water Resource Economics and Policy: An Introduction. Edward Elgar Publishing Limited, Cheltenham, UK – Northampton, MA, USA. 2005. ISBN 1 84376 917 4 (cased).

6.3- Recommended books

Ronald C. Griffin. Water Resource Economics: The Analysis of Scarcity, Policies, and Projects. ISBN: 9780262072670. 2005

Walter Lukenga. Water Resource Management. www.bookboon.com 1st Edition. ISBN 978–87-403-0978-2. 2015.

6.4- Periodicals, Web sites, … etc.

Determination of a number of research articles written on the socioeconomic aspects of water resources is to be made. Research articles are mostly found on the following link: http://ageconsearch.umn.edu/. This is a scientific research link associated with the University of Minnesota, Twin Cities, USA, Department of Applied Economics.

7- Facilities required for teaching and learning

- Computer
- Data Show.

Course coordinator:

Head of Department:

Date: / /

Specialization Module: Environmental Soil and Water Resources Management

Elective Course: Sustainable Soil Fertility Management

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Environmental Soil and Water Resources Management

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Sustainable Soil Fertility Management **Code:** SLM 14743

Credit Hours / ECTS: 2 / 6

Lecture: 2 **Tutorial/Practical:** **Total:** 2

B- Professional Information

1 – Overall Aims of Course

This course will provide an advanced sustainable management of soil fertility as it relates to plant nutrients and soil fertility, plant nutrient use and environment, soil fertility problems; challenges and responses at the farmer's level, modelling yield response to added nutrients in farming systems, and computer based diagnostic soil fertility tools. Students are expected to gain an understanding of the principles and practices of nutrient requirements and management for crop production and the implications of soil fertility management practices on agricultural sustainability and environmental protection.

Moreover, the course is organized in a foreword three main subjects. Part I: aims at integrating aspects controlling availability of nutrient to plant uptake in the soil/plant/nutrient system and their interrelationships and interaction. Part II: aims at optimization of fertilizer use through applying scientific bases and calculations and integrating organic matter application. And Part III: treats the relationships between mineral nutrition and balance between economic production-food quality-environmental risks. Case studies and practical parts of this course are designed to strengthen the theoretical part.

2 – Intended Learning Outcomes of Course (ILOs)

e- Knowledge and Understanding:

a1- Explain What soil fertility means and what makes a soil fertile and productive.

a2- Identify soil nutrient problems and opportunities.

a3- Describe the plant nutrient balance system.

a4- list benefits of integrated nutrient management system.

f- Intellectual Skills

b1- Demonstrate how mineral nutrients influence plant growth and understand the importance of nutrient placement and management in various soils and plant production systems.

b2- Apply a participatory approach to designing and implementing an integrated nutrient management program.

b3- Propose methodologies and tools to assess suitability, economic feasibility, and impacts of Integrated Soil Fertility Management (ISFM) on agricultural production, soil fertility, and the environment.

b4-Propose fertilizer recommendations that are agronomically efficient, environmentally sustainable, and economically profitable.

g- Professional and Practical Skills

c1- Apply modeling yield response to added nutrients.

c2- Evaluate sources and flows of nutrients in farming.

c3- Practice nutrient flow analysis.

c4- Use computer based diagnostic soil fertility tools.

h- General and Transferable Skills

d1- Communicate and present soil fertility idea, principles and theories through written, oral and visual means.

d2- Evaluate approaches to problem-solving related to soil fertility.

d3- Develop skills in communicating tasks within a group setting, take part in group discussions and co-operative learning.

3- Contents

weeks	topics
1-2	**Introduction to soil fertility,** **Essential nutrients, Plant-soil-nutrients interrelationship;** • Processes affecting nutrient availability. Soil chemical, physical, biological properties affecting availability-processes. Plant factors affecting availability-processes. • How to manage processes towards more ecological use of a nutrient?
3	**Diagnostic techniques for nutritional disorders (soil fertility evaluation)** • Soil and plant tests for nutrients and their interpretations. • Soil constituents as modifiers for soil test interpretation. • Case study I. available or published data (reports)
4	**Case study II. Field trip, soil and plant sampling**
5-6	**Scientifically based fertilizers recommendation** • Based on soil test • Based on soil budget • Based on both soil and plant test (fruit crops)
7-8	**High vs. low agriculture inputs** • Over fertilization and nutrient unbalance • Nutrient mining and consequence effects • Nutrient deficiency symptoms and correction • Case studies (reports)

9-10	**Integrated Nutrient Management (INM) and Best Management Practices (BMP)** • Goal of INM and BMP • Nutrient application, conservation, cycling and alternative sources • Nutrient use efficiency by crops and cropping systems. • Models creations through discussion groups and home work
11	**Site specific soil fertility management**. • Case studyII, fertility status-, recommendation-, and yield- mapping (variable rate technology and GIS as tool).
12-13	**Mineral nutrition (MN) vs human health and environmental risks** • MN vs food quality • MN vs. plant diseases • MN vs. environmental risk • How to manage nutrients with care?
14	**Student's presentations for both case studies.**
15	**Final exam**

Case study and Lab work.

week	Activity
1-2-3	------
4	Field trip, soil and plant sampling
5	Soil and plant samples preparation for analysis
6	EC, organic matter, CEC determinations
7-8	Available nutrients in soil
9-10	Plant analysis for nutrient content
11-13	Data analysis and reporting
14	Project presentations

4. Teaching and Learning Methods

4.1. Mini lectures,
4.2. Team work, problem solving and consultation,
4.3. Watching educational videos or/and accessing web sites searching for specific information,
4.4. homework/assignment,
4.5. Interacting with instructors or classmate (e-mail, new groups and browse documents).
4.6. Hands-on experience during the laboratory time.

5- Student Assessment Methods

5.1. Group Assignments to assess written communication, time management, teamwork, problem solving, and IT skills
5.2. Oral exam and presentation to assess oral communication skill
5.3. Written exam to assess knowledge and intellectual skills
5.4. Research paper to assess self learning and practical skill

Assessment Schedule

Assessment 1: Assignments reports and presentations	During the semester
Assessment 2: Midterm exam	Week 6th
Assessment 3: Oral exam	Week 11th
Assessment 4: research paper presentation	Week 12th
Assessment 5: Final exam	Week 13th

Weighting of Assessments

Mid-term Examination	10%
Final-term Examination	60%
Oral Examination.	10%
Research Paper	10%
Semester Work	05%
Other types of assessment	05%
Total	100%

6- List of References

6.1- Course Notes

Environmental Management of Soil Fertility (Hand-out)

6.2- Essential Books (Text Books)

1. Havlin, J.L.; J.D. Beaton; S.L. Tisdale and W.L. Nelson. 1999. Soil Fertility and Fertilizers. An Introduction to Nutrient Management. Sixth edition, Prentice Hall, New Jersey, USA.

6.3- Recommended Books

1. Foth, H.D. and B.G. Ellis. 1996. Soil fertility. John Wiley and Sons, New York.
2. Marschner, Horst. 1995. Mineral nutrition of higher plants (2nd Edition). Academic Press Inc. San Diego, CA, USA.
3. Mengel, K. and E.A. Kirkby. 1987. Principles of plant nutrition (4th Edition). International Potash Institute, Worblaufen-Bern, Switzerland.
4. Prasad, R. and J.F. Power. 1997. Soil fertility management for sustainable agriculture. CRC Press LLC, Lewis Publishers, Florida, USA.
5. Rodriguez-Barrueco. 1994. Fertilizers and Environment. Kluwer Academic Publishers, The Netherlands.
6. Westerman, R.L. 1990. Soil testing and plant analysis (3rd Edition). Soil Science Society of America, Inc., Madison, WI.
7. T. Defoer, A. Budelman, C. Toulmin, S. Carter, J. Ticheler, 1998. Soil fertility management in Africa: A resource guide for participatory learning and action research. A KIT Publication, Amsterdam, The Netherlands.

6.4- Periodicals, Web Sites, … etc

- Soil Fertility Management - http://agguide.agronomy.psu.edu/CM/Sec2/Sec2toc.html
- Michigan State University's CSS 430: Soil Fertility and Chemistry - http://www.css.msu.edu/css430/
- Worldwide Portal to Information on Soil Health - http://mulch.mannlib.cornell.edu/browse.html
- Guidelines and manuals (FAO's AGL Division) - http://www.fao.org/ag/agl/agll/farmspi/docs.stm#ffs-manual
- Online documents on plant nutrition (FAO's AGL Division) - http://www.fao.org/ag/agl/agll/oldocsp.jsp
- Soil biodiversity portal (FAO's AGL Division) - http://www.fao.org/ag/agl/agll/soilbiod/default.stm
- Online documents on Fertilizers, soil fertility, plant nutrition (AGNET) - http://www.agnet.org/library/list/subcat/E.html
- Miscellaneous resources on soil fertility, acidity, alkalinity (AGRIFOR) - http://agrifor.ac.uk/hb/5a12a57a48789740ed6e74f24fca59b2.html
- International fertiliser industry association - http://www.fertilizer.org/ifa/
- Integrated plant nutrition systems resource documents (FADINAP) - http://www.fadinap.org/ipns/index.htm
- Soil Fertility and Fertilizers (Open Directory) - http://dmoz.org/Science/Agriculture/Soils/Soil_Fertility_and_Fertilizers/
- Soil: Fertility & Chemistry (Portal site) - http://homepages.which.net/~fred.moor/soil/links/l0102.htm
- Soil Fertility Guide -http://www.gov.nf.ca/agric/pubfact/Fertility/FertiGuide.htm
- Soil Information compiled by Dept. of Land Management, Universiti Putra Malaysia (Directory) - http://agri.upm.edu.my/jst/soilinfo.html
- Natural Ressources Conservation Service: Soils - http://soils.usda.gov/
- Fertilizers and their efficient use - http://www.fertilizer.org/ifa/publicat/PDF/introd.pdf
- International Fertilizer Industry Association - http://www.fertilizer.org/ifa/

Course Coordinator: Prof. Abdou Abdou Soaud

Head of Department:

Date: / /

Specialization Module: Environmental Soil and Water Resources Management

Elective Course: Alternative Agricultural Systems

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Environmental Soil and Water Resources Management

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Alternative Agricultural Systems **Code:** SLM 14744

Credit Hours / ECTS: 2 / 6

Lecture: 1 **Tutorial/Practical:** 2 **Total:** 2

B- Professional Information

1 – Overall aims of course

This course provides a short history of agriculture which enables the students to gain a better understanding of the transitional development of the current agricultural systems. Considering the evolution of agriculture and the emergence of the modern systems that are so essential to the modern civilization. Studying the pros and cons of various strategies of alternative farming systems. Hence, this course is split into two inter-related parts, firstly an abridged history of agriculture is given, which acts as a foundation in order to appreciate the philosophies and backgrounds of current systems, particularly pre-existing 'organic' agriculture, and secondly the development of the 'conventional' and the 'alternative' schools of thought and their respective production systems.

2 – Intended learning outcomes of course (ILOs)

a - Knowledge and Understanding:

By the end of this course the student should be able to:

A.1. Summarizes the history of agriculture in the world.

A.2. Recognize Knowledge of alternative land use options

A.3. Identify of the field crops composition and programs of alternative land use in the agricultural policy of different regions.

A.4. List the pros and cons of various strategies of farming (conventional, integrated, low input, organic, precision, etc..).

A 5. Summarize the alternative land use systems, including the application of subsidies

A.6. Explain the designs of alternative management systems focused on the use of phytomass to produce food, energy and industrial raw materials

A.7. Determine the optimal management systems to maintain sustainability in alternative agricultural systems

A.8. Write a list of standards of natural, chemical and biological soil under the alternative agricultural systems.

b - Intellectual skills:

B.1. Uses the theories, models, concepts and principles in the field of alternative agricultural systems.

B.2. Collects, analyzes and summarizes the information in the field of alternative agricultural systems.

B.3. Analyze and interpret the observations and data of alternative agricultural systems.

B.4. Recognize and identify problems and propose and implement solutions, taking into account the environmental dimension.

B .5. Integrates and applies concepts and principles of alternative agricultural systems to another and linking them to environmental science.

B.6. Plans to set up an agricultural systems that coup with specific tasks.

B.7. Choose the most suitable service systems to maintain sustainability in the alternative agricultural systems.

B.8. Propose appropriate ways to modify the characteristics of the soil to reach out to a good quality

C - Professional and practical Skills:

C.1. Determine the soil, water and plant quality attributes using appropriate techniques.

C.2 . Helps the farm to the adoption of a new agricultural system.

C.3. Design with good specifications appropriate techniques for alternative agricultural systems

C.4. Runs an alternative agricultural system for the production of safe food with the application of standards to preserve the environment.

C.5. Efficiently apply protocols of alternative agricultural systems

D - General Skills (Transferable)

D.1. Use information technology to collect, interpret and display data for alternative agricultural systems.

D.2. Writes reports to interpret the results and make recommendations

D.3. Works within a team and share knowledge effectively.

D.4. Apply self-learning skills, time management and work order to determine the personal goals and academic and career development.

D.5.Communicate with professionals in different field of study

D.6.Make decisions, organize and plan ahead

D.7.design and managing projects

3 - Course Content:

Theoretical content

Week	Subject	Source/s
1	The concept / the origin and development of world agriculture.	Miller 2008: World Regional Trends in Agriculture ftp://ftp.fao.org/docrep/fao/006/Y5160e/Y5160e04.pdf
2	Patterns and the foundations of conventional agriculture	Foley et al 2011: Solutions for a cultivated planet http://www.nature.com/nature/journal/v478/n7369/full/nature10452.html
3	Development of	Weil, R. R. 1990. Defining and using the concept of sustainable

	sustainable agricultural systems	agriculture. J. Agron. Educ. 19:126-130. What Is Sustainable Agriculture? http://www.sarep.ucdavis.edu/concept.htm#Top
4	Conventional / Standard Agriculture vs. Conservation Farming	Do industrial agricultural methods actually yield more food per acre http://grist.org/food/do-industrial-agricultural-methods-actually-yield-more-food-per-acre-than-organic-ones/ Organic versus conventional farming http://ec.europa.eu/agriculture/rica/pdf/FEB4_Organic_farming_final_web.pdf
5	Organic Agriculture	Kristiansen, P. Taji, A. And Reganold, J eds. Organic Agriculture. A global perspective. CABI (2006) http://base.dnsgb.com.ua/files/book/Agriculture/Organic-Agriculture/Organic-Agriculture.pdf
6	Bio-Dynamic agriculture: Principals, Design, pros and cons	Biodynamic agriculture and organic farming http://quantum-agri-phils.com/Applying+Biodynamics+in+Organic+Seed+%20System.pdf
7	Agroforestry: Principals, Design, pros and cons Biosaline Agriculture	World Agroforestry: http://worldagroforestry.org/sites/default/files/ICRAF%202011-12%20annual%20report-29th%20August.pdf Biosaline Agriculture http://www.halophyte.org/pdfs/drkhan_pdfs/104.pdf
8	Permaculture: Principals, Design, pros and cons Rhodale : Principals, Design, pros and cons urban agriculture systems: garden, vertical, roof-top etc..	Essence of Permaculture - English - Permaculture Principles https://permacultureprinciples.com/wp-content/uploads/.../Essence_of_Pc_EN.pdf Permaculture design fundamentals - Open Permaculture School https://www.openpermaculture.com/wp-content/uploads/.../permaculture-ebook.pdf Rodale's LaSalle on organic farming to mitigate global warming: http://www.eenews.net/tv/video_guide/796 Urban Agriculture https://sustainabledevelopment.un.org/content/documents/5764Urban%20Agriculture.pdf
9	Precision agriculture: Principals, Design, pros and cons – Climate Smart Agriculture: Principals, Design, pros and cons	The concept and implementation of precision farming and rice integrated crop management systems for sustainable production in the twenty-first century http://www.fao.org/3/a-a0869t/a0869t04.pdf Climate-Smart Agriculture Sourcebook - Food and Agriculture www.fao.org/docrep/018/i3325e/i3325e.pdf
10	Evidence of physical, chemical, and biological to the quality of the soil under alternative agricultural systems..	Assessing Soil Quality https://organic-center.org/reportfiles/SoilQualityReport.pdf

11	Management systems for the sustainable agriculture .(crop rotation. mulching – green fertilization - coverage)	Sustainable soil management http://soilslab.cfr.washington.edu/Watershed_Stewardship/Sustainable_soil.PDF Agricultural sustainability: concepts, principles and evidence http://rstb.royalsocietypublishing.org/content/363/1491/447
12	Managing Water and Fertilizer for Sustainable Agricultural Intensification	http://www.iwmi.cgiar.org/Publications/Books/PDF/managing_water_and_fertilizer_for_sustainable_agricultural_intensification.pdf?galog=no Best Management Guidelines for Sustainable Irrigated Agriculture http://www.saiplatform.org/uploads/Library/%23516-Bestmanagementguidelinesforsustainableirrigatedagriculture.pdf

3-Practical content

Week	Subject
1	View and discuss the film of organic agriculture.
2	Visit the organic farm and open discussion and writing the report.
3	Visit the Egyptian Centre for Organic Agriculture and write the report of the visit
4	Presentation and discussion of the film for biodynamic agriculture
5	Determination of the rate of soil respiration lab
6	Determination of organic carbon in the soil and compost.
7	mid semester exam.
8	Determination of carbon to nitrogen ratio in the compost
9	Separation of the components of humus, compost
10	Determination of available nitrate and ammonium in the soil.
11	Extraction and assessment of phosphorus from organic fertilizers.
12	Activity of compost and commercial bio fertilizer.

4-Teaching and Learning Methods:

4.1- Active Lectures: power point presentation and blackboard.
4.2- Term paper: selected Topics for student groups.
4.3- laboratory projects
4.4- Demonstrations
4.5- Clarification Pauses
4.6- Muddiest points
4.7 Group discussion
4.8 Seminar

5- Student Assessment attributes:

Assessment	Objective	Week	Degree %
Assignment:	To assess the ability to work independently and discussion	Weekly	3
Homework :	To assess understanding	Weekly	2
Term paper:	To assess the ability to work in group to form subject from pieces	3,6 and 9	12
Presentation :	To assess the ability to communicate and discuss	5 and 10	8

Internet report:	To assess IT skills	3,6 and 9	Combined with term paper
Case study:	To assess the skills of Solve problems, Present data	11	5
Mid-Term exam		7	10
Oral exam:	To assess skill of analysis and discussion	11	5
Practical exam:	To assess the professional skills	12	15
Final written exam	To assess the ability to remember, understand, analysis, problem solving skills	??	40

6- List of References:

6.1. Course notes :

Handout and hard copy of PP-presentations

6.2. Essential Textbook :

Kristiansen, P. Taji, A. And Reganold, J eds. 2006. Organic Agriculture. A global perspective. CABI

6.3 Recommended Readings:

Miguel A. Altieri, "Agroecology, Small Farms, and Food Sovereignty," Monthly Review, 2009, download at: http://monthlyreview.org/author/miguelaaltieri

S. D. Williams and Heidi Fritschel, "Farming Smarter," Insights, Vol. 2 no. 2, .Available at : http://ebrary.ifpri.org/cdm/singleitem/collection/p15738coll2/id/126967/rec/9

Ecomodernist Manifesto, download at http://www.ecomodernism.org

Paarlberg, "Precision Agriculture: Can Small Farmers Participate https://www.thechicagocouncil.org/blog/global-food-thought/precisionagriculture-smallholders-paarlberg-harvard

7. Facilities Required for Teaching and Learning:

Portable Thermometer with datalogger PC connected
Portable CO_2-meter with datalogger PC connected
Luxmeter - IR-Thermometer
Computer and Data Show - internet
Digital balance and UV-VIS Spectrophotometer
Automatic pipettes, Automatic Digital Buretts, Dispensers

Course coordinator:

Head of Department:

Date: / /

Specialization Module: Farm System Modeling in Land Management

Elective Course: Plant System Modeling in Land Management

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Farming system modeling in land management

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Plant System Modeling in Land Management **Code:** SLM 14745

Credit Hours / ECTS: 2 / 6

Lecture: 2 **Tutorial/Practical:** **Total:** 2

B- Professional Information

1 – Overall aims of course

Plants have developed sophisticated mechanisms to capture and use resources efficiently. Complex internal molecular/biochemical mechanisms mediate the transport, accumulation, transformation of nutrients in the different compartments of the plant. Specialised structures are formed to exploit resources availability in space. While the components required for these basic processes are becoming increasingly well characterised, little is still known of their precise coordination and control in space and time. In the Plant Systems Modelling, a quantitative approach is developed to understand and predict the precise nature of the coupling between these genetic and biophysical processes.

Increasingly, agricultural decision support systems are being delivered for use under various cropping and management systems over large geographic areas with diverse environments and soils. These systems are mathematical models of various types which combines the most recent knowledge achievements of agricultural research and experiences. Therefore, this course will include an introduction to mathematical modeling and simulation with an explanation of basic concepts and ideas, which includes definitions of terms such as system, model, simulation, mathematical model, reflections on the objectives of mathematical modeling and simulation, on characteristics of ‘‘good’’ mathematical models, and a classification of mathematical models. A hands-on application of specific methods will be explained, such as regression or neural network, methods or differential equations (DEs).

2 – Intended learning outcomes of course (ILOs)

On completion of this course, the student will be able to:

1. Describe the different plant growth stages.
2. Identify the different factors affecting plant growth and development.
3. Distinguish between the different types of stresses facing plant growth.
4. Define models, mathematical models and simulation.
5. Name the different modeling methods and types of mathematical models.
6. Apply mathematical methods for solving equations and curve fitting to experimental data.
7. Analyze different mathematical models for their type, structure, parameters and input-output data.
8. Justify the suitability of different mathematical approaches and its application.

3- Contents

Week	Contents
Part I: Plant growth and development as basis for modeling	
1	<u>Introduction to plant growth and development:</u> - Plant growth vs. plant development - Stages of plant growth and the growth curve - Plant growth factors in relation to crop farming - Genetic factors, environmental factors and G x E interaction
2	<u>Factors affecting plant growth: I. Climatic factors:</u> - Temperature - Moisture supply - Radiant energy - Components of the atmosphere (air quality – air pollutants – CO_2)
3	<u>Factors affecting plant growth: II. Soil factors:</u> - Soil aeration - Soil reactions - Availability of soil nutrients (mechanisms of uptake and translocation)
4	<u>Biotic and Abiotic stresses:</u> - Biotic stresses - Abiotic stresses (heat – salinity – drought) - Stress tolerance vs. Stress avoidance - Mechanisms of stress tolerance/avoidance
Part II: Principles of mathematical modeling	
5	- Models, mathematical models and simulation - Principles of mathematical modeling and scientific method - Some methods of mathematical modeling - Dimensional analysis (Dimensions and Units, Dimensional homogeneity, Systems of units) - Scaling (Abstraction and scale, linearity and geometric scaling, scaling in equations, design of experiments, perceptions of presented data as models) - Problems

6	- Approximating and validating - Taylor's formula - Algebraic approximations - Numerical approximations - Significant figures - Validating the model (adequacy, errors, accuracy and precision) - Fitting curves to data - Elementary statistics - Problems
7	- Exponential growth and decay - Exponential functions and their differential equations - Radioactive decay - A Nonlinear Model of Population Growth - Optimization (Continuous optimization Modeling, optimization with linear programming) - Choosing the best alternative (Rankings and pairwise comparisons, borda counts and pairwise comparisons, rank reversals) - Pairwise Comparisons and Making Decisions - Problems
8	- Classification of mathematical models - Phenomenological models (Elementary statistics, linear, multiple linear and nonlinear regression, neural networks) - Mechanistic models (ordinary and partial differential equations) - Fitting ODE's to data - Analytical and numerical solutions to PDE (finite difference and finite element methods) - Problems
Part III: Applications	
9	<u>Crop Growth Modelling:</u> - RI-RUE concept - Crop development and photosynthesis - Assimilate portioning - Dynamics of shoot - Model parameters and simulation using SFELLA model
10	<u>Photosynthesis and Carbon Assimilation:</u> - Mathematical model of C3 photosynthesis - Canopy photosynthesis, measurements, models
11	<u>Root growth and activity and soil-plant-water relationships:</u> - Branching and distribution models of root growth - Factors affecting root growth - Water potential in soil and plant - Below ground processes - Above ground Processes

	- Combining below and above ground - Modelling water uptake
12	Plant growth stress: - Modelling transient root zone salinity (Concept, boundary conditions) - Modelling solute transport - Modelling chemical interaction - Modelling plant response - Application SALTMED model

4– Teaching and learning methods

4.1-Case Studies
4.2-Presentations
4.3-Tutirial

5- Student assessment methods

Weighing of assessments

Mid-term written exam	20%
Final written exam	40%
Oral exam and/or final report	20%
Coursework and continuous assessment	20%
Total	100%

Any formative only assessments

6- List of references

The following textbooks and research articles provide valuable background materials for this course. We do not expect the students to purchase these books to undertake the course as they are available across the faculty and university libraries. Some materials are already available in the PDF format. Further reading materials will be provided via lecture and lab notes.

1. Dym C. L. (2004) Principles of Mathematical Modeling. Claremont, California. USA.
2. Kuttler C. (2010) Basics of Mathematical Modeling. Lecture Notes.
3. Murthy, V. R. K. (2010) Crop growth modeling and its application in agricultural meteorology. Satellite Remote Sensing and GIS Applications in Agricultural Meteorology pp. 235-261.
4. Velten, K. (2009) Mathematical Modeling and Simulation: Introduction for Scientists and Engineers. 2009 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany.
5. Rössel, D., H. Ortiz-Laurel, N. Kanswohl and M. Schlegel (2008) Mathematical modelling for precisely improving inputs supply for crop production. Agronomy Research 6 (Special issue), 307–314.

Course coordinator:

Head of Department:

Date: / /

Specialization Module: Farm System Modeling in Land Management

Elective Course: Animal System Modeling in Land Management

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Farming system modeling in land management

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Animal System Modeling in Land Management **Code:** SLM 14746

Credit Hours / ECTS: 2 / 6

Lecture: 1 **Tutorial/Practical:** 2 **Total:** 2

B- Professional Information

Summary

There are different agriculture either plant (crops, vegetables, ...etc.) or animal (ruminants, poultry, fish, ...etc.) productive systems in exhibiting a mosaic pattern both at the national, regional, or International levels. Each mosaic pattern is the result of the geographical location of the centers of origin of animal/plant in the world and their dispersion during history. The way humans choose and combine animal/plant is the result of the interactions among physical (soil and climate), biological (animal, plant, disease, pest, ...etc.) and socio-economic factors (population growth, credit, etc.). For each of the biological production systems, these elements will be highlighted to understand the guiding forces behind the equilibrium among different production systems. The analyses of these elements will create opportunities to formulate models (integrated productive systems) to improve production existing systems if necessary and in what way. The theoretical and innovative proposed animal based models will then discussed and might be implemented on real cases by each student.

1 – Overall aims of course

Overall Aims of the Course: This course deliver knowledge and provide skills to create ideas helping the students to formulate models of integrated Animal-based productive systems for sustainable land management. The following topics planned to be covered: Introduction to Agricultural productive systems (Livestock: Animal, Poultry, and Fish; Plant: crops, vegetables ...etc); Integrated agricultural systems modiling; targeted animal-based systems pre-modeling components, requirements, criteria, and limitations; designing a complete systems modeling; evaluate the proposed model; Logical Framework Matrix (LFM; Indicators, verifications and risk mitigation); model traceability, coding and certification.

2 – Intended Learning Outcomes (ILOs):

a. Knowledge and Understanding:

1. Remember types of different animal productive systems.
2. List types of different plant productive systems.
3. State the differences between agricultural productive systems and systems model.
4. Categorize the main components required for systems modeling.
5. Define the concept of animal-based systems modeling.
6. Explain the requirements to build an organic integrated system (model).
7. Discuss the meaning of integrated system modeling.
8. Classify the characteristics of good agriculture integrated productive systems model.
9. Recognize the Logical Framework Matrix (LFM) components.
10. Identify the suitable code of traceability for certifying a new model.

b. Intellectual Skills:

1. Solve several problems related to pre-model limitations in a targeted area.
2. Identify specific problems associated with animal-based systems model.
3. Design a pre-model for integrated agricultural productive systems.
4. Think creatively to suggest new animal-based systems model for sustainable land use.
5. Create a suitable Logical Framework Matrix (LFM) for a suggested model.
6. Innovate a traceability coding for suggested systems model certification.

c. Professional and Practical Skills

1. Present a suggested Animal-based systems modeling for a targeted area.
2. Summarize systems modeling indicators.
3. Calculate economical impacts of a suggested Animal-based systems modeling.
4. Analyze the sustainable limitations in a targeted area.
5. Prioritize the managerial structure criteria related to targeted area.
6. Verify the risk assessment components of a suggested Animal-based systems modeling.
7. Suggest risk mitigation with suitable contingency plan(s).

d. General and Transferable Skills:

1. Use information technology (IT) facilities for self-learning.
2. Contribute constructively to class and group discussion.
3. Work in small groups for problem solving.
4. Write effectively a scientific report in English.

3- Contents:

Week(s)	Lecture title	Tutorial/Practical title
1	Introduction to Animal Livestock Productive Systems	Examples of Animal, Poultry, Fish Productive Systems
2	Introduction to Plant Productive Systems	Examples of Crops, Vegetables, other agricultural Productive Systems
3	Agricultural productive system vs. Agricultural systems modeling	Examples for sustainable agricultural integrated productive systems
4	Requirements to build a systems modeling (integrated, organic, ecological, economical,	Sustainable limitations in a targeted area (identify problems to strength diversity)

5	and productive model)	Managerial structure criteria (budget, team and resources)
6		Designing a pre-model
7	Midterm	
8	Examples for integrated systems modeling	Designing a complete animal-based systems modeling (project)
9		
10	Evaluation criteria for an integrated model	Evaluate proposed animal-based systems modeling (project)
11	Logical Framework Matrix (LFM) components	LFM indicators and verification
12	Risk assessment	Risk mitigation and contingency plan
13	Traceability coding and certification	Examples on traceability coding
14	Practical and Oral Exam	
15		
16	Final Exam	

4. Teaching and Lecturing Methods:

1. Effective lectures including simulating tools.
2. Group discussion and assessment.
3. Case study.
4. Course notes and additional readings.

5- Student assessment methods, schedule and weighting:

a. Assessment tools (methods):

1. Mid-term exam to assess obtained knowledge and understanding, and intellectual skills.
2. Practical exam to assess technical and technological skills.
3. Oral exam to assess all required skills (intellectual, technical/professional, technological and soft/social skills).
4. Final written exam to assess retained knowledge and understanding, and intellectual skills.
5. Writing and present a project related to the course to assess general and transferable, knowledge and understanding, technological, professional and technical skills.

b. Assessment schedule:

Assessment 1: Mid-term exam	Week 7
Assessment 2: Project report	Week 8-13
Assessment 3: Practical exam	Week 14 and/or 15
Assessment 4: Oral exam	Week 15
Assessment 5: Final written exam	Week 16

c. Weighting of assessments:

Mid-Term Examination	10%
Final report	20%
Practical Exam	20%
Oral Exam	10%
Final-Term Examination	40%
Total	100%

6- List of References

6.1- Course notes.

6.2- Essential books (text books)

- Altieri M. A. 1995. Agroecology: The science of sustainable agriculture, second edition. Westview Press, Boulder, Colorado, USA.
- Bouma J. and van Beukering P. 2015. Ecosystem Services: From concept to practice. Cambridge University Press (267 p).
- Ford A. 1999. Modeling the Environment: An Introduction to System Dynamics Models of Environmental Systems.
- Gliessman S. 2004. Chapter 2, Agroecology and Agroecosystems. In D. Rickerl and C. Francis, (ed.). Agroecosystems Analysis. American Society of Agronomy, Madison , WI.
- Gooley, G. J. and Gavine, F. M. 2003. Integrated Agri-Aquaculture Systems – A Resource Handbook. Rural Industries Research and Development Corporation. ISBN 0 642 58580 6). ISSN 1440-6845. Level 1, AMA House 42 Macquarie Street BARTON ACT 2600 PO Box 4776 KINGSTON, Australia.
- Lampkin N. 1997. Organic Poultry Production. ISBN: 0902124625. Welsh Institute of Rural Studies University of Wales, Aberystwyth SY23 3AL.
- Nicholson C. 2004. Some Thoughts on the Use of System Dynamics Modeling for Assessment of the Evolution of Agricultural based Livelihood Systems.
- Seré C., H. Steinfeld, and J. Groenewold. 1995. World Livestock Production Systems. FAO Animal Production and Health Paper No. 127. Food and Agriculture Organization of the United Nations.
- Stout M. 2013. Aquaponic Gardening. International Standard Book Number: 978-1-61564-235-9. Library of Congress Catalog Card Number: 2012951749. Alpha Books, Penguin Group (USA) Inc. 375 Hudson Street, New York, USA.
- Thornley J. H. M. 2000. Plant and Crop Modeling: A Mathematical Approach to Plant and Crop Physiology.
- Tidwell J. H. 2012. Aquaculture Production Systems. ISBN: 978-0-8138-0126-1. John Wiley & Sons, Ltd., Publication. 2121 State Avenue, Ames, Iowa 50014-8300, USA.
- Vandermeer J. H. 2010. The ecology of agroecosystems. Jones & Bartlett Learning, Sudbury, MA.
- Vaneekeren N., A. Maas, H. W. Saatkamp, and M. Verschuur. 2006. Small-scale chicken production. ISBN Agromisa: 90-8573-069-4. ISBN CTA: 978-92-9081-347-7. Agromisa Foundation and CTA, Wageningen, Netherlands.

Course coordinator: Prof. Dr. Hosam Safaa

Head of Department:

Date: / /

Specialization Module: Farm System Modeling in Land Management

Elective Course: Integrated Pest Management

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Farming system modeling in land management

Department offering the program: Soil and Water Sciences

Department offering the course: Pesticides Chemistry

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Integrated Pest Management (IPM) **Code:** SLM 14747

Credit Hours / ECTS: 2 / 6

Lecture: 1 **Tutorial/Practical:** 2 **Total:** 2

B- Professional Information

Course Description

Integrated Pest Management (IPM) is designed to introduce students to the theory and practice of integrated pest management systems in major agronomic and horticultural crops; turf grass and pasture systems; and aquatic, non-cropland, and urban settings. The course aims at combining knowledge with analytical, managerial, and communication skills to address real-world problems in a diversity of management systems.

1 – Overall Aims of Course

1. Understand the IPM decision-making process and how it differs from conventional pest control
2. Understand how pest biology and behavior affects the success of management practices.
3. Develop/increase skills in monitoring, record-keeping, setting treatment thresholds, using non-chemical prevention and treatment methods, using reduced-risk pesticides as a last resort, and developing customer cooperation with the IPM service.
4. Learn how to incorporate IPM concepts and methods into a structural pest control business

2 – Intended Learning Outcomes of Course (ILOs)

i- Knowledge and Understanding:

- Describe damage/injury caused by different pests.
-Know the alternatives of chemical control methods
- List benefits of integrated pest management.

b- Intellectual Skills

- Demonstrate economic threshold for different pests.
- Evaluate IPM program.
- Evaluate approaches to problem-solving related to integrated pest management.
- forecast pest outbreaks.
- Propose suitable control methods for integration.
- Propose suitable methods for measuring pest control efficiency.

c- Professional and Practical Skills

- Apply different pest control methods (or techniques) .
- Record population size periodically.
- Use computer for forecasting pests outbreaks.
- Monitoring pest population and fluctuation
- Diagnose pests caused damage

d- General and Transferable Skills

- Write and Communicate scientific reports related to IPM
- Contribute constructively to class and group discussion.
- Work in small groups for problem solving.
- Write effectively a scientific report in English.
- Utilize information technology (IT) and electronic resources effectively.

4 - Contents

Date	Topic
Week 1	History of Integrated Pest Management and appropriate definitions .
Week 2	Host plant resistance, crop rotation and cultural practices .
Week 3	Principles of weed, insect, disease and nematode management (strategies, thresholds, issues) .
Week 4	Environmental fate of pesticides, pesticide use, pesticide registration process, pesticide resistance, and utilization of GM traits in pest management .
Week 5	Managing pests in organic systems .
Week 6	Using peanut to demonstrate IPM principles (host plant resistance, crop rotations, risk indices, weather-based advisories, decision tools, fumigation, plant populations, tillage systems, secondary pest outbreaks, international agriculture) .
Week 7	Examples of large-scale management programs : Vegetable and crops (insects,

disease and greenhouse operations) .

Week 8 Turf grass and nursery crops (aesthetics, propagation) .

Week 9 Livestock and pastures (grazing, feedlots) .

Week 10 Urban IPM (insects and rodents) .

Week 11 Post-harvest handling of vegetables, commodities, etc.

Week 12 Consultant and Extension roundtable

4- Teaching and Learning Methods

- Effective Lectures
- Practical sessions
- Assignments
- Case Study

5- Student Assessment Methods

- mid-term exam to assess obtained knowledge and understanding and skills assess
- Oral exam to assess knowledge, understanding, and intellectual skills
- Practical exam to assess professional, intellectual, and general skills

Final exam to assess retained knowledge, understanding and skills

- Class attendance and activities

Assessment Schedule

Assessment 1: Assignments reports and presentations during the semester	
Assessment 2: Midterm exam	7th Week
Assessment 3: research paper presentation	12th Week
Assessment 4: Oral exam	13th Week
Assessment 5: Practical exam	14th Week
Assessment 5: Final exam	15th Week

Weighting of Assessments

Mid-term Exam	10%
Final Exam	40%
Case study & reporting	20%
Oral Examination	10%
Practical Exam	20%
Total	100%

6- List of References

6.1- Course Notes

Integrated Pest Management (Hand-out)

6.2- Essential Books (Text Books)

Elliott, N. C., Farrell, J. A., Gutierrez, A. P., van Lenteren, J. C., Walton, M. P., & Wratten, S. (1995). *Integrated pest management*. D. Dent (Ed.). Springer Science & Business Media.

Gent, D. H., Barbour, J. D., Dreves, A. J., James, D. G., Parker, R., Walsh, D. B., & O'Neal, S. (2009). Field Guide for Integrated Pest Management in Hops. Oregon State University, University of Idaho, USDA Agricultural Research Service, Washington State University, USA.

Hill, D. S. (2008). *Pests of crops in warmer climates and their control*. Springer Science & Business Media.

6.3- Recommended Books

- Common Sense Pest Control, W. Olkowski, Sheila Daar, Helga Olkowski. 1991 Newtown, CT: The Taunton Press. 715 pp.

- NPMA Field Guide to Structural Pests by Eric H. Smith and Richard C. Whitman, Published 1992

- Handbook of Pest Control by Arnold Mallis, Published by Franzak & Foster Co.

- Integrated Pest Management for Schools: A How-To Manual (written by BIRC staff)

6.4- Periodicals, Web Sites, … etc

- IPM Institute

http://www.ipminstitute.org/school biblio buildings.htm

- California Department of Pesticide Regulation

http://www.cdpr.ca.gov/cfdocs/apps/schoolipm/school ipm law/26 exempt text5.pdf

- University of California Statewide IPM Project

http://axp.ipm.ucdavis.edu/PMG/selectnewpest.home.html

University of California at Riverside Entomology Department

http: //entmuseum.ucr. edu/bugfaq.html

University of Florida Entomology Department http://creatures.ifas.ufl.edu/main/search common.htm

University of Florida School IPM http://schoolipm.ifas.ufl.edu/

Marin County Department of Agriculture Model School IPM Program

http://www.co.marin.ca.us/schoolIPM/

&- Facilities Required for Teaching and Learning

8.1- Class room equipped with movable table and chairs, computers, data show and Internet .

8.2- Equipped Laboratory for pesticide toxicology and data analysis .

8.3- Facilities for Field trips and community outreaching .

Course coordinator:

Head of Department:

Date: / /

Specialization Module: Farm System Modeling in Land Management

Elective Course: Applied Bioeconomics

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Farming system modeling in land management

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

A- Basic Information

Title: Applied Bioeconomics **Code:** SLM 14748

Credit Hours / ECTS: 2 / 6

Lecture: 2 **Tutorial/Practical:** **Total:** 2

B- Professional Information

Keywords**:** *Farming Systems, Land Resources, consumer behavior, producer behavior, market types, natural resources, consumer surplus, producer surplus, resource scarcity, opportunity cost.*

Course Description:

The course encompasses elements of agricultural and food economics, as well as natural resources economics and uses of the principles of microeconomics and macroeconomics pertinent to and with application to sustainable land management. The course considers sustainable food systems and food security from a wide range of perspectives. It examines farming as a social practice, as commercial food production, as a challenge to environmental policy, and as an integral part of sustainable and healthy consumption. Specifically, it provides the theoretical background to consumer and producer theories, market types, competition and natural monopolies, and why uncertainty affects economic analysis, especially when dealing with non-renewable natural resources. The course further displays the uses of the demand and supply analysis to determine the optimal levels of production, consumption, pollution, evaluate market structures, and price formulation for food and agricultural products and resources.

2 – Intended learning outcomes of course (ILOs)

1. Learn the basic microeconomic concepts needed for analysis and decision- making regarding environmental and agricultural resources.
2. Study the consumer behavior and demand to know what motivates people to consumer the services of land.

3. Analyze and make decisions to solving production problems. This is since production leads to resource exhaustion and degradation and yields pollution as a secondary undesired product.
4. Understand the fundamental principles needed for market supply and demand analysis, market price determination, and forms of market competition.
5. Understand the fundamental principles needed for sources of risk and risk management analysis, economic policy analysis, and natural resources economics and policy analysis.
6. Review the recent economic literature on land degradation and improvement.
7. Address that land degradation has higher economic returns than inaction.
8. Conceptualize the methodological areas for future research on the sustainability of land management.

3- Contents

The course is an intermediate level course focusing on aspects of consumption, production, organization, and exchange in the economy. It incorporates elements of agricultural and food economics, as well as natural resource economics, along with the utilization of microeconomics and macroeconomics. The course considers sustainable food systems and food security from a wide range of perspectives. Farming is examined as a social practice, a commercial food production, a contributor and challenger to environmental policy, and an integral part of sustainable and healthy consumption.

Week	Class Topics
Week 1	Introduction Course overview Important concepts in economics (scarcity and opportunity cost). Micro versus Macroeconomics. The farm and the food system. Natural resources and economics.
Week 2-3	Consumer behavior and Demand
Week 4-5	Producer decision making: single variable input and two variable inputs and enterprise selection.
Week 6-7	Production costs, supply, and price determination
Week 8	Production costs, supply, and price determinantion under uncertainty
Week 9	Competition, monopolies, natural monopolies, and the market
Week 10	Imperfect competition, role of governments, and market regulations pertaining to land resources.

Week	Class Topics
Week 11-12	Natural Resources Welfare Analysis (consumer and producer surpluses)

*Midterm and Final Exams will be held during the extra week(s) of the semester.

4– Teaching and learning methods

Lecture
Directed Learning
*In*dependent Learning
Exam Preparation
Exam Taking .

5- Student assessment methods

Weighing of assessments

Quizzes	25%
In-class participation and HW	10%
Midterm Exam	25%
Final Exam	40%
Total	100%

6- List of references

6.2- Essential books (text books)

Barkley & Barkley. Principles of Agricultural Economics, Routledge. 2013.
OECD, 2009. The bioeconomy to 2030: designing a policy agenda. Paris: OECD Publishing.

6.3- Recommended books

Introduction to Agricultural Economics 5/E by John B Penson, Jr., Oral Capps, Jr., C. Parr Rosson III, and Richard T. Woodward. Prentice Hall ISBN-13: 978-0-13-507026-0, ISBN-10: 0-13-507026-0. 2010.

The textbook provides a clear explanation of the concepts in agricultural economics and business. The student's understanding of the lectures will be enhanced by reading the assigned chapters before the class. Supplemental readings will be assigned occasionally during the semester. Class notes or handouts, exercises, and other materials will be provided. This is in addition to materials used in E-Learning.

Alisher Mirzabaev, Ephraim Nkonya, Joachim von Braun, Economics of Sustainable Land Management, Center for Development Research (ZEF), University of Bonn, Walter Flex Str,

53113 Bonn, Germany, International Food Policy Research Institutive (IFPRI), 2033 K St, NW Washington, DC 20006-1002, USA, ISSN 1864-6638, Bonn, March 2013.

Course coordinator:

Head of Department:

Date: / /

Specialization Module: Farm System Modeling in Land Management

Elective Course: Advanced Agricultural Waste Management

University: Alexandria **Faculty:** Agriculture

Program on which the course is given: Sustainable Land Management (SLM)

Major or minor element of program: Farming system modeling in land management

Department offering the program: Soil and Water Sciences

Department offering the course: Soil and Water Sciences

Academic year / Level: Master

Date of specification approval:

B- Basic Information

Title: Advanced Agricultural Waste Management **Code:** SLM 14749

Credit Hours / ECTS: 2 / 6

Lecture: 1 **Tutorial/Practical:** 2 **Total:** 2

C- Professional Information

1 – Overall aims of course

This course covers principles of managing, handling, treating and applying animal and field and other agriculture wastes. Topics include waste characterization, role of soils in waste management, role of plant in waste management, agricultural waste management systems, and preparation of waste management plans, waste utilization and waste management equipment.

2 – Intended Learning Outcomes of Course (ILOs)

a. Knowledge and Understanding:

1. Define the Pollution versus contamination.
2. Define waste characterization and management terms
3. Names the factors affecting the pollution process.
4. Identify effects of animal waste on the water, air and animal resources.
5. Discuss role of Soils and plant in Waste Management.
6. List different agricultural wastes and its application
7. Select agriculture waste management system
8. Write the different methods of Waste Utilization
9. Mention suitable waste management equipment depending on the type of the waste.

b. Intellectual Skills:

1. Choose suitable methods of analysis of different agriculture waste
2. Choose suitable agriculture waste in different application
3. Have analytical thinking
4. Distinguishes between different Agriculture waste

5. Conclude the analysis of composts and silage
6. Distinguishes between different system of waste management
7. Summarises waste utilization

c. Professional and Practical Skills

1. Use instruments in analytical laboratories.
2. Detect the quality of analyzed agricukture waste.
3. Write full report justifying his judgment.
4. Apply results of agricultural waste analysis in different application
5. Apply waste utilization and management system
6. Have practical knowledge of planning an agricultural waste management system

d. General and Transferable Skills:

1. Interact efficiently with others.
2. Work effectively in a team.
3. Manage time effectively.
4. Make appropriate decisions depending on analysis results .
5. Collect the gained experiences in different waste utilization and management systems.
6. Write effectively a scientific report in English.

3- Contents:

Topic	Lecture	Tutorial/Practical
	Registration of Students	Registration of Students
1	Agricultural Wastes and Water, Air, and Animal Resources *Pollution versus contamination *Effects of animal waste on the water resource *Factors affecting the pollution process	Sample Preparation
2	Agricultural Wastes and Water, Air, and Animal Resources *Controlling the pollution process *Effects of animal waste on the air resource *Effects of animal waste on the animal resource	Proximate Analysis of Agriculture Waste * (Moisture– Protein - Carbohydrates – Ash – Mineral Matter)
3	Agricultural Waste Characteristics * Definitions of waste characterization terms * Animal waste characteristics * Field wastes * Other wastes	Proximate Analysis of Agriculture Waste * (Crude Fibre - Cellulose)
4	Role of Soils in Waste Management * Soil phases *Soil-agricultural waste interaction *Soil-agricultural waste mineralization relationship * Soil characteristics	Proximate Analysis of Agriculture Waste * (Hemicellulose - Lignins)
5	Role of Plants in Waste Management * Agricultural waste as a resource for plant growth * The plant–soil system * Plant nutrient uptake	The Analysis of Composts * Determination of cation exchange capacity (CEC) in composts

	*Balancing plant nutrient needs with waste application	
6	Midterm Exam	
7	Application of agricultural waste	The Analysis of Composts * Determination of Ca, K, Mg and P in composts
8	Agricultural Waste Management Systems * Definitions of waste management terms * Waste management functions * Management Systems *Typical agricultural waste management systems	The Analysis of Composts * Determination of heavy metals in compost
9	Planning an agricultural waste management system	The Analysis of Silage * Determination of ammonium-N in silage
10	Waste Utilization * Waste consistency * Land application * Salinity * Plant nutrients * Nutrient management	The Analysis of Silage * Determination of moisture in silage * Determination of pH in silage
11	Waste Management Equipment * Waste production equipment * Waste collection equipment * Waste utilization equipment	The Analysis of Silage * Determination of volatile fatty acids (VFAs) in silage * Extraction method for obtaining silage juice for analysis for VFAs
12	Revision	Revision

4. Teaching and Lecturing Methods

4.9. Lectures.
4.10. Practical sessions.
4.11. Group discussions.
4.12. Data analysis.
4.13. Problem solving.
4.14. Seminars.
4.15. Reports
4.16. self-study

5- Student assessment methods

5.1. Mid-term exam
5.2. Oral exam
5.3. Practical exam
5.4. Final written exam
5.5. Writing on a subject related to the course

Assessment schedule

Assessment 1: Mid-term exam Week 6
Assessment 2: Practical exam Week 13
Assessment 3: Oral exam Week 13

Assessment 4: Final written exam	Week 14
Assessment 5: report	Week 11, 12

Weighting of assessments

Mid-Term Examination	5%
Oral exam	5%
Practical exam	20%
Final report	10%
Final-Term Examination	60%

6- List of References

6.1- Course notes

Agricultural Waste Management (Hand-out)

6.2- Essential books (text books)

- Williams, P.T.; Waste treatment and disposal, 2005, John Wiley and Sons, England
- Vaughn J., Waste management handbook, 2009, AbcClio, Oxford, England
- Davis, M.L.; Cornwell, D.A. (1998): Introduction to environmental engineering, McGraw-Hill, Inc., New York, USA
- Agricultural Waste Management Field Handbook, United States Department of Agriculture

Course coordinator: Hend El-akkad / M. Momtaz/ Mohamed Ali/ Abdelhady Ali / Adham Elsaghir

Head of Department:

Date: / /