جامعة بني سويف
كلية الحاسبات والمعلومات

اللائحة الداخلية

لمرحلة البكالوريوس بنظام الساعات المعتمدة

2015

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المحتوى

رؤية الكلية

- تسعى كلية الحاسبات والمعلومات بجامعة بني سويف للارتقاء بالمستوى العلمي والعملي والبحثي في مجالات علوم الحاسب وتكنولوجيا المعلومات والوسائط المتعددة لتحقيق مكانة مرموقة بين كليات الحاسبات والمعلومات وتحقيق التميز والابتكار في مجالات التعليم والبحث العلمى وخدمة المجتمع على المستوى المحلي والإقليمي، وأن تكون الكلية ضمن أفضل كليات الحاسبات وتكنولوجيا المعلومات المصنفة على المستوى الاقليمى والدولى.

رسالة الكلية

تتمثل رسالة كلية الحاسبات والمعلومات في:

- إمداد الطالب بإصول المعرفة والبحث العلمى فى مجالات علوم الحاسب ونظم وتكنولوجيا المعلومات وتنمية شخصية الطالب لجعله راغباً في الابتكار ومحباً للعمل الجماعى و قادراً على المنافسة المحلية والإقليمية والعالمية.
- تطوير المناهج الدراسية وتحديثها بصورة مستمرة بما يتماشى مع التقدم العلمى ومتطلبات العصر واحتياجات سوق العمل.
- تنمية الوعى بقيمة التعليم المستمر وحتمية التعلم الذاتى وأهمية استخدام الأساليب الحديثة فى هذا المجال.
- استخدام البحث العلمي كوسيلة لتحقيق الابتكار في مجالات الكلية عن طريق دراسة الأهمية الاقتصادية والتجارية والاجتماعية لمردود البحث العلمي.
- تقديم خدمة مجتمعية متميزة في مجالات الكلية.
- تعزيز مبادئ المصداقية والأخلاقيات.

أنه قد تمت مراعاة النسب الموجودة فى هذا النمط القياسى(NARS)

National Academic Reference Standards (NARS) For Computing an Informatic

	Subject Area	Tolerance %	T%
A	Humanities, ethical and Social Sciences (Univ. Req.)	8-10	10.4%
B	Mathematics and Basic Sciences	16-18	19.4
C	Basic Computing Sciences (institution req.)	26-28	29
D	Applied Computing Sciences (specialisation)	28-30	33
E	Training	3-5	3.5%
F	Projects	3-5	4.2%
	Subtotal	84-96	89.5%
G	Optional (Institution character-identifying subjects)	16-4	10.5%
	Total	100	100

مادة (1) أهداف الكلية

تسعى الكلية إلى تحقيق الأهداف الآتيـة:

إعداد المتخصصين فى الحاسبات والمعلومات المؤهلين بالأسس النظرية ومنهجيات التطبيق بما يؤهلهم للمنافسة العالمية فى التطوير الدائم والمستمر للبرمجيات ونظم وتكنولوجيا المعلومات .

1. إجراء الدراسات والبحوث العلمية والتطبيقية فى مجال الحاسبات والمعلومات وفى مقدمتها تلك التى لها أثر مباشر على التنمية المتكاملة فى المجتمع وانشاء وحدات ابحاث متخصصة فى الفروع المختلفة للحاسبات والمعلومات .
2. تقديم الاستشارات والمساعدات العلمية والفنية للهيئات والجهات التى تستخدم تكنولوجيا الحاسبات والمعلومات وتهتم بصناعة واتخاذ القرار ودعمه .
3. تدريب الكوادر الفنية فى قطاعات الدولة المختلفة على تكنولوجيا الحاسبات والمعلومات.
4. نشر الوعي وتعميقه فى المجتمع بهدف استخدام تكنولوجيا الحاسبات والمعلومات فى قطاعات ومؤسسات الدولة المختلفة ، ورفع كفاءة استخدامها .
5. تنظيم المؤتمرات وعقد الاجتماعات العلمية بهدف الارتقاء بالمستوي التعليمي وتعميق المفهوم العلمي بين الكوادر المتخصصة .
6. عقد الاتفاقيات العلمية مع الهيئات والمؤسسات المناظرة على المستوي المحلي والإقليمي والعالمي بهدف تبادل الآراء وإجراء البحوث المتعلقة بتخصصات الحاسبات والمعلومات.
7. توفير وتدعيم وسائل النشر والبحث العلمي فى شتي مجالات التخصص .
8. إنشاء وحدات متخصصه متقدمه فى الفروع المختلفه لعلوم الحاسبات والمعلومات.
9. الاشتراك مع الجهات المتخصصة لتطوير وتعريب برمجيات النظم والتطبيقات المختلفة.

مادة (2) أقسام الكلية

تضم كلية الحاسبات والمعلومات الأقسام التالية:

1. **قسم علوم الحاسب**
   - ويشرف على برنامج علوم الحاسب
2. **قسم نظم المعلومات**
   - ويشرف على برنامج نظم المعلومات
3. **قسم تكنولوجيا المعلومات**
   - ويشرف على برنامج تكنولوجيا المعلومات
4. **قسم الوسائط المتعددة**
   - ويشرف على برنامج الوسائط المتعددة

ويجوز أن تنشأ بالكلية أقسام أخري مستقبلاً وفقاً لأحكام قانون تنظيم الجامعات.

قسم علوم الحاسب

ويتضمن المجالات العلمية التالية:برمجة الحاسبات ومفاهيم لغات الحاسب ومترجماتها - هياكل البيانات – تحليل وتصميم الخوارزميات – نظم تشغيل الحاسبات – بنية وتنظيم الحاسبات – تشفير البيانات وأمن الحاسب – ضغط البيانات –

هندسة البرمجيات – الذكاء الاصطناعى – النظم الذكية – النظم الخبيرة – معالجة الصور – معالجة اللغات الطبيعية – نظم الوكلاء المتعددة – نظم قواعد المعرفة – المعالجة على التوازى والنظم الموزعة – الحوسبة السحابية – نظم التعليم الذكية – تعليم الحاسبات – التعرف على النماذج – طرق اتصال الإنسان بالحاسب – الرؤية بالحاسب – نظم الرسم بالحاسب – تعريب الحاسبات.

قسم نظم المعلومات

ويتضمن المجالات العلمية التالية:تحليل وتصميم نظم المعلومات – منهجيات تطوير نظم المعلومات – معماريات نظم المعلومات - نظم تخزين واسترجاع المعلومات – نظم قواعد البيانات – نظم المعلومات – نظم المعلومات الإدارية – نظم المعلومات الجغرافية – نظم معلومات الوسائط المتعددة – نظم المعلومات الموزعة – نظم المعلومات الذكية – هندسة المعلومات – اكتشاف المعرفة فى نظم قواعد البيانات – قواعد البيانات الشيئية - اقتصاديات نظم المعلومات – التنقيب في البيانات – مستودعات البيانات – إدارة مراكز المعلومات – نظم المعلومات المتكاملة – منهجيات تطوير نظم المعلومات – تأكيد جودة البرمجيات ونظم المعلومات – تطبيقات نظم المعلومات فى المجالات المختلفة – نظم معلومات الشبكية.

قسم تكنولوجيا المعلومات

ويتضمن المجالات العلمية التالية:شبكات الحاسبات بأنواعها المختلفة – شبكات المعلومات وتطبيقاتها – تكنولوجيا الاتصالات – تكنولوجيا الإنترنت – تأمين وسرية المعلومات والشبكات – معالجة الإشارات الرقمية –نظم الزمن الحقيقي – النظم الرقمية – عمارة الحاسبات – المعالجات الدقيقة وتطبيقاتها –النظم المدمجة – الحاسبات الذكية والكمية – نظم الحاسبات ذات الأعطال المحتملة – نظم الحاسبات الموزعة والمتوازية – النظم الديناميكية والإنسان الآلي – التعلم الإلكتروني والمكتبات الرقمية – الأعمال الإلكترونية – التجارة الإلكترونية–نظم الرسم بالحاسب – معالجة الصور- معالجة الكلام.

قسم الوسائط المتعددة

ويتضمن المجالات العلمية التالية: الواقع الافتراضي – الوسائط المتعددة – الوسائط المتعددة التفاعلية –كتابة النصوص – النمذجة والحركة ثنائية وثلاثية الابعاد– مواجهات الحاسبات – النظم المدمجة –التصوير ثلاثى الابعاد – تفاعل الإنسان والحاسب –الفيديو الرقمى– الصوت الرقمي- ضغط البيانات معالجة الصور- معالجة الكلام.

مادة (3) الدرجات العلمية

تمنح جامعة بني سويف بناء على توصية مجلس كلية الحاسبات والمعلومات درجة البكالوريوس في الحاسبات والمعلومات فى أحد التخصصات التالية :

أ. **علوم الحاسب.**
ب. **نظم المعلومات.**
ج. **تكنولوجيا المعلومات.**

د. قسم الوسائط المتعددة

- ويتطلب الحصول على درجة البكالوريوس أن يجتاز الطالب بنجاح دراسة (144) ساعة معتمدة تتضمن متطلبات عامة ، ومتطلبات للكلية إلى جانب متطلبات التخصص وأن يجتاز الطالب التدريب الصيفيولا تضاف درجات التدريب للمجموع التراكمي.

مادة (4) شروط القبول بالكلية

- يتم إختيار الطلاب للدراسة بالكلية بناء على القواعد التى يضعها مكتب تنسيق القبول بالجامعات من بين الطلاب الحاصلين على الثانوية العامة" علمى رياضة"أوما يعادلها .

مادة (5) نظام الدراسة

أ. تعتمد الدراسة بالكلية على نظام الساعات المعتمدة، وتكون الساعة المعتمدة هي وحدة قياس دراسية لتحديد وزن المقرر الدراسي. **بالنسبة للمحاضرات النظرية:**

تحتسب ساعة معتمدة واحدة لكل محاضرة مدتها ساعة واحدة اسبوعيا خلال الفصل الدراسى الواحد.

و بالنسبة للساعات المعملية و التدريبات التطبيقية:

تحتسب ساعة معتمدة واحدة لكل فترة عملية أو تدريبية مدتها من 2 الى 3 ساعات اسبوعيا خلال الفصل الدراسى الواحد.

ب. يتطلب الحصول على البكالوريوس أن يجتاز الطالب بنجاح 144 ساعة معتمدة وذلك على مدي ثمانية فصول دراسية على الأقل، مقسمة إلي أربعة مستويات دراسية بالإضافة إلى تدريب عملي صيفي على ضوء ما يحدده مجلس الكلية.

ج. الدراسة فى المستوى الأول والثانى مشتركة لجميع التخصصات ، ويبدأ التخصص فى المستوى الثالث . ولكل قسم أن يضع الشروط المؤهلة للالتحاق به بعد إقرارها من مجلس الكلية .

د. يتم إعلان الطلاب بالتخصصات الدراسية المختلفة بالكلية والمنصوص عليها باللائحة خلال فترة التقدم للكلية.

ه. يتم توزيع الطلاب على التخصصات حسب رغباتهم وطبقاً لشروط القبول المحددة من قبل كل قسم.

و. مستويات الدراسة بالكلية أربعة ويشار إلى الطلاب بهذه المستويات مع بداية كل عام دراسي بالمسميات التالية:

- المستوى الأول: يسمى الطالب "مبتدئ" (Freshman) قبل إتمامه 36 ساعة معتمدة.
- المستوى الثاني: يسمى الطالب "مستجد" (Sophomore) بعد إتمامه 36 ساعة معتمدة.
- المستوى الثالث: يسمى الطالب "حديث" (Junior) بعد إتمامه 72 ساعة معتمدة.
- المستوى الرابع: يسمى الطالب "قديم" (Senior) بعد إتمامه 108 ساعة معتمدة.

مادة (6) لغة التدريس

الدراسة فى كلية الحاسبات والمعلومات باللغة الإنجليزيةوالعربية طبقا لمتطلبات كل مقر دراسى .

مادة (7) التدريب الصيفى

يكون تدريب الصيفى داخلى بالكلية بالمستوى الأول و الثانى وذلك يعتبر نشاط للطلاب و تنمية و رفع مستواهم بما يتتطلبه المقررات الدراسية بالكلية والتدريب الصيفى اجبارى بعد المستوى الثالث ويكون تدريب خارجيتطلب الحصول على شهادة معتمدة

من شركات التدريب ويعد كل قسم نظاما للتدريب الصيفى خلال العطلة الصيفية لمدة ثلاث أسابيع سنويا على الاقل وينفذ تحت اشراف أعضاء هيئة التدريس ولا ينقل الطالب بالفرقة التالية إلا بعد حضوره التدريب الصيفى ما لم يتقدم بعذر يقبله مجلس الكلية.

مادة (8) مواعيد الدراسة والتخرج

تقسم السنة الدراسية إلى فصلين دراسيين على النحو التالى:

- الفصل الدراسي الأول (فصل الخريف) مدته 15 أسبوعاً ويبدأ فى ميعاد يحدده مجلس الجامعة.
- الفصل الدراسى الثانى (فصل الربيع) مدته 15 أسبوعاً ويبدأ فى ميعاد يحدده مجلس الجامعة.

ويجوز أن يكون هناك فصل صيفى طبقاً لطبيعة الدراسة بالكلية مدته 8 أسابيع ويبدأ فى ميعاد يحدده مجلس الجامعة، ويعقب كل فصل دراسي فترة الإمتحانات النهائية ومدتها إسبوعين.

يكون التخرج في نهاية كل فصل دراسي وبالتالي فإن أدوار التخرج ستكون هي:

- التخرج في نهاية الفصل الدراسي الأول (دور يناير).
- التخرج في نهاية الفصل الدراسي الثاني (دور يونيو).
- التخرج في نهاية الفصل الصيفي (دور سبتمبر).

مادة (9) التسجيل والحذف والإضافة

أ. مع بداية كل فصل دراسي يقوم الطالب بتسجيل المقررات الدراسية التى يختارها ، وذلك من خلال نموذج طلب التسجيل والذي توفره الكلية وفى الأوقات التى تحددها إدارة الكلية قبل بدء انتظام الدراسة.

ب. يحدد مجلس الكلية الحد الأدني لعدد الطلاب المطلوب تسجيلهم فى مقرر والشروط التي يمكن معها فتح هذا المقرر.

ج. يكون الحد الأدني للساعات المعتمدة للتسجيل فى كل فصل دراسي 12 ساعة معتمدة ، والحد الأقصي 18 ساعة معتمدة، ويجوز لمجلس الكلية الترخيص بالنزول عنالحد الأدنى وتجاوز الحد الأقصي للساعات المعتمدة للتسجيلبما لايزيد عن 3 ساعات معتمدة فى الفصل الواحد و ذلك لحالات التخرج.

د. يجوز للطالب بعد إكمال إجراءات التسجيل أن يقوم بحذف أو إضافة مقرراً أو أكثروذلك خلال فترة تحددها الكلية للحذف والإضافة ، ويتم ذلك بالتنسيق مع المرشد الأكاديمي للطالب ومن خلال نموذج محدد توفره الكلية.

هـ. يسمح للطالب بدراسة المقررات المختلفة والتسجيل فى المستويات الأعلي بناء على قيامه باختيار المقررات المطلوبة كمتطلبات للمقررات الأعلي . ولا يتم تسجيل الطالب فى مقرر أعلي إلا إذا نجح فى متطلباته.

مادة (10) الانسحاب من المقرر

أ. يجوز للطالب بعد تسجيل المقررات التى اختارها أن ينسحب من مقرر أو أكثر خلال فترة محددة تعلنها إدارة الكلية بحيث لا يقل عدد الساعات المسجلة للطالب عن الحد الأدني للتسجيل فى الفصل الدراسي الواحد (12 ساعات معتمدة) وفى هذه الحالة لا يعد الطالب راسباً فى المقررات التى انسحب منها ويحتسب له تقدير "منسحب" فقط.

ب. إذا انسحب الطالب من مقرر أو أكثر بعد الفترة المحددة لذلك دون عذر قهري يقبله مجلس الكلية يحتسب له تقدير "راسب" فى المقررات التى انسحب منها. أما إذا تقدم قبل الامتحان بشهر على الأقل بعذر قهري يقبله مجلس الكلية فيحتسب له تقدير "منسحب".

مادة (11) الإرشاد الأكاديمي

- **المرشد الأكاديمى**: يعين وكيل الكلية لشئون التعليم والطلاب بالتشاور مع رؤساء الأقسام لكل طالب عند التحاقه بالدراسة مرشداً أكاديمياً من بين أعضاء هيئة التدريس (بعد تدريبهم كمرشدين أكاديمين).
- يلتزم المرشد الأكاديمى بمتابعة أداء الطالب ومعاونته فى إختيار المقررات فى كل فصل دراسي.
- لا يجوز للمرشد الأكاديمى طلب إعادة الطالب لبعض المقررات التى نجح فيها من قبل بغرض رفع متوسط النقاط للطالب ولكن يمكنه إضافة ساعات زائدة للتخرج لمقررات إختيارية لم يدرسها الطالب من قبل بحد أقصى 6 ساعات معتمدة بهدف رفع المعدل التراكمي على أن يتم ذلك بعد موافقة مجلس القسم وإعتماد مجلس الكلية.

مادة (12) المواظبة والغياب

أ. الدراسة فى كلية الحاسبات والمعلومات نظامية ولا يجوز فيها الانتساب وتخضع عملية متابعة حضور الطلاب لشروط ولوائح تحددها إدارة الكلية.

ب. يتطلب دخول الطالب الامتحان النهائي تحقيق نسبة حضور لا تقل عن 75% من المحاضرات والتمارين العملية والنظرية فى كل مقرر فيما عدا تمارين المعامل المفتوحة (انظر المادة 22) فلا يشرط بها نسبة حضور. وإذا تجاوزت نسبة غياب الطالب – دون عذر مقبول – فى أحد المقررات 25% يكون لمجلس الكلية حرمانه من دخول الامتحان النهائي بعد إنذاره. ويعطي درجة "صفر" فى درجة الأختبار النهائى للمقرر. أما إذا تقدم الطالب بعذر يقبله مجلس الكلية يحتسب له تقدير "منسحب" فى المقرر الذي قدم عنه العذر.

ج. الطالب الذي يتغيب عن الامتحان النهائي لأى مقرر – دون عذر مقبول – يعطي درجة "صفر" فى ذلك الامتحان .

د. إذا تقدم الطالب بعذر قهري يقبله مجلس الكلية عن عدم حضور الامتحان النهائي لأي مقرر خلال يومين من إجراء الامتحان يحتسب له تقدير "غير مكتمل" فى هذا المقرر بشرط أن يكون حاصلاً على 60% على الأقل من درجات الأعمال الفصلية ، وإلا يكون قد تم حرمانه من دخول الامتحانات النهائية.

وفى هذه الحالة يتاح للطالب الحاصل على تقدير "غير مكتمل" فرصة أداء الامتحان النهائي فى الفصل التاليالمطروح به المقرر و بحد أقصى سنة دراسية منذ حصوله على تقدير مكتمل. وتحتسب الدرجة الكلية للطالب على أساس الدرجة الحاصل عليها فى الامتحان النهائي إضافة إلى الدرجة السابق الحصول عليها فى الأعمال الفصلية.

مادة (13) الانقطاع عن الدراسة

أ. يعتبر الطالب منقطعاً عن الدراسة إذا لم يسجل فى فصل دراسي أو انسحب من جميع مقررات الفصل الدراسي بدون عذر مقبول.

ب. يجوز لمجلس الكلية الموافقة على قبول عذر الطالب عن فصلين متتاليين او ثلاثة فصول غير متتالية وما يزيد عن ذلك يعرض على مجلس الجامعة.

ج. يجوز للطالب أن يتقدم بطلب لإيقاف القيد بالكلية حسب الشروط والضوابط التى تضعها الجامعة.

مادة (14) نظام الامتحانات

أ.الدرجة العظمى لكل مقرر هي 100 درجة وتوزع على النحو التالي:

1. بالنسبة للمقرر النظري

- 50 **درجة تخصص لأعمال الفصل الدراسي وتوزع على النحو التالي:**
  - **25** درجة للاختبارات الدوريةالتي يجريها الأستاذ بصفة دورية و الاختبارات الشفوية (الخاصة بمقررات متطلبات الكلية ومتطلبات التخصص) والتطبيقات العملية أو الأعمال التي يكلف بها الطلاب أثناء الفصل الدراسي.
  - **25** درجة لامتحان منتصف الفصل الدراسي.
- **50 درجة تخصص لامتحان نهاية الفصل الدراسي.**

2. بالنسبة للمقرر الذي يحتو ي على دراسات عملية يحتسب كالاتى:

- 50 **درجة تخصص لأعمال الفصل الدراسي وتوزع على النحو التالي:**
  - **30** درجة للاختبارات الدوريةالتي يجريها الأستاذ بصفة دورية و الاختبارات الشفوية (الخاصة بمقررات متطلبات الكلية ومتطلبات التخصص الرئيسي) والتطبيقات العملية أو الأعمال التي يكلف بها الطلاب أثناء الفصل الدراسي.
  - **20** درجة لامتحان منتصف الفصل الدراسي.
- **50 درجة تخصص لامتحان نهاية الفصل الدراسي.**

ب .ويكون لمجلس الكلية تحديد مواعيد امتحانات منتصف الفصل الدراسي ، والامتحانات النهائية وإعلانها للطلاب في وقت مناسب.

ج .أما مادة المشروع فتكون الدراسة بها ممتدة على مدى فصلين دراسيين ويكون الامتحان فى نهاية الفصل الدراسى الثانى وتوزع الدرجات بنسبة 50% لأعمال السنة، 50% للامتحان الشفوى (مناقشة المشروع).

50% اعمال سنة و توزع كالاتى	50% للامتحان الشفوى النهائى (مناقشة المشروع).
25% بواسطة المشرف	50% بواسطة لجنة مشكلة بقرار قسم لايشترك فيها المشرف

25% بواسطة لجنة مشكلة بقرار مجلس قسم ويشارك فيها المشرف واذاكاناكثر من مشرف فيشاركو بصوت واحد	على المشروع

د.على مجلس القسم ان يحدد معايير التقييم للمشروع.

هـ .ينذر الطالب – أكاديمياً – إذا وصل معدله التراكمي فى اى فصل دراسى إلى أقل من 2.0 فإذا لم يستطع رفع معدله التراكمي فى الفصلين التاليين يوجه له إنذار ثان. ويجوز لمجلس الكلية منح الطالب فرصة استثنائية وأخيرة لرفع معدله التراكمي. ويحتسب المعدل التراكمي طبقاً للمادة رقم (15).

مادة (15) نظام التقييم

أ. تتبع الكلية نظام الساعات المعتمدة والذي يعتمد على أن الوحدة الأساسية هي المقرر الدراسي وليس السنة الدراسية ويكون نظام التقييم على أساس التقدير فى كل مقرر بنظام النقاط والذي يحدد طبقاً للجدول التالي:

النسبة المئوية للدرجة	التقدير	النقاط	التقدير الوصفى
95% وأعلى	A^+	4	ممتاز
90% حتى اقل من 95%	A	3.7	
85%حتى اقل من 90 %	A^-	3.3	
80%حتى اقل من 85%	B+	3	جيد جدا
75%حتى اقل من 80%	B	2.8	
70%حتى اقل من 75%	C+	2.6	جيد
65%حتى اقل من 70%	C	2.3	
60%حتى اقل من 65%	D+	2	مقبول
55%حتى اقل من 60%	D	1.7	ضعيف
50%حتى اقل من 55%	D^-	1.4	
أقل من 50%	F	صفر	راسب

ب. ويعتبر الطالب ناجحا فى المقرر إذا حصل على متوسط 1.4على الأقل ، وبشرط حصوله فى الامتحان النهائى على ثلث الدرجة علىالأقل. وفي حالة حصول الطالب على تقدير D فإنه يجب عليه الحصول على معدل تراكمي أكثر من 2.0 وإلا سيتم وضعه تحت الملاحظة الأكاديمية (انظر المادة 18) ويكون معرضاً للفصل من الكلية.

ج. حساب المعدل التراكمي

يتم حساب المعدل التراكمي للطالب (GPA) على النحو التالي:

- يتم ضرب قيمة تقدير كل مقرر دراسي (النقاط الموضحة فى الجدول السابق) فى عدد الساعات المعتمدة لهذا المقرر لنحصل على عدد النقاط الخاصة بكل مقرر دراسي .
- يتم جمع نقاط كل المقررات الدراسية التى سجل فيها الطالب.
- يتم قسمة مجموع النقاط على إجمالي الساعات المسجلة للطالب لنحصل على المعدل التراكمي كما يلي:

المعدل التراكمي الفصلى (GPA)=

$$\frac{\text{مجموع حاصل ضرب نقاط كل مقرر x عدد ساعاتهالمعتمدة}}{\text{حاصل جمع الساعات المعتمدة لهذه المقررات في الفصل}}$$

المعدل التراكمي العام (GPA) =

$$\frac{\text{مجموع حاصل ضرب نقاط كل مقرر(تم دراسته) xعدد ساعاته المعتمدة}}{\text{مجموع الساعات المعتمدة لكل المقررات التي تمت دراستها فى جميع الفصول}}$$

ويقرب الناتج إلى رقمين عشريين فقط.

د. حساب التقدير العام

يتم حساب التقدير العام للطالب بناء على المعدل التراكمي طبقاً للجدول التالي:

المعدل التراكمي	التقدير	التقدير الوصفي
من 3.8 إلى أقل من 4.0	A^+	ممتاز
من 3.5 إلى أقل من 3.8	A	
من 3.2 إلى أقل من 3.5	B^+	جيد جداً
من 2.8 إلى أقل من3.2	B	
من 2.4 إلى أقل من 2.8	C^+	جيد
من 2 إلى أقل من 2.4	C	
من 1.8 إلى أقل من 2	D^+	مقبول
من 1.4 إلى أقل من 1.8	D	
أقل من 1.4	F	ضعيف

هـ. يمنح الطالب مرتبة الشرف في حالة اجتيازه لجميع الوحدات الدراسية التي درسها بمعدل تراكمي لايقل عن 3.0بشرط ألا تزيد فترة الدراسة عن أربع سنوات أكاديمية وأن لايكون قد رسب في أي مقرر.

و. يعتبر الطالب ناجحاً في التقدير العام إذا حصل على معدل تراكمي 2.0 على الأقل.

مادة (16) الرسوب والإعادة

أ. إذا رسب الطالب فى مقرر فعليه إعادة دراسته والامتحان فيه مرة أخري. فإذا نجح فى المقرر بعد إعادة دراسته تحتسب له كأقصى درجة أعلى مقبول.

مادة (17) السجل الأكاديمي

- السجل الأكاديمى: هو بيان يوضح سير الطالب الدراسي، ويشمل المقررات التي يدرسها فى كل فصل دراسي برموزها وأرقامها وعدد وحداتها المقررة والتقديرات التي حصل عليها، ورموز وقيم تلك التقديرات، كما يوضح السجل المعدل الفصلى والمعدل التراكمي وبيان التقدير العام، بالإضافة إلى المقررات التي أعفى منها الطالب المحول من كلية جامعية أخرى.
- تقدير "غير مكتمل": تقدير برصد الدرجات مؤقتاً لكل مقرر يتعذر على الطالب إستكمال متطلباته في الموعد المحدد، وذلك بعد موافقة مجلس القسم ويرمز له فى السجل الأكاديمى بالرمز (IC).
- تقدير "مستمر": تقدير يرصد مؤقتاً لكل مقرر تقتضى طبيعة دراسته أكثر من فصل دراسي لإستكماله، ويرمز له بالرمز (IP).

مادة (18) وضع الطالب تحت الملاحظة الأكاديمية وفصله من الكلية

- إذا حصل الطالب فى أى فصل دراسي- عدا الفصل الدراسي الذى يلي إلتحاقه بالكلية على معدل تراكمي أقل من(2.00) فإنه يوضع تحت الملاحظة الأكاديمية خلال الفصل الدراسي الذى يليه.
- يكون على الطالب الموضوع تحت الملاحظة الأكاديمية أن يرفع معدله التراكمي إلى 2.0 على الأقل وذلك فى مدة أقصاها ثلاثة فصول دراسية متتالية، ويرسل إليه إنذار لتذكيره بالفصل الدراسي الأخير إذا أكمل فصلين دراسيين دون الوصول إلى المعدل المطلوب.
- لا يسمح للطالب الموضوع تحت الملاحظة الأكاديمية بالتسجيل لأكثر من (12) ساعة معتمدة خلال الفصل الدراسي، بإستثناء فصل التخرج فيسمح للطالب بالإضافة إلى ما تقدم بتسجيل مقرر واحد بعدد ساعاته إن كان ذلك كافياً لتخرجه.
- لا تنطبق هذه المادة على الفصل الدراسي الصيفي إن وجد.
- يفصل الطالب من الكلية أو التخصص اذا استمر معدله التراكمي أقل من 2 لمدة فصلين دراسيين تاليين للإنذار ويستثنى من ذلك الطالب المقيد في المستوى الأخير من برنامجه الدراسي.

مادة (19) الإنذار

- يوجه إنذاراً للطالب فى حالة وصول نسبة غيابه فى المقرر إلى 20% عن طريق كشوف تعلن بالكلية، وإذا تعدت النسبة 25% فإنه يتخذ قرار بحرمان الطالب من دخول الإمتحان ويحسب للطالب فى المقرر معدل 0.0 (صفر).

مادة (20) أحكام تنظيمية

أ. تقوم لجنة شئون التعليم والطلاب بالكلية بمتابعة الطلاب دورياً من خلال التنسيق مع المرشد الأكاديمي ، ويعطي كل طالب بياناً بحالته الدراسية إذا ظهر تدني مستواه. ويعتمد مجلس الكلية مستويات المتابعة تلك ويضع الضوابط التى يمكن من خلالها متابعة وتحسين حالة الطالب.

ب. لمجلس الكلية أن ينظم دورات تدريبية أو دراسات تنشيطية فى الموضوعات التى تدخل ضمن اختصاص الأقسام المختلفة.

ج. يجوز لمجلس الكلية الموافقة على عقد فصول صيفية (فصل صيفى) مكثفة فى بعض المقررات بناء على اقتراح الأقسام العلمية ووفقاً لما تسمح به إمكانيات وظروف الكليةعلى ألا يسجل الطالب في أكثر من تسع ساعات معتمدة.

د. يجوز لمجلس الجامعة بناء على اقتراح مجلس الكلية تحصيل مقابل خدمات تعليمية من الطلاب الدارسين فى الفصل الصيفى . كما يجوز أيضاً لمجلس الجامعة صرف مكافأت خاصة بناء على اقتراح مجلس الكلية لأعضاء هيئة التدريس و معاونيهم من القائمين بالتدريس فى هذا الفصل

مادة (21) نظام الاستماع

يجوز لمجلس الكلية بعد أخذ رأي مجالس الأقسام العلمية المختصة بأن يقبل طلاب من كليات أو جامعات أخرى من مصر او الخارج كمستمعين لبعض المقررات بالكلية وفقاً لقواعد ورسوم يحددها المجلس، وتمنح الكليـة شهادة باجتياز هذه المقررات مبيناً فيها تقدير الطالب ولا يتبع ذلك منح أي درجة جامعية.

مادة (22)تطبيق قانون تنظيم الجامعات ولائحته التنفيذية

تطبق أحكام قانون تنظيم الجامعات ولائحته التنفيذية فيما لم يرد فيه نص فى هذه اللائحة.

مادة (23) المقررات الدراسية

يشترط للحصول على درجة البكالوريوس فى الحاسبات والمعلومات فى أحد تخصصات الكلية دراسة 144 ساعة معتمدة موزعة على النحو التالي وأن لا يقل معدله التراكمي عن 2.0:

أ. المتطلبات العامة (15) ساعة معتمدة :

- (10) ساعة إجبارية
- (5) ساعة يختارها الطالب من بين المقررات الاختيارية .

ب. متطلبات الكلية (70) ساعة معتمدة :

- (58) ساعة إجبارية
- (12) ساعة يختارها الطالب من بين المقررات الاختيارية .

ج. متطلبات التخصص الرئيسي (48) ساعة معتمدة :

- (30) ساعة إجبارية
- (18) ساعة يختارها الطالب من بين المقررات الاختيارية .

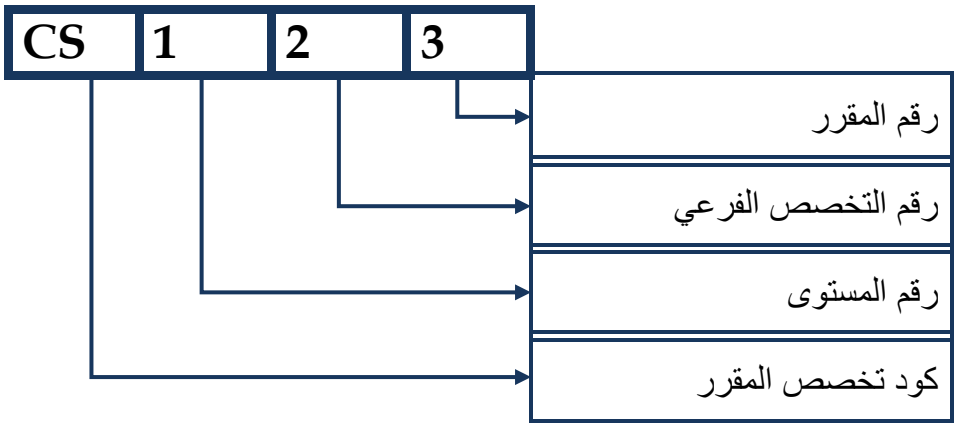
د. متطلبات المشروعات و التدريب (11) ساعة معتمدة

مادة (24) قواعد النظام الكودى للمقررات الدراسية

- يتكون كود أى مقرر (Course - Code) من مجموعة من الأحرف أقصى اليسار تمثل الرمز الكودى للتخصص أو القسم، كما هو موضح بالجدول التالي:

Group / Department	Code	التخصص أو القسم
Computer Science	CS	علوم الحاسب
Information Systems	IS	نظم المعلومات
Information Technology	IT	تكنولوجيا المعلومات
Multimedia	MM	الوسائط المتعدده
Electrical Engineering	EE	الهندسة الكهربية
Mathematics	MA	الرياضيات
Physics	PH	الفيزياء
Humanities	HU	الإنسانيات

- يتبع مجموعة الحروف رقم مكون من ثلاث خانات.
- الرقم فى خانة المئات يمثلالمستوى، يدل الرقم 1 على المستوى الأول والرقم 2 على المستوىالثاني والرقم 3 على المستوىالثالث والرقم 4 على المستوىالرابع.
- الرقم فى خانة العشرات يمثل رقم التخصص الفرعي للمقرر حسب جداول التخصصات الفرعية الموضحة لاحقاً.
- يلى ذلك رقم فى خانة الآحاد يمثل مسلسل للمقرر داخل التخصص الفرعي.
- والشكل التالى يوضح هذا النظام



مادة (25) أرقام التخصصات الفرعية

طبقاً لمرجعيات IEEE و ACM تم تقسيم تخصصات المقررات إلى التخصصات الفرعية الموضحة بالجداول التالية.

جدول1. أرقام التخصصات الفرعية لعلوم الحاسب

Code	Sub-Majors	Code	Sub-Majors
0	Discrete Structures and Computational Science	1	Algorithms and Complexity
2	Architecture and Organization	3	Parallel and Distributed Computing
4	Programming Languages	5	Graphics and Visual Computing
6	Intelligent Systems and social and professional issue	7	Human-Computer Interaction
8	Net-Centric Computing	9	Software Engineering

جدول2. أرقام التخصصات الفرعية لنظم المعلومات

Code	Sub-Majors	Code	Sub-Majors
0	Foundations of Information Systems	1	Data and Information Management
2	IS Project Management	3	Systems Analysis and Design
4	IS Strategy, Management and Acquisition	5	Social and Professional Issues

جدول3. أرقام التخصصات الفرعية لتكنولوجيا المعلومات

Code	Sub-Majors	Code	Sub-Majors
0	Information Technology Fundamentals	1	Information Assurance and Security
2	Integrative Programming and Technologies	3	Networking and communication
4	Platform Technologies	5	System Administration, Maintenance and System Integration and Architecture
6	Social and Professional Issues	7	Web Systems and Technologies

جدول 4. أرقام التخصصات الفرعية للوسائط المتعددة

Code	Sub-Majors	Code	Sub-Majors
0	Multimedia Fundamentals	1	Human Computer Interaction
2	Graphic and Game Design	3	Social and Professional Issues
4	Graphics and Visualization		

جدول 5. أرقام تخصصات العلوم الأساسية والإنسانية

Code	Sub-Majors	Code	Sub-Majors
0	Basic Sciences	1	Languages
2	Social Sciences	3	Business, Management and Economics
4	Legal and Law	5	General Subjects

* ***Computer Science Curricula 2013 Curriculum Guidelines for Undergraduate Degree Programs in Computer Science December 20, 2013. The Joint Task Force on Computing Curricula Association for Computing Machinery (ACM) IEEE Computer Society***

مادة (26) المتطلبات العامة

15 ساعة معتمدة (10 ساعات إجباري + 5 ساعات اختياري)

في الجداول التالية يتم توزيع المقررات على تخصصات الكلية: علوم الحاسب (CS) ونظم المعلومات (IS) وتكنولوجيا المعلومات (IT) والوسائط المتعددة (MM) ، كما توضح هذه الجداول ما إذا كانت المقررات إجبارية (R) أم اختيارية (E).

جدول 6. مقررات المواد الإنسانية (المتطلبات العامة)

Code	Course Name	Credit	CS		IS		IT		MM	
			R	E	R	E	R	E	R	E
HU111	English Language I	2	✓		✓		✓		✓	
HU112	English Language II	2		✓		✓		✓		✓
HU121	Social Context of Computing	1	✓		✓		✓		✓	
HU122	Intellectual Property	1		✓		✓		✓		✓
HU131	Organizational Behavior	2		✓		✓		✓		✓
HU132	Interpersonal Communication	2	✓		✓		✓		✓	
HU133	Computing Economics	2		✓		✓		✓		✓
HU141	Computer Law	2		✓		✓		✓		✓
HU142	Privacy and Civil Liberties	1		✓		✓		✓		✓
HU151	Hand Drawing	2		✓		✓		✓		✓
HU152	History of Computing	2		✓		✓		✓		✓
HU153	Islamic Culture	1		✓		✓		✓		✓
HU154	Scientific Thinking	1		✓		✓		✓		✓
HU231	Business Administration	2	✓		✓		✓		✓	
HU232	Technical Writing	2	✓		✓		✓		✓	
HU233	Math communication	1		✓		✓		✓		✓
HU241	Computers and Ethics	1	✓		✓		✓		✓	
Subtotal			10	5	10	5	10	5	10	5
Total			15		15		15		15	

Hand writing course is very important in multimedia department*

مادة (27) متطلبات الكلية

70 ساعة معتمدة (58 ساعة إجباري + 12 ساعة اختياري)

مقررات العلوم الأساسية

في الجدول التالي يتم توزيع مقررات العلوم الأساسية على تخصصات الكلية.

جدول 7. مقررات العلوم الأساسية

Code	Course Name	Credit	CS		IS		IT		MM	
			R	E	R	E	R	E	R	E
MA101	Mathematics I	3	✓		✓		✓		✓	
MA102	Mathematics II	3	✓		✓		✓		✓	
MA201	Mathematics III	3	✓		✓		✓		✓	

MA202	Probability and Statistics	2	✓		✓		✓		✓	
MA301	Numerical Analysis	3		✓		✓		✓		✓
CS201	Discrete Structures	3	✓		✓		✓			✓
CS301	Operation Research	3		✓		✓		✓		✓
CS302	Simulation and Modeling	3		✓		✓		✓	✓	
PH101	Physics I	3	✓		✓		✓		✓	
EE101	Electronics	3	✓		✓		✓		✓	
EE102	Digital logic and design	2	✓		✓		✓		✓	
EE201	Digital Signal Processing	3		✓		✓		✓		✓
		Subtotal	22	6	22	6	22	6	22	6
Total			28		28		28		28	

مقررات الحوسبة الأساسية

في الجدول التالي يتم توزيع مقررات الحوسبة الأساسية على تخصصات الكلية.

جدول 8. مقررات الحوسبة الأساسية

Code	Course Name	Credit	CS		IS		IT		MM	
			R	E	R	E	R	E	R	E
CS101	Introduction to Computer Science	3	✓		✓		✓		✓	
CS141	Programming Fundamentals	3	✓		✓		✓		✓	
CS211	Data Structures and Algorithms	3	✓		✓		✓		✓	
CS241	Object-Oriented Programming	3	✓		✓		✓		✓	
CS322	Operating Systems	3	✓				✓		✓	
CS341	Visual Programming	3		✓		✓		✓		✓
CS351	Computer Graphics	3	✓			✓	✓		✓	
CS361	Artificial Intelligence	3	✓					✓		
CS391	Software Engineering	3	✓		✓		✓		✓	
IS101	Foundations of Information Systems	3		✓	✓			✓		✓
IS212	Databases	3	✓		✓		✓		✓	
IS231	Systems Analysis and Design	3		✓	✓			✓		✓
IT251	Data Communications	3	✓		✓		✓		✓	
IT351	Computer Networks	3	✓		✓		✓		✓	
IT271	Web Programming	3		✓	✓		✓			✓
MM301	Introduction to Multimedia Technology	3		✓		✓		✓	✓	
CS321	Computer Architecture	3	✓		✓		✓		✓	
Subtotal			36	6	36	6	36	6	36	6
Total			42		42		42		42	

مادة (28) متطلبات التخصص

48 ساعة معتمدة (30 ساعة إجباري + 18 ساعة اختياري)

في الجداول التالية يتم توزيع مقررات التخصص لكلٍ من تخصصات الكلية.

جدول 9. مقررات تخصص علوم الحاسب

	Code	Course Name	Credit
Compulsory Courses	CS311	Algorithm Design and Analysis	3
	CS342	Automata and Language Theory	3
	CS352	Image Processing	3
	CS431	Parallel Computation	3
	CS332	Soft-Computing	3
	CS441	Compiler Construction	3
	CS471	Introduction to Computer Security	3
	CS433	Genetic Algorithms	3
	CS331	Neural Networks	3
	CS464	Knowledge Base Systems	3
		Subtotal	**30**
Elective Courses*	CS353	Advanced Computer Graphics	3
	CS421	Advanced Operating Systems	3
	CS441	Compiler Construction	3
	CS442	Programming Language Design	3
	CS451	Computer Animation	3
	CS452	Computer Vision	3
	CS461	Intelligent Systems	3
	CS462	Machine Learning	3
	CS463	Pattern Recognition	3
	CS472	Cryptography	3
	CS491	Software Quality Assurance and Testing	3
	CS464	Advanced Representation and Reasoning	3
	CS465	Reasoning Under Uncertainty	3
	CS466	Computational Biology	3
	CS467	Theory of Computation	3
	IS411	Advanced Database	3
	IS412	Distributed and Object Databases	3
	IS414	Data Mining	3
	IT431	Wireless and Mobile Computing	3
	IT432	Network Programming	3
	MM402	Virtual Reality	3
	CS422	Advanced Computer Architecture	3
	CS423	Embedded Systems	3
	MM441	Speech Processing	3
	CS432	Cloud Computing	3
		Subtotal	**18**
		Total	**48**
* يختار الطالب عدد (6) مقرر اختياري فقط			

جدول 10. مقررات تخصص نظم المعلومات

	Code	Course Name	Credit
Compulsory Courses	IS311	Geographical Information Systems	3
	IS341	Decision Support Systems	3
	IS342	IS Strategy, Management and Acquisition	3
	IS412	Distributed and Object Databases	3
	IT411	Information Assurance and Security	3
	IT441	Enterprise Architecture	3
	IS411	Advanced Database	3
	IS312	Distributed Database systems	3
	IS313	Data Warehousing	3
	IS418	Analysis and Design of Information Systems	3
		Subtotal	**30**
Elective Courses*	IS321	Advanced Project Management	3
	IS413	Web Information Systems	3
	IS414	Data Mining	3
	IS415	Database Administration	3
	IS416	Transaction Processing	3
	IS417	Multimedia Databases	3
	IS441	Quality Assurance of Information Systems	3
	IS442	IS Application Development	3
	IS443	Data Modeling	3
	IS418	Information Storage and retrieval	3
	IS451	Social Information Systems	3
	IS452	Social networks: Technology and Society	3
	IT471	E-commerce technology	3
	MM412	Human Computer Interaction	3
		Subtotal	**18**
		Total	**48**
		* يختار الطالب عدد (6) مقرر اختياري فقط	

جدول 11. مقررات تخصص تكنولوجيا المعلومات

	Code	Course Name	Credit
Compulsory Courses	IT311	Network Security	3
	IT331	Network Management	3
	CS352	Image Processing	3
	IT431	Wireless and Mobile Computing	3
	IT441	Enterprise Architecture	3
	IT451	Network Analysis and Design	3
	MM441	Speech Processing	3
	MM402	Virtual Reality	3
	MM412	Human Computer Interaction	3
	IT432	Network Programming	3
		Subtotal	**30**
	IT433	Network Forensics	3
	IT452	Networked Embedded Systems	3
	IT471	E-commerce technology	3
	IT434	Micro Computer Applications	3
	IT473	Scripting for system administration	3
	IT414	Ethical hacking for system administration	3
	IT455	System Integration	3
	IT456	Virtual Instrumentation	3
	IT447	Advanced programming for IT	3
	CS431	Parallel Computation	3
	CS451	Computer Animation	3
	CS452	Computer Vision	3
	CS461	Intelligent Systems	3
	IS321	Advanced Project Management	3
	IS411	Advanced Database	3
	IS412	Distributed and Object Databases	3
	MM301	Introduction to Multimedia Technology	3
	MM402	Virtual Reality	3
	CS422	Advanced Computer Architecture	3
	CS423	Embedded Systems	3
	CS432	Cloud Computing	3
		Subtotal	**18**
		Total	**48**
* يختار الطالب عدد (6) مقرر اختياري فقط			

جدول 12.مقررات تخصص تصميم الوسائط المتعددة

	Code	Course Name	Credit
Compulsory Courses	MM302	Introduction to Digital Video	3
	MM401	Interactive Multimedia Development	3
	MM423	Game Architecture and Design	3
	MM402	Virtual Reality	3
	CS451	Computer Animation	3
	CS452	Computer Vision	3
	CS352	Image Processing	3
	MM441	Speech Processing	3
	MM422	Principles of 2D Animation	3
	CS352	Game Programming	3
		Subtotal	**30**
Elective Courses*	MM321	3D Modeling and Animation	
	MM411	Scripting and Storyboarding	3
	MM403	Digital Sound	3
	MM412	Human Computer Interaction foundation	3
	MM413	Human Factors and Security	3
	MM414	Designing Interaction	3
	MM415	Programming Interactive Systems	3
	MM421	3D Photography and Geometry Processing	3
	MM422	Principles of 2D Animation	3
	MM423	Game Architecture and Design	**3**
	MM424	Game Modification and development	3
	MM425	Game Development	**3**
	MM426	Foundations of Game Production	**3**
	MM437	Introduction to Robotics	**3**
	MM431	3d user interfaces and augmented reality	**3**
	MM432	Clones, Drones and Cyborgs	**3**
	MM441	Interactive Visualization	3
	CS453	Advanced Computer Graphics	3
	CS353	Pattern Recognition	3
	CS463	Introduction to Computer Security	3
	CS471	Multimedia Databases	3
	IT271	Web Programming	3
	CS432	Cloud Computing	3
		Subtotal	**18**
		Total	**48**
	* يختار الطالب عدد (6) مقرر اختياري فقط		

مادة (29) متطلبات التدريب والتعلم الذاتي

11 ساعة معتمدة اجبارية (الموضوعات تحدد وفقا لمتطلبات كل الأقسام)

جدول13. مقررات المشروعات والتدريب

Code	Course Name	Credit	CS	IS	IT	MM
IS221	Project Management	2	✓	✓	✓	✓
CS381	Software Development and Professional Practice	3	✓	✓	✓	✓
CS481	Capstone Project I	3	✓			
CS482	Capstone Project II	3	✓			
IS451	Capstone Project I	3		✓		
IS452	Capstone Project II	3		✓		
IT461	Capstone Project I	3			✓	
IT462	Capstone Project II	3			✓	
MM431	Capstone Project I	3				✓
MM432	Capstone Project II	3				✓
		Total	11	11	11	11

مادة (30) مستويات ومتطلبات المقررات

مقررات المستوى الأول

مقررات المستوى الأول للطلاب المبتدئين (Freshman) في أي من التخصصات الأربعة: علوم الحاسب ونظم المعلومات وتكنولوجيا المعلومات والوسائط المتعددة يكون كالآتي

جدول 14. مقررات المستوى الأول للطلاب المبتدئين

1st Level Courses									
Code	**Course**	**Credits**	**Prerequisites**	**Type**		**Teaching Hours**			
				R	**E**	**L**	**T**	**P**	
CS101	Introduction to Computer Science	**3**	-	✓		**2**		**3**	
CS141	Programming Fundamentals	**3**	CS101	✓		**2**		**3**	يختار الطالب 8 ساعات من الساعات الاختيارية
MA101	Mathematics I	**3**	–	✓		**2**	**2**		
MA102	Mathematics II	**3**	MA101	✓		**2**	**2**		
PH101	Physics I	**3**	–	✓		**2**		**2**	
EE101	Electronics	**3**	–	✓		**2**		**2**	
EE102	Digital logic and design	**2**	EE101	✓		**2**		**2**	
HU111	English Language I	**2**	–	✓		**2**			
HU112	English Language II	**2**	HU111		✓	**2**			
HU121	Social Context of Computing	**1**	–	✓		**1**			
HU122	Intellectual Property	**1**	–		✓	**1**			
HU132	Interpersonal Communication	**2**	–	✓		**2**			
IS101	Foundations of Information Systems	**3**	CS101		✓	**2**		**2**	
HU133	Computing Economics	**2**	–		✓	**2**			
HU141	Computer Law	**2**	–		✓	**2**			
HU142	Privacy and Civil Liberties	**1**	–		✓	**1**			
HU151	Hand Drawing	**2**	–		✓	**1**		**2**	
HU152	History of Computing	**2**	–		✓	**2**			
HU153	Islamic Culture	**1**	–		✓	**1**			
HU154	Scientific Thinking	**1**	–		✓	**1**			
HU131	Business Administration	**2**	–	✓		**2**			
HU143	Computers and Ethics	1	–	✓		**1**			
Subtotal				28	8				
Total				36					

مقررات المستوى الثانى

مقررات المستوى الثانى للطلاب المستجدين (Sophomore) في أي من التخصصات الأربعة: علوم الحاسب ونظم المعلومات وتكنولوجيا المعلومات و الوسائط التعددة يكون كالآتي

جدول 15.مقررات المستوى الثاني

2nd Level Courses									
Code	**Course**	**Credits**	**Prerequisites**	**Type**		**Teaching Hours**			
				R	**E**	**L**	**T**	**P**	
CS201	Discrete Structures	**3**	MA102	✓		**2**	**2**		يختار الطالب 9 ساعات من الساعات الاختيارية
CS211	Data Structures and Algorithms	**3**	CS241	✓		**2**		**2**	
CS241	Object-Oriented Programming	**3**	CS141	✓		**2**		**3**	
IS212	Databases	**3**	IS101	✓		**2**		**2**	
IS221	Project Management	**2**	CS101	✓		**2**		**2**	
IS231	Systems Analysis and Design	**3**	CS101		✓	**2**	**2**		
IT251	Data Communications	**3**	CS101	✓		**2**	**2**		
IT271	Web Programming	**3**	CS141, IT251	✓		**2**		**3**	
MA201	Mathematics III	**3**	MA102	✓		**2**	**2**		
MA202	Probability and Statistics	**2**	MA102	✓		**2**		**2**	
EE201	Digital Signal Processing	**3**	MA201		✓	**2**		**2**	
HU231	Organizational Behavior	**2**	–		✓	**2**			
HU232	Technical Writing	**2**	HU111	✓		**2**			
HU233	Math communication	1	-		✓	**1**			
Subtotal				27	9				
Total				36					

برنامج علوم الحاسب

جدول 16. مقررات المستوى الثالث لتخصص علوم الحاسب

3rdLevel Courses									
Code	Course	Credits	Prerequisites	Type		Teaching Hours			
				R	E	L	T	P	
CS301	Operation Research	3	CS201		✓	2		2	يختار الطالب 3 ساعات من الساعات الاختيارية
CS302	Simulation and Modeling	3	MA202		✓	2		2	
CS311	Algorithm Design and Analysis	3	CS211	✓		2	2		
CS322	Operating Systems	3	CS321	✓		2		2	
CS342	Automata and Language Theory	3	CS141, CS201	✓		2	2		
CS341	Visual Programming	3	CS211		✓	2		2	
CS351	Computer Graphics	3	CS101, CS201	✓		2		2	
CS352	Image Processing	3	CS211	✓		2		2	
CS353	Advanced Computer Graphics	3	CS351		✓	2		2	
CS361	Artificial Intelligence	3	CS101, CS201	✓		2		2	
CS381	Software Development and Professional Practice	3	CS211, CS391	✓		2		3	
CS391	Software Engineering	3	CS211	✓		2	2		
CS332	Soft-Computing	3	CS201	✓		2	2		
CS331	Neural Networks	3	MA201	✓		2		3	
IT351	Computer Networks	3	IT251, CS321		✓	2		2	
CS321	Computer Architecture	3	CS141, CS201	✓		2		2	
MM301	Introduction to Multimedia Technology	3	CS241		✓	2		2	
MA301	Numerical Analysis	3	MA102		✓	2	2		
Subtotal				33	3				
Total				36					

جدول 17. مقررات المستوى الرابع لتخصص علوم الحاسب

4th Level Courses									
Code	Course	Credits	Prerequisites	Type		Teaching Hours			
				R	E	L	T	P	
CS421	Advanced Operating Systems	3	CS322		✓	2		3	يختار الطالب 12 ساعة من الساعات الاختيارية
CS431	Parallel Computation	3	CS311, CS322	✓		2		2	
CS441	Compiler Construction	3	CS211, CS342	✓		2		3	
CS432	Soft-Computing	3	CS431	✓		2		2	
CS442	Programming Language Design	3	CS211		✓	2		2	
CS451	Computer Animation	3	CS352		✓	2		2	
CS452	Computer Vision	3	CS241		✓	2		2	
CS461	Intelligent Systems	3	CS361		✓	2		2	
CS462	Machine Learning	3	CS361		✓	2		2	
CS463	Pattern Recognition	3	CS361		✓	2		2	
CS464	Advanced Representation and Reasoning	3	CS462,		✓	2		2	
CS465	Reasoning Under Uncertainty	3	CS462, CS464		✓	2		2	
CS466	Computational Biology	3	CS462		✓	2		2	
CS467	Theory of computation	3	CS462		✓	2		2	
CS471	Introduction to Computer Security	3	CS211, IT351	✓		2		2	
CS472	Cryptography	3	CS211, IT351		✓	2		2	
CS481	Capstone Project I	3	IS221	✓		1		4	
CS482	Capstone Project II	3	IS221	✓		1		4	
CS491	Software Quality Assurance and Testing	3	CS391		✓	2		2	
IS411	Advanced Database	3			✓	2		2	
IS412	Distributed and Object Databases	3	IS212		✓	2		2	
IS414	Data Mining	3			✓	2		2	
IT431	Wireless and Mobile Computing	3	IT251		✓	2		2	
IT432	Network Programming	3	IT351		✓	2		2	
MM402	Virtual Reality	3			✓	2		2	
CS433	Genetic Algorithms	3	CS201	✓		2		3	
CS464	Knowledge Base Systems	3	CS361	✓		2		2	
MM441	Speech Processing	3	EE201		✓	2		3	
CS422	Advanced Computer Architecture	3	CS321		✓	2		2	
CS423	Embedded Systems	3	CS321		✓	2		2	
CS432	Cloud Computing	3	CS211		✓	2		2	
CS492	Selected topics in CS (1)	3			✓	2		2	
CS493	Selected topics in CS (2)	3			✓	2		2	
Subtotal				24	12				
Total				36					

برنامج نظم المعلومات

جدول 18 .مقررات المستوى الثالث لتخصص نظم المعلومات

3rd Level Courses									
Code	Course	Credits	Prerequisites	Type		Teaching Hours			
				R	E	L	T	P	
CS301	Operation Research	3	CS201		✓	2		2	يختار الطالب 9 ساعات من الساعات الاختيارية
CS302	Simulation and Modeling	3	MA202		✓	2		2	
CS321	Computer Architecture	3	CS101, CS201	✓		2		2	
CS341	Visual Programming	3	CS211		✓	2		2	
CS351	Computer Graphics	3	CS101, CS201		✓	2		2	
CS381	Software Development and Professional Practice	3	CS211, CS391	✓		2		3	
CS391	Software Engineering	3	CS211	✓		2	2		
IS311	Geographical Information Systems	3	IS101, IS212	✓		2		2	
IS321	Advanced Project Management	3	IS221		✓	2		2	
IS312	Distributed Database system	3	IS212	✓		2		2	
IS313	Data Warehousing	3	IS212	✓		2		2	
IS341	Decision Support Systems	3	IS101	✓		2		2	
IS342	IS Strategy, Management and Acquisition	3	IS101	✓		2		2	
IT351	Computer Networks	3	IT251	✓		2		2	
MM301	Introduction to Multimedia Technology	3	CS241		✓	2		2	
MA301	Numerical Analysis	3	MA102		✓	2	2		
Subtotal				27	9				
Total				36					

جدول .19.مقررات المستوى الرابع لتخصص نظم المعلومات

4th Level Courses									
Code	Course	Credits	Prerequisites	Type		Teaching Hours			
				R	E	L	T	P	
IS411	Advanced Database	3	IS212	✓		2		2	يختار الطالب 21ساعة من الساعات الاختيارية
IS412	Distributed and Object Databases	3	IS212	✓		2		2	
IS413	Web Information Systems	3	IS101, IT271		✓	2		2	
IS414	Data Mining	3	IS101		✓	2		2	
IS415	Database Administration	3	IS212		✓	2		2	
IS416	Transaction Processing	3	IS212		✓	2		2	
IS417	Multimedia Databases	3	IS212, CS241		✓	2		2	
IS441	Quality Assurance of Information Systems	3	IS101		✓	2		2	
IS418	**Analysis and Design of Information Systems**	3	IS101	✓		2		2	
IS442	IS Application Development	3	IS212, IS413		✓	2		2	
IS443	Data Modeling	3	IS101		✓	2		2	
IS418	Information Storage and Retrieval	3	IS101	✓		2		2	
IS451	Social Information Systems	3	IS413		✓	2		2	
IS452	Capstone Project I	3	IS221	✓		1		4	
IS453	Capstone Project II	3	IS221	✓		1		4	
IT411	Information Assurance and Security	3	IT351	✓		2		2	
IT441	Enterprise Architecture	3	IT351	✓		2		2	
IT471	E-commerce technology	3	IT271		✓	2		2	
MM412	Human Computer Interaction	3	CS341		✓	2		2	
IS454	Selected topics in IS (1)	3			✓	2		2	
IS455	Selected topics in IS (2)	3			✓	2		2	
Subtotal				15	21				
Total				36					

برنامج تكنولوجيا المعلومات

جدول 18. مقررات المستوى الثالث لتخصص تكنولوجيا المعلومات

3rd Level Courses									
Code	Course	Credits	Prerequisites	Type		Teaching Hours			
				R	E	L	T	P	
CS301	Operation Research	3	CS201	✓		2		2	يختار الطالب 9 ساعات من الساعات الاختيارية
CS302	Simulation and Modeling	3	MA202		✓	2		2	
CS322	Operating Systems	3	CS321	✓		2		2	
CS341	Visual Programming	3	CS211		✓	2		2	
CS351	Computer Graphics	3	CS101, CS201	✓		2		2	
CS352	Image Processing	3	CS211	✓		2		2	
CS381	Software Development and Professional Practice	3	CS211, CS391	✓		2		2	
CS391	Software Engineering	3	IS231	✓		2		2	
IS321	Advanced Project Management	3	IS221		✓	2		2	
IT311	Network Security	3	IT351	✓		2		2	
IT331	Network Management	3	IT351	✓		2		3	
IT351	Computer Networks	3	IT251, CS321	✓		2		2	
CS361	Artificial Intelligence	3	CS101, CS201		✓	2		2	
MM301	Introduction to Multimedia Technology	3	CS241		✓	2		2	
MA301	Numerical Analysis	3	MA102		✓	2	2		
Subtotal				27	9				
Total				36					

جدول 21. مقررات المستوى الرابع لتخصص تكنولوجيا المعلومات

4th Level Courses									
Code	Course	Credits	Prerequisites	Type		Teaching Hours			
				R	E	L	T	P	
IT431	Wireless and Mobile Computing	3	IT251	✓		2		2	يختار الطالب 12ساعة من الساعات الاختيارية
IT451	Network Analysis and Design	3	IT351, MA202	✓		2		2	
IT432	Network Programming	3	IT351	✓		2		2	
IT441	Enterprise Architecture	3	IT351	✓		2		2	
IT471	E-commerce technology	3	IT271		✓	2		2	
IT433	Network Forensics	3	IT351		✓	2		2	
IT452	Networked Embedded Systems	3	IT351, CS423		✓	2		2	
IT434	Micro computer and applications	3	CS101		✓	2		2	
MM441	Speech Processing	3			✓	2		2	
IT414	Ethical hacking for system administration	3	CS101		✓	2		2	
CS432	Cloud Computing	3	CS211		✓	2		2	
IT455	System integration	3	IT351		✓	2		2	
IT456	Virtual instrumentation	3	IT455		✓	2		2	
IT473	Scripting for system administration	3	IT351		✓	2		2	
IT474	Advanced programming for IT	3	IT351		✓	2		2	
IT461	Capstone Project I	3	IS221	✓		1		4	
IT462	Capstone Project II	3	IS221	✓		1		4	
CS451	Computer Animation	3			✓	2		2	
CS431	Parallel Computation	3			✓	2		2	
CS452	Computer Vision	3	CS241		✓	2		2	
CS461	Intelligent Systems	3	CS361		✓	2		2	
IS411	Advanced Database	3	IS212		✓	2		2	
IS412	Distributed and Object Databases	3	IS212		✓	2		2	
MM402	Virtual Reality	3		✓		2		2	
CS422	Advanced Computer Architecture	3	CS321		✓	2		2	
CS423	Embedded Systems	3	CS321		✓	2		2	
IT401	Selected topics in IT(1)	3			✓	2		2	
IT402	Selected topics in IT (2)	3			✓	2		2	
MM412	Human Computer Interaction	3	CS211	✓		2		2	
Subtotal				24	12				
Total				36					

برنامج تصميم الوسائط المتعددة

جدول 22. مقررات المستوى الثالث لتخصص تصميم الوسائط المتعددة

3rd Level Courses									
Code	**Course**	**Credits**	**Prerequisites**	**Type**		**Teaching Hours**			
				R	**E**	**L**	**T**	**P**	
CS301	Operation Research	**3**	CS201		✓	**2**		**2**	يختار الطالب 3 ساعات من الساعات الاختيارية
CS302	Simulation and Modeling	**3**	MA202		✓	**2**		**2**	
CS322	Operating Systems	**3**	CS321	✓		**2**		**2**	
CS341	Visual Programming	**3**	CS211		✓	**2**		**2**	
CS351	Computer Graphics	**3**	CS101, CS201	✓		**2**		**2**	
CS352	Image Processing	**3**		✓		**2**		**2**	
CS353	Advanced Computer Graphics	**3**	CS352		✓	**2**		**2**	
CS381	Software Development and Professional Practice	**3**	CS211, CS391	✓		**2**		**2**	
CS391	Software Engineering	**3**	CS211	✓		**2**	**2**		
IT351	Computer Networks	**3**	IT251, CS321	✓		**2**		**2**	
MM301	Introduction to Multimedia Technology	**3**	CS241	✓		**2**		**2**	
MM302	Introduction to Digital Video	**3**	CS241, MA202	✓		**2**		**2**	
MM321	3D Modeling and Animation	**3**	CS101	✓		**2**		**3**	
CS352	Game Programming	**2**	CS211	✓		**2**		**2**	
MA301	Numerical Analysis	**3**	MA102	✓		**2**	**2**		
Subtotal				33	3				
Total				36					

جدول 23. مقررات المستوى الرابع لتخصص تصميم الوسائط المتعددة

4th Level Courses									
Code	Course	Credits	Prerequisites	Type		Teaching Hours			
				R	E	L	T	P	
MM401	Interactive Multimedia Development	3	MM301	✓		2		2	يختار الطالب 12ساعة من الساعات الاختيارية
MM411	Scripting and Storyboarding	3	MM301		✓	2		2	
MM402	Virtual Reality	3	CS352	✓		3		2	
MM412	Human Computer Interaction	3	CS341		✓	2		2	
MM421	3D Photography and Geometry Processing	3	MM301		✓	2		2	
MM431	Capstone Project I	3	IS221	✓		1		4	
MM432	Capstone Project II	3	IS221	✓		1		4	
MM422	Principles of 2D Animation	3	MM301	✓		2		2	
MM423	Game Architecture and Design	3	MM321		✓	2		2	
MM424	Game Modification and development	3	MM321		✓	2		2	
MM425	Game Development	3	MM321		✓	2		2	
MM426	Foundations of Game Production	3	MM321		✓	2		2	
CS451	Computer Animation	3	CS352	✓		2		2	
CS452	Computer Vision	3	CS241	✓		2		2	
CS471	Introduction to Computer Security	3	CS211, IT351		✓	2		2	
CS463	Pattern Recognition	3	CS361		✓	2		2	
CS453	Game Programming	3	MM301		✓	2		2	
IS417	Multimedia Databases	3	IS212, CS241		✓	2		2	
MM441	Speech Processing	3		✓		2		2	
CS432	Cloud Computing	3	CS211		✓	2		2	
MM403	Selected topics in MM (1)	3			✓	2		2	
MM404	Selected topics in MM(2)	3			✓	2		2	
Subtotal				24	12				
Total				36					

ملحق (1) المحتوى العلمي للمقررات

مقررات المواد الإنسانية

HU111 **English Language I** **لغة إنجليزية 1**

Credits 2 Hours
Prerequisites –
Contents The material reflects the stylistic variety that advanced earners have to be able to deal with. The course gives practice in specific points of grammar to consolidate and extend learners existing knowledge. Analysis of syntax; comprehension; skimming and scanning exercises develop the learner's skills, comprehension questions interpretation and implication. The activities aim to develop listening, speaking and writing skills through a communicative, functional approach, with suggested topics for discussion and exercises in summary writing and composition.

HU112 **English Language II** **لغة إنجليزية 2**

Credits 2 Hours
Prerequisites HU111
Contents The course aims at enabling the students to further polish and develop their skills in English language through various interactive activities. The need for more articulate written English is reinforced through further in depth study of applied grammar. Again a conversational and situational dialogue based contents are presented to attract students' interest. Pronunciations and comparatively complex grammar are simultaneously introduced. Field related terminology and longer conversations are also presented with emphasis on contrastive grammar and a more articulate pronunciation.

HU121 **Social Context of Computing** **السياق الاجتماعي للحوسبة**

Credits 1 Hour
Prerequisites –
Contents Introduction to the social implications of computing – Social informatics – Social impact of IT on society – Social implications of networked communication – Growth of, control of, and access to the Internet – International issues – Online communities & social implications – Philosophical context – Diversity issues – Gender-related issues – Cultural issues – Accessibility issues – Globalization issues – Economic issues in computing –Digital divide

HU122 **Intellectual Property** **الملكية الفكرية**

Credits 1 Hour
Prerequisites –
Contents Foundations of intellectual property – Ownership of information – Copyrights, patents, trademarks and trade secrets – Software piracy – Software patents – Transnational issues concerning intellectual property – Fair use – Digital Millennium Copyright Act (DMCA) – International differences – Egyptian Intellectual Property law

HU131 **Organizational Behavior** **سلوكيات الهيئات**

Credits 2 Hours

Prerequisites –
Contents Perception, learning, motivation and value; individual differences and work performance; undestanding yourself; motivating yourself and others, working within groups, achieving success through goal setting, achieving high personal productivity and quality; achieving rewarding and satisfying career; communicating with people; leading and influencing others; building relationships with supervisors, co-workers and customers.

HU132 **Interpersonal Communication** **التواصل الشخصي**
Credits 2 Hours
Prerequisites –
Contents Elements of the communication process, barriers to communications, effective writing skills, report writing, and oral presentation skills. Good diction, extempore speaking in the appropriate context will be key skills in this course.

HU133 **Computing Economics** **اقتصاديات الحوسبة**
Credits 2 Hours
Prerequisites –
Contents Monopolies and their economic implications; Effect of skilled labor supply and demand on the quality of computing products; Pricing strategies in the computing domain; cost-benefit analysis and break-even analysis; return on investment; analysis of options; time value of money; management of money: economic analysis, accounting for risk; Differences in access to computing resources and the possible effects thereof.

HU141 **Computer Law** **قوانين الحاسبات**
Credits 2 Hours
Prerequisites –
Contents History and examples of computer crime – "Cracking" ("hacking") and its effects – Viruses,worms, and Trojan horses – Crime prevention strategies– System use policies & monitoring – Risks and liabilities of computer-based systems – Accountability, responsibility, liability.

HU142 **Privacy and Civil Liberties** **الخصوصية والحريات المدنية**
Credits 1 Hour
Prerequisites –
Contents Ethical and legal basis for privacy protection; Privacy implications of computer and information systems; Technological strategies for privacy protection; Freedom of expression in cyberspace; International and intercultural implications.

HU151 **Hand Drawing** **الرسم باليد**
Credits 2 Hours
Prerequisites –

Contents Introduction and proportions - Gestalt theory and gestural drawing - Blind contour drawing - Using light and dark; discovering mass drawing; using negative space as a tool to create atmosphere and shape - Exploring different mediums and paper - Conclusion and final portfolio drawing

HU152 **History of Computing** **تاريخ الحوسبة**

Credits 2 Hours
Prerequisites –
Contents Prehistory—the world before 1946; Implications of: History of computer hardware, software; History of the Internet; Telecommunications ; The IT profession;IT education; Pioneers of computing.

HU153 **Islamic Culture** **الثقافة الإسلامية**

Credits 1 Hours
Prerequisites –
Contents Fundamental elements of the Islamic Culture; Islamic culture concept; Islamic culture resources; Islamic culture importance; Islamic culture relation with other cultures; The faith's impact on society.

HU154 **Scientific Thinking** **التفكير العلمي**

Credits 1 Hour
Prerequisites –
Contents Personal Development Planning − Learning and personal skills development − Transferable skills development, including time and stress management, note taking, essay writing, literature finding, and exam and revision skills − Develops an understanding of the nature of scientific thinking − Scientific methods are introduced and evaluated − Critical and creative thinking skills − The processes of induction and deduction − Empirical reasoning and the evaluation of evidence − Heuristic strategies for critical and creative thinking − A range of motivating examples on sustainability and personal development.

HU231 **Business Administration** **إدارة الأعمال**

Credits 2 Hours
Prerequisites –
Contents Management concepts, level and types of management, planning and organization of work flow, delegation, leadership styles, decision making, stress and time management, and employee relations, decision-making in such areas as investment in operations, productions planning, scheduling and control, reliability and maintenance.

HU232 **Technical Writing** **الكتابة التقنية**

Credits 2 Hours
Prerequisites HU111
Contents General Principles of Good Writing − Design and Usability − Documentation Development Process − Writing Procedures − Aspects of the Language − Obstacles to Readability − Writing Reports − Practices in Technical Writing

HU241 **Computers and Ethics** **الحاسبات والأخلاقيات**

Credits 1 Hour

Prerequisites	–
Contents	Community values and the laws by which we live − The nature of professionalism in computing − Various forms of professional credentialing and the advantages and disadvantages − The role of the professional in public policy − Maintaining awareness of consequences − Ethical dissent and whistle-blowing − Codes of ethics, conduct, and practice (IEEE, ACM, SE, AITP, and so forth) − Dealing with harassment and discrimination − "Acceptable use" policies for computing in the workplace.

مقرراتالعلوم الأساسية

MA101 **Mathematics I** **رياضيات ١**

Credits 3 Hours
Prerequisites –
Contents Pre-calculus review: sets and functions; limits and continuity –Derivatives:techniques of differentiation;derivatives of the basic and fundamental functions;implicit differentiation;linear approximation and differentials;extreme of functions;optimization problems; velocity and acceleration –Integrals: indefinite integrals;change of variables;definite integrals;the fundamental theorem of calculus –Techniques of integration: integration by parts; trigonometric integrals and substitutions; integrals of rational functions – Numerical integration – Applications of definite integrals.

MA101 **Mathematics II** **رياضيات ٢**

Credits 3 Hours
Prerequisites MA101
Contents Partial fractions –Infinite series: sequences, convergent and divergent series, positive-term series, tests of convergence, alternating series and absolute convergence, power series, power series representations of functions, Maclauran and Taylor series – Differential equations: definition, classifications and terminology, techniques of solution of ordinary first–order linear differential equations–Matrices–Linear equations – Vector spaces, inner product spaces – Linear transformations – Eigen-values and eigenvectors.

MA201 **Mathematics III** **رياضيات ٣**

Credits 3 Hours
Prerequisites MA102
Contents Laplace transform – Inverse Transform – Fourier series – complex Fourier series – Fourier integrals – Fourier cosine and sine transforms – Fourier transform – Discrete and fast Fourier transforms – Z-transform –Inverse Z-transform – Discrete-time systems and difference equations – Discrete linear systems – Wavelet transform –Applications.

MA202 **Probability and Statistics** **الاحتمالات والاحصاء**

Credits 2 Hours
Prerequisites MA102
Contents Introduction to probability: Basic concepts; Properties of probability; Conditional probability and independence; Total probability and Bayes' rule; Random variables;Probability distributions.
Introduction to statistical analysis: Sampling and sampling distributions; Point estimation; Methods of moments and maximum likelihood; Interval estimation; Least squared concept; Testing hypotheses; Statistical tests.
Applications: Statistical software packages; Applications of statistics to reliability engineering.

MA301 **Numerical Analysis** **تحليل عددي**

Credits 3 Hours

Prerequisites MA102
Contents Numerical Computing and Computers − Solving Nonlinear Equations − Solving Sets of Equations − Interpolation and Curve Fitting − Approximation of Functions − Finite Differences − Numerical Differentiation and Numerical Integration − Numerical Solution of ODEs − Boundary-Value Problems − Sample applications usingsoftware tools.

CS201 **Discrete Structures** **هياكل متقطعة**
Credits 3 Hours
Prerequisites MA102
Contents Introduction to logic and proofs − Fundamental structures: Functions; relations; sets; cardinality and countability − Boolean algebra − Propositional logic: Logical connectives; truth tables; normal forms; validity − Elementary number theory: Factorability; properties of primes; greatest common divisors and least common multiples; Euclid's algorithm; modular arithmetic; the Chinese Remainder Theorem − Basics of counting: Counting arguments; pigeonhole principle; permutations and combinations; binomial coefficients − Predicate logic: Universal and existential quantification; modus ponens and modus tollens; limitations of predicate logic − Recurrence relations: Basic formulae; elementary solution techniques − Graphs and trees: Fundamental definitions; simple algorithms; traversal strategies; proof techniques; spanning trees; applications.

CS301 **Operation Research** **بحوث عمليات**
Credits 3 Hours
Prerequisites CS201
Contents Linear programming: The Simplex method − Integer programming − Probabilistic modeling − Queuing theory: Petri nets; Markov models and chains − Optimization − Network analysis and routing algorithms − Prediction and estimation: Decision analysis; Forecasting; Risk management; Econometrics and microeconomics; Sensitivity analysis − Dynamic programming − Sample applications − Software tools.

CS302 **Modeling And Simulation** **النمذجة والمحاكاه**
Credits 3 Hours
Prerequisites MA202
Contents Definition of simulation and modeling: Purpose including benefits and limitations − Important application areas: healthcare; economics and finance; classroom of the future; training and education; city and urban simulations; simulation in science and in engineering; games; military simulation − Different kinds of simulations − The simulation process − Model building: use of MAematical formula or equation, graphs, constraints − Methodologies and techniques − Use of time stepping for dynamic systems − Theoretical considerations; Monte Carlo methods, stochastic processes, queuing theory − Technologies in support of simulation and modeling − HUan computer interaction considerations − Assessing and evaluating simulations in a variety of contexts − Software in support of simulation and modeling; packages, languages.

PHY101 **Physics I** **الفيزياء ١**
Credits 3 Hours
Prerequisites −

Contents Mechanics: Physics and measurements;Motion in one dimension;Vectors;Motion in two dimensions;Laws of motion;Circular motion and its applications;Work and energy;Potential energy and conservation of energy;Linear momentum and collision;Rotation of a rigid body;Rolling motion;Law of gravity.
Waves: Oscillatory motion;Wave motion;Sound waves.
Magnetic fields: Definitions and properties; Sources of magnetic fields; electromagnetic waves; The fourMaxwell's equations.

EE101 **Electronics** **الإلكترونيات**

Credits 3 Hours
Prerequisites –
Contents Electrical circuit laws and theorems: Ohm's Kirchhoff's, mesh, nodal, Thevenin's maximum power transfer theorems for both DC and AC circuits , R, L, C elements. Electronic components and circuits diodes − bipolar junction transistors − field-effect transistors and use of transistors in amplifiers. OP-Amp, digital circuits − PHical design of simple gates − flip-flops and memory circuits.

EE102 **Digital logic and design** **تصميم منطقي**

Credits 2 Hours
Prerequisites EE101
Contents This course provides a modern introduction to logic design and the basic building blocks used in digital systems, in particular digital computers. It starts with a discussion of combinational logic: logic gates, minimization techniques, arithmetic circuits, and modern logic devices such as field programmable logic gates. The second part of the course deals with sequential circuits: flip-flops, synthesis of sequential circuits, and case studies, including counters, registers, and random access memories. State machines will then be discussed and illustrated through case studies of more complex systems using programmable logic devices. Different representations including truth table, logic gate, timing diagram, switch representation, and state diagram will be discussed.The course has an accompanying lab component that integrates hands-on experience with modern computer-aided design software including logic simulation, minimization and an introduction of the use of hardware description language (VHDL).

EE201 **Digital Signal Processing** **معالجة الاشارات الرقمية**

Credits 3 Hours
Prerequisites MA201
Contents Digital processing of signals, sampling, difference equations, discrete-time Fourier transforms, discrete and fast Fourier transforms, digital filter design.

مقررات الحوسبة الأساسية

CS101 **Introduction to Computer Science** **مقدمة فى علوم الحاسب**

Credits 3 Hours
Prerequisites –
Contents Introduction: Brief history of computing; the components of a computing system. Machine level representation of data: Bits, bytes, and words; numeric data representation and number bases; signed and twos-complement representations; fundamental operations on bits; representation of nonnumeric data.Digital logic: Switching circuits; gates; memory.Assembly level machine organization: Basic organization of the von Neumann machine; control unit; instruction fetch, decode, and execution; instruction sets and types; assembly/machine language programming; instruction formats.Hardware realizations of algorithms: Data representation; the von Neumann model ofcomputation; the fetch/decode/execute cycle; basic machine organization.Operating systems and virtual machines: Historical evolution of operating systems; responsibilities of an operating system; basic components of an operating system.Computing applications: Word processing; spreadsheets; editors; files and directories.Introduction to net-centric computing: Background and history of networking and the Internet; demonstration and use of networking software including e-mail, telnet, and FTP.

CS141 **Programming Fundamentals** **أساسيات البرمجة**

Credits 3 Hours
Prerequisites IT101
Contents Fundamental programming constructs: Syntax and semantics of a higher-level language; variables, types, expressions, and assignment − Simple I/O − Conditional and iterative control structures − Functions and parameter passing − Structured decomposition − Algorithms and problem-solving: Problem-solving strategies; the role of algorithms in the problem-solving process; implementation strategies for algorithms; debugging strategies; the concept and properties of algorithms − Fundamental data structures − Machine level representation of data − Human-computer interaction: Introduction to design issues − Software development methodology: Fundamental design concepts and principles; structured design; testing and debugging strategies; test-case design; programming environments; testing and debugging tools.

CS211 **Data Structures and Algorithms** **هياكل البيانات والخوارزميات**

Credits 3 Hours
Prerequisites CS241
Contents Review of elementary programming concepts − Fundamental data structures: Stacks; queues; linked lists; hash tables; trees; graphs − Basic algorithmic analysis: big “O,” little “o,” omega, and theta notation − Fundamental computing algorithms: O(N log N) sorting algorithms; hash tables, including collision-avoidance strategies; binary search trees; representations of graphs; depth- and breadth-first traversals − Recursion and divide-and-conquer strategies − Basic algorithmic strategies: Brute-force algorithms; greedy algorithms; divide and

conquer; backtracking − Standard complexity classes.

CS241 **Object-Oriented Programming** **البرمجة الشيئية**

Credits 3 Hours
Prerequisites CS141
Contents Introduction to object-oriented programming − Using an object-oriented language; classes and objects; syntax of class definitions; methods; members − Simple data: variables, types, and expressions; assignment − Control structures: Iteration; conditionals − Message passing: Simple methods; parameter passing – Sub-classing; encapsulation and information hiding; separation of behavior and implementation; class hierarchies; inheritance; polymorphism − Collection classes and iteration protocols − Using APIs: Class libraries; packages for graphics and GUI applications − Object-oriented design: Fundamental design concepts and principles; introduction to design patterns; object-oriented analysis and design; design for reuse .

CS321 **Computer Architecture** **معماريات الحاسب**

Credits 3 Hours
Prerequisites CS141, CS201
Contents Register transfer notation; Physical considerations (gate delays, fan-in, fan-out). Assembly level organization: Basic organization of the von Neumann machine; control unit; instruction fetch, decode, and execution; instruction sets and types (data manipulation, control, I/O); assembly/machine language programming; instruction formats; addressing modes; subroutine call and return mechanisms; I/O and interrupts. Memory systems: Storage systems and their technology; coding, data compression, and data integrity; memory hierarchy; main memory organization and operations; latency, cycle time, bandwidth, and interleaving; cache memories (address mapping, block size, replacement and store policy); virtual memory (page table, TLB); fault handling and reliability. Interfacing and communication: I/O fundamentals: handshaking, buffering, programmed I/O, interrupt-driven I/O; interrupt structures: vectored and prioritized, interrupt acknowledgment; external storage, PHical organization, and drives; buses: bus protocols, arbitration, direct-memory access (DMA); introduction to networks; multimedia support; raid architectures. Functional organization: Implementation of simple datapaths; control unit: hardwired realization vs. microprogrammed realization; instruction pipelining; introduction to instruction-level parallelism (ILP). Multiprocessor and alternative architectures: Introduction to SIMD, MIMD, VLIW, EPIC; systolic architecture; interconnection networks; shared memory systems; cache coherence; memory models and memory consistency. Performance enhancements: RISC architecture; branch prediction; prefetching; scalability. Contemporary architectures: Hand-held devices; embedded systems; trends in processor architecture.

CS322 **Operating Systems** **نظم التشغيل**

Credits 3 Hours
Prerequisites CS321
Contents Overview: Role and purpose of operating systems; history of operating system

development; functionality of a typical operating system; design issues (efficiency, robustness, flexibility, portability, security, compatibility). Basic principles: Structuring methods; abstractions, processes, and resources; device organization; interrupts; user/system state transitions. Concurrency: The idea of concurrent execution; states and state diagrams; implementation structures; dispatching and context switching; interrupt handling in a concurrent environment. Mutual exclusion: Definition of the "mutual exclusion" problem; deadlock detection and prevention; solution strategies; models and mechanisms (semaphores, monitors, condition variables, rendezvous); synchronization; multiprocessor issues. Scheduling: Preemptive and non-preemptive scheduling; scheduling policies; processes and threads; real-time issues. Memory management: Review of PHical memory and memory management hardware; overlays, swapping, and partitions; paging and segmentation; page placement and replacement policies; working sets and thrashing; caching. Device management: Characteristics of serial and parallel devices; abstracting device differences; buffering strategies; direct memory access; recovery from failures. File systems: Fundamental concepts (data, metadata, operations, organization, buffering, sequential vs. non-sequential files); content and structure of directories; file system techniques; memory-mapped files; special-purpose file systems; naming, searching, and access; backup strategies. Security and protection: Overview of system security; policy/mechanism separation; security methods and devices; protection, access, and authentication; models of protection; memory protection; encryption; recovery management.

CS322 **Computer Architecture and Operating Systems** **معماريات الحاسب ونظم التشغيل**

Credits 3 Hours

Prerequisites CS141, CS201

Contents Computer architecture: data representation, digital logic, the internal structure of the CPU, primary and secondary storage, input/output, control unit, and assembly language. Operating systems: processes, inter-process communication, process scheduling, resource allocation, memory management, virtual memory, file systems, and input/output device management.

CS341 **Visual Programming** **البرمجة المرئية**

Credits 3 Hours

Prerequisites CS211

Contents Graphical user interface (GUI), review of concepts, and anatomy of a windows program using different languages. Available developing tools. Keyboard and mouse input, menus creating, adding menus to programs. Dialog boxes: buttons, text, list boxes, grids and spreadsheets. Graphics files and file handling. Multiple documents interfaces and views (MDI). Exception Handling and Debugging. Object Linking and Embedding (OLE).

CS351 **Computer Graphics** **الرسم بالحاسب**

Credits 3 Hours

Prerequisites CS101, CS201

Contents This course introduces techniques for 2D and 3D computer graphics, including simple color models, homogeneous coordinates, affine transformations (scaling, rotation, translation), viewing transformation, clipping, illumination and shading, texture maps, rendering, high level shader language, video display devices, PHical and logical input devices, hierarchy of graphics software, hidden surface removal

methods, Z-buffer and frame buffer, color channels, and using a graphics API.

CS361 **Artificial Intelligence** **الذكاء الاصطناعي**

Credits 3 Hours
Prerequisites CS101, CS201
Contents Fundamental issues in intelligent systems – History of artificial intelligence – Agents: Definition of agents; successful applications and state-of-the-art agent-based systems; software agents, personal assistants, and information access; multi-agent systems – Modeling the world; the role of heuristics – Search and constraint satisfaction – Knowledge representation and reasoning – Advanced search: Genetic algorithms; simulated annealing; local search – Advanced knowledge representation and reasoning – Structured representation; nonmonotonic reasoning; reasoning on action and change – AI planning systems: Definition and examples of planning systems; planning as search; operator-based planning; propositional planning.

CS391 **Software Engineering** **هندسة البرمجيات**

Credits 3 Hours
Prerequisites CS211
Contents Software processes: Software life-cycle and process models; process assessment models; software process metrics. Software requirements and specifications. Software design: Fundamental design concepts and principles; software architecture; structured design; object-oriented analysis and design; component-level design; design for reuse. Software validation: Validation planning; testing fundamentals; unit, integration, validation, and system testing; object-oriented testing; inspections. Software evolution: Software maintenance; characteristics of maintainable software; reengineering; legacy systems; software reuse. Software project management. Component-based computing: Fundamentals; basic techniques; applications; architecture of component-based systems; component-oriented design; event handling; middleware.

IS101 **Foundations of Information Systems** **أساسيات نظم المعلومات**

Credits 3 Hours
Prerequisites CS101
Contents Information systems components. Information systems in organizations: Characteristics of IS professionals, IS career paths, Cost/value information, Quality of information, competitive advantage of information, IS and organizational strategy, Value chains and networks. Globalization. Valuing information systems: Investment evaluation, Multi-criteria analysis, Cost-benefit analysis, Identifying and implementing innovations. E-business: B-to-C, B-to-B, Intranets, Internet, extranets, E-government, Web 2.0 Technologies: e.g., wikis, tags, blogs, netcasts, self-publishing, New forms of collaboration: social networking, virtual teams, viral marketing crowd-sourcing. Security of information systems: Threats to information systems, Technology-based safeguards. Business intelligence: Organizational decision making, functions, and levels, Executive, managerial, and operational levels, Systems to support organizational functions and decision making. Information and knowledge discovery: Reporting systems, Online analytical processing, Data, text, and Web mining, Business analytics. Application systems: Executive, managerial, and operational support systems, Decision support systems.

IS212 **Databases** **قواعد البيانات**

Credits 3 Hours
Prerequisites CS141
Contents Database systems: History and motivation for database systems; components of database systems; DBMS functions; database architecture and data independence. Data modeling: Data modeling; conceptual models; object-oriented model; relational data model. Relational databases: Mapping conceptual schema to a relational schema; entity and referential integrity; relational algebra and relational calculus. Database query languages: Overview of database languages; SQL; query optimization; 4th-generation environments; embedding non-procedural queries in a procedural language; introduction to Object Query Language. Relational database design: Database design; functional dependency; normal forms; multivalued dependency; join dependency; representation theory.

IS231 **Systems Analysis and Design** **تحليل وتصميم النظم**

Credits 3 Hours
Prerequisites CS101
Contents Information requirements: Structuring of IT-based opportunities into projects; Project specification; Project prioritization; Analysis of project feasibility. Operational, Tangible costs and benefits (financial and other measures such as time savings), Intangible costs and benefits such as good will, company image: Technical; Schedule; Cultural (organizational and ethnic). Fundamentals of IS project management in the global context. Using globally distributed communication and collaboration platforms. Analysis and specification of system requirements; Data collection methods; Methods for structuring and communicating requirements; Factors affecting user experience; User interface design; System data requirements; Factors affecting security; Ethical considerations in requirements specification. Different approaches to implementing information systems to support business requirements: Packaged systems; enterprise; systems; Outsourced development; In-house development. Specifying implementation alternatives for a specific system. Methods and impact of implementation alternatives on system requirements specification. Different approaches to systems analysis and design: structured SDLC, unified process/UML, agile methods

IT251 **Data Communications** **تراسل البيانات**

Credits 3 Hours
Prerequisites CS101
Contents Communication models, Data communication, networks, protocol architectures. Data Transmission, Transmission media wired and wireless, transmission impairment. Encoding and modulating baseband, Digital and analog modulation. Flow control and Error control. Multiplexing.

IT351 **Computer Networks** **شبكات الحاسب**

Credits 3 Hours
Prerequisites IT251, CE321or CS322
Contents Standards bodies. Switched vs. packets networking. OSI model. Internet model (TCP/IP). Nodes & links. LAN, WAN. Bandwidth, throughput. Components and architectures. Routing and switching. Communication protocols. Application,

Transport, and network layers protocols.

IT271	**Web Programming**	**البرمجة العنكبوتية**
Credits	3 Hours	
Prerequisites	CS141, IT251	
Contents	The fundamental technologies behind the Web. Concepts of Web Programming both client-side and server-side. HTML and CSS Web page development. Fundamentals of Server side scripting language such PHP. Fundamentals of Client side scripting language such as JavaScript.	

MM301	**Introduction to Multimedia Technology**	**مقدمة في تكنولوجيا الوسائط المتعددة**
Credits	3 Hours	
Prerequisites	CS241	
Contents	Basic knowledge about multimedia and multimedia technology. Basic media such as text, image, animation, graphic, and sound. Current multimedia technology. Roles and uses of multimedia technology in many areas such as education, advertisement, and public relation etc.	

CS311 **Algorithm Design and Analysis** تصميم وتحليل الخوارزميات

Credits 3 Hours
Prerequisites CS211
Contents Review of proof techniques−Basic algorithmic analysis: Asymptotic analysis of upper and average complexity bounds; best, average, and worst case behaviors; big-O, little-o, Ω, and Θ notation; standard complexity classes; empirical measurements of performance; time and space tradeoffs in algorithms; using recurrence relations to analyze recursive algorithms − Algorithmic strategies: branch-and-bound; heuristics; pattern matching and string/text algorithms; numerical approximation− Graph and tree algorithms: Shortest-path algorithms (Dijkstra's and Floyd's algorithms); transitive closure (Floyd's algorithm); minimum spanning tree (Prim's and Kruskal's algorithms); topological sort – Dynamic Programming – Randomized Algorithms – NP-complete problems.

CS342 **Automata and Language Theory** نظرية الآلياتواللغات

Credits 3 Hours
Prerequisites CS141, CS201
Contents Introduction: The purpose of automata theory; relationship of automata and languages; the Chomsky hierarchy. Finite automata: Definition of finite automata and their operation; deterministic and nondeterministic automata and their equivalence; two-way finite automata; minimization of deterministic automata. Regular expressions: Relationship of regular expressions and finite automata; Kleene analysis and synthesis theorems; applications of regular expressions. Properties of regular sets: The Myhill-Nerode theorem; the pumping lemma; closure properties; decision algorithms. Context-free grammars: Equivalence and ambiguity of grammars; languages generated by context-free grammars; simplification of context-free grammars; Chomsky and Greibach normal forms; general strategies for top-down and bottom-up parsing. Properties of context-free languages: The pumping lemma for context free languages; closure properties of context-free languages; decision algorithms. Pushdown automata: Languages accepted by pushdown automata; pushdown automata and context-free languages. Linear-bounded automata: Definition and operation; context-sensitive languages; properties of context-sensitive languages. Turing machines: Definitions and introduction to the mechanics of Turing machine operation; the universal Turing machine; the Church-Turing thesis; variations of Turing machines; languages recognized by Turing machines; computable languages; undecidability; the P = NP question.

CS352 **Image Processing** معاجة الصور

Credits 3 Hours
Prerequisites CS211
Contents Scope and applications of image are processing. Perspective transformations (Modeling picture taking, perspective transformations in homogeneous coordinates and with two reference frames). The spatial frequency domain (The sampling theorem, template matching and the convolution theorem, spatial filtering). Enhancement and restoration, image segmentation. Image representation: (Spatial differentiation and smoothing, template matching, region

analysis, contour following). Descriptive methods in scene analysis. Hardware and software considerations. Applications.

CS353 **Advanced Computer Graphics** **الرسم بالحاسب المتقدم**

Credits 3 Hours
Prerequisites CS351
Contents This course will study advanced topics in computer graphics which includes GPU programming, shader languages, modeling natural phenomena, real-time rendering for games, information visualization, geometric optimization, level-of-detail rendering, bi-directional reflectance distribution functions (BRDFs), environment mapping, bump mapping, subdivision surfaces, higher-order surface modeling.

CS421 **Advanced Operating Systems** **نظم التشغيل المتقدمة**

Credits 3 Hours
Prerequisites CS321
Contents Parallel and distributed operating systems. Load sharing, scheduling, reliability, recovery, memory management. Distributed file systems, distributed agreement, and object- oriented operating systems.

CS431 **Parallel Computation** **الحسابات المتوازية**

Credits 3 Hours
Prerequisites CS311, CS321
Contents Introduction to parallel computing −Models of parallel computers − Data and task parallelism − Shared and Distributed memory parallel machine architecture concepts − Interconnection networks − Basics of threaded parallel computation− Parallel algorithmic design − Languages and libraries for threaded parallel programming − Languages and libraries for distributed memory parallel programming − Co-processor techniques including GPU and FPGA − Experimental techniques −Measuring performance and computing speed-up.

CS432 **Soft Computation**

Credits 3 Hours
Prerequisites CS431
Contents Biological and artificial neurons, perception and multilayer perception. ANN models and learning
algorithms. Fuzzy sets, and fuzzy logic. Basic fuzzy mathematics. Fuzzy operators. Fuzzy systems: Fuzzifier, knowledge base, inference engine, and various inference mechanisms such as composition, and Defuzzifier.

CS441 **Compiler Construction** بناء المترجمات

Credits 3 Hours
Prerequisites CS211, CS341, CE321
Contents Compiler Functions, Language Elements − BNF Grammars, Regular Expressions, Finite State Machines, Lexical Analyzers − Context Free Grammars, Grammar Ambiguity, Parse Trees, Push Down Automata − Parsing Methods; Top-Down, Recursive Descent, LL, LR − Symbol Table Construction, Type Checking − Code Generation − Handling Recursion and Arrays − Code Optimization Techniques.

CS433 **Genetic Algorithms** الخوارزميات الجينية
Credits 3 Hours
Prerequisites CS201
Contents Evolutionary programming, basic genetic algorithms, populations, fitness evaluation, objective functions, cross-over, mutation, strategies for replacement, schema theory, game playing: prisoners dilemma, gray code, floating point representation, integer representation, non-uniform mutation.

CS331 **Neural Networks** الشبكات العصبية
Credits 3 Hours
Prerequisites CS201
Contents Neural network concepts: Basic definition, connections, processing elements. Feed-forward neural networks (non-recurrent neural networks). Associative memories. Recurrent neural networks. Dynamic neural networks.

CS464 **Knowledge-Based Systems** نظم قواعد المعرفة
Credits 3 Hours
Prerequisites CS361
Contents Introduction to Knowledge-based Systems. Knowledge representation principles and techniques. Knowledge acquisition and construction, practical problem solving, uncertainty in knowledge. Knowledge-based systems development methodologies and tools.

CS442 **Programming Language Design** تصميم لغات البرمجة
Credits 3 Hours
Prerequisites CS211, CE321
Contents Fundamental issues in language design: General principles of language design; design goals; typing regimes; data structure models; control structure models; abstraction mechanisms. Overview of programming paradigms: Procedural paradigm; object-oriented paradigm; functional paradigm; logic paradigm. Type systems: Data types; type-checking models; semantic models of user-defined types; parametric polymorphism; subtype polymorphism; type-checking algorithms. Models of execution control: Order of evaluation of subexpressions; exceptions and exception handling; parallel composition; functions with delayed evaluation; runtime systems. Declaration, modularity, and storage management: Declaration

models; parameterization mechanisms; type parameterization; mechanisms for sharing and restricting visibility of declarations; garbage collection. Programming language semantics: Informal semantics; overview of formal semantics; denotational semantics; axiomatic semantics; operational semantics. Language-based constructs for parallelism: Communication primitives for tasking models with explicit communication; communication primitives for tasking models with shared memory; programming primitives for data-parallel models; comparison of language features for parallel and distributed programming; optimistic concurrency control vs. locking and transactions; coordination languages; asynchronous remote procedure calls; other approaches.

CS451 **Computer Animation** **الحركة بالحاسب**

Credits 3 Hours
Prerequisites –
Contents Basics of key-frame animation, camera animation, forward and inverse kinematics, particle systems, rigid body simulation, flocking, autonomous behavior, modeling natural phenomena such as water and gases, animation of articulated structures, facial animation, clothes, scripting system, morphing, motion capture, and deformation.

CS452 **Computer Vision** **الرؤية بالحاسب**

Credits 3 Hours
Prerequisites CS241, PH102
Contents An introduction to the concepts and applications in computer vision. Topics include: cameras and projection models, low-level image processing methods such as filtering and edge detection; mid-level vision topics such as segmentation and clustering; shape reconstruction from stereo, as well as high-level vision tasks such as object recognition, scene recognition, face detection and human motion categorization. Applications such as scene reconstruction and tracking.

CS453 **Game Programming** **برمجة الألعاب**

Credits 3 Hours
Prerequisites MM301
Contents This course describes the techniques and programming tricks used to build efficient game engines that support landscape visualization, complex scenes, lighting, shadows, motion control, collision, dynamics, image based rendering, and multi-player.

CS461 **Intelligent Systems** **النظم الذكية**

Credits 3 Hours
Prerequisites CS361
Contents Application Areas of Intelligent Systems – Intelligent System Architecture – Knowledge Engineering and Control –Languages Used in Expert Systems – Bayesian Interference – Fuzzy Logic – Decision Support Systems –Software toolsfor developing expert systems –Software tool for developing intelligent systems). Robotics: Overview; configuration space; planning; sensing; robot programming; navigation and control.

CS462 **Machine Learning** **تعلم الآلة**

Credits 3 Hours
Prerequisites CS361
Contents Introduction to machine learning – Definition and examples of machine learning – Supervised learning (of classification and regression functions); K-nearest neighbors, decision trees, naïve Bayes, support vector machines, logistic regression, evolutionary algorithms, Bayesian Networks, hidden Markov model, neural networks, boosting – Unsupervised learning and clustering K-means, hierarchical clustering (agglomerative and divisive), principal component analysis, independent component analysis, Expectation Maximization algorithm – Reinforcement learning – Kernel methods – Sparse kernel machines – Mixture models and the EM algorithm – Combining multiple learners.

CS463 **Pattern Recognition** **التعرف بالنماذج**

Credits 3 Hours
Prerequisites CS361
Contents Introduction − Statistical Decision Theory − Statistical Decision Theory continued − Parameter Estimation − Parameter Estimation continued − Introduction to Principal Component Analysis and Linear Discriminant Analysis − Face Recognition − Non-parametric Techniques − Decision Trees − Neural Networks − Classifier Combination − Feature Selection − Unsupervised Learning, Clustering, and Multidimensional Scaling − Semi-supervised learning.

CS471 **Introduction to Computer Security** **مقدمة أمن الحاسب**

Credits 3 Hours
Prerequisites CS211, IT351
Contents Security Goals, Fundamentals (confidentiality, integrity, availability, etc.). Introduction to risk assessment and management. Security standards in government and industry. Computer system protection principles (UNIX and Windows). Access controls, including MAC, DAC, and role-based. Cryptography fundamentals. Authentication, passwords, introduction to protocols, Kerberos. Security operations. Attacks: software attacks, malicious code, buffer overflows, social engineering, injection attacks, and related defense tools. Network attacks: Denial of service, flooding, sniffing and traffic redirection, defense tools and strategies. Attacking web sites: cross-site scripting. IPSec, Virtual Private networks and Network Address Translation. Ethics, SP issues that are related. Introduction to Forensics.

CS472 **Cryptography** **التشفير**

Credits 3 Hours
Prerequisites CS211, IT351
Contents Introduction − Secret-Sharing − Defining Encryption − Symmetric-Key Encryption − Public-Key Encryption − Hash functions, Digital Signatures − Key Exchange − Secure Communication Protocols − Homomorphic Encryption − Private Information Retrieval − Attribute-based Cryptography − Pairing-based Cryptography − Formal Methods in Cryptography − Private Set Intersection − Signatures.

CS491 **Software Quality Assurance and Testing** **ضمان جودة البرمجيات واختبارها**

Credits 3 Hours

Prerequisites CS391
Contents Quality: how to assure it and verify it, and the need for a culture of quality– Avoidance of errors and other quality problems– Inspections and reviews– Testing, verification and validation techniques– Process assurance vs. Product assurance– Quality process standards– Product and process assurance– Problem analysis and reporting– Statistical approaches to quality control.

CS464 **Advanced Representation and Reasoning** **التمثيل المتقدم والمنطق**
Credits 3 Hours
Prerequisites **CS462**
Contents Knowledge representation issues o Description logics o Ontology engineering • Non-monotonic reasoning (e.g., non-classical logics, default reasoning) • Argumentation • Reasoning about action and change (e.g., situation and event calculus) • Temporal and spatial reasoning • Rule-based Expert Systems • Semantic networks • Model-based and Case-based reasoning • Planning: o Partial and totally ordered planning o Plan graphs o Hierarchical planning o Planning and execution including conditional planning and continuous planning o Mobile agent/Multi-agent planning

CS465 **Reasoning Under Uncertainty** **المنطق في ظل عدم اليقين**
Credits 3 Hours
Prerequisites **CS462, CS464**
Contents Review of basic probability (cross-reference DS/Discrete Probability) .Random variables and probability distributions o Axioms of probability o Probabilistic inference o Bayes' Rule . Conditional Independence . Knowledge representations o Bayesian Networks . Exact inference and its complexity . Randomized sampling (Monte Carlo) methods (e.g. Gibbs sampling) o Markov Networks o Relational probability models o Hidden Markov Models . Decision Theory of Preferences and utility functions of Maximizing expected utility

CS467 **Theory of Computation** **نظرية الحسابات**
Credits 3 Hours
Prerequisites **CS462, CS464**
Contents This course provides an overview of Computational Biology. Topics covered include database searching, DNA sequence alignment, phylogeny reconstruction, protein structure prediction, microarray analysis, and genome assembly using techniques such as string matching, dynamic programming, suffix trees, hidden Markov models, and expectation-maximization. Format: lecture/laboratory

CS466 **Computational biology** **الحسابات البيلوجية**
Credits 3 Hours
Prerequisites **CS462**
Contents This course focuses on the algorithmic and machine learning foundations of computational biology, combining theory with practice. We study the principles of algorithm design for biological datasets, and analyze influential problems and techniques. We use these to analyze real datasets from large-scale studies in genomics and proteomics. The topics covered include:(1) Genomes: biological sequence analysis, hidden Markov models, gene

finding, RNA folding, sequence alignment, genome assembly (2) Networks: gene expression analysis, regulatory motifs, graph algorithms, scale-free networks, network motifs, network evolution and (3) Evolution: comparative genomics, phylogenetics, genome duplication, genome rearrangements, evolutionary theory, rapid evolution

IS321 **Advanced Project Management** **إدارة المشروعات المتقدمة**

Credits 3 Hours
Prerequisites IS221
Contents Managing Project Quality. Managing Project Risk. Managing Project Procurement: Alternatives to systems development; External acquisition; Outsourcing-domestic and offshore; Steps in the procurement process; Managing the procurement process. Project Execution, Control & Closure: Managing project execution; Monitoring progress and managing change; Managing Project Control & Closure; Cost control; Change control; Administrative closure; Personnel closure; Contractual closure; Project auditing.

IS341 **Decision Support Systems** **نظم دعم اتخاذ القرار**

Credits 3 Hours
Prerequisites IS101
Contents Basic concepts of DSS and their architectures and different components. Characteristics, structures, and uses of DSS in different fields. DSS models. Institutional and ad hoc DSS. DSS operating and evolving. Application of decision support systems in different disciplines. Hardware and software selections of DSS.

IS342 **IS Strategy, Management and Acquisition** **استراتيجية وإدارة واكتساب نظم المعلومات**

Credits 3 Hours
Prerequisites IS101
Contents The Strategic Role of Information Systems; Information Systems and Organizations; Information Management, and Decision Making; Ethical and Social Impact of Information Systems; Information Systems Software; Managing Data Resources: Telecommunications, Enterprise-Wide Computing and Networking; Redesigning the Organization with Information Systems; Ensuring Quality with Information Systems; Systems Success and Failure: Implementation, Information and Knowledge Work Systems; Enhancing Management Decision Making; Controlling Information Systems; Managing International Information Systems.

IS411 **Advanced Database** **قواعد البيانات المتقدمة**

Credits 3 Hours
Prerequisites IS212
Contents Data and database administration: Transaction processing; Using a database management system from an application development environment; Use of database management systems in an enterprise system context; Data / information architecture; Data security management. Basic data security principles. Data security implementation: Data quality management. Data quality audits. Data quality improvement: Business intelligence. On-line analytic processing. Data warehousing.

IS412 **Distributed and Object Databases** **قواعد البيانات الموزعة والشيئية**

Credits 3 Hours
Prerequisites IS212
Contents Levels of distribution transparency. Distributed database design, mapping users' transactions to distributed level. Optimization of accesses strategies. The management of distributed transactions. Distributed concurrence control, recovery in distributed database. Distributed database administration. Commercial systems. The SDD 1 system. Object-databases.

IS413 **Web Information Systems** **نظم المعلومات الشبكية**

Credits 3 Hours
Prerequisites IS101, IT271
Contents Expertise and skills in web technologies. Professional web publishing and web-application development. Server side and client side scripting languages. Using the web technology to manage and maintain information systems. Concepts of the distributed database and developing its web interface. Web master administration.

IS414 **Data Mining** **استخلاص البيانات**

Credits 3 Hours
Prerequisites IS101
Contents Main concepts and algorithms to data mining. Data warehouses/data marts. Online analytic processing. Data, text, web mining. Applied studies on problems in financial engineering, e-commerce, geo-sciences, bioinformatics and elsewhere. Reporting systems; Business analytics;Organizational decision making, functions, and levels: Executive, managerial, and operational levels; Systems to support organizational functions and decision making. Information visualization: Visual analytics; Dashboards.

IS415 **Database Administration** **إدارة قواعد البيانات**

Credits 3 Hours
Prerequisites IS212
Contents Different DBA job roles (VP of DBA, developer DBA, production DBA). The changing job role of the DBA. Environment management (network, CPU, disk and RAM). Instance management (managing SGA regions). DBMS table and index management. Instance Architecture. The three security methods (VPD, Grant security/role-based security, grant execute). Creating New Database Users. Auditing User activity. Identifying System and Object Privileges. Granting and Revoking Privileges. Creating and Modifying Roles. Displaying user security Information from the Data Dictionary. Object management. Database maintenance.

IS416 **Transaction Processing** **معالجة المعاملات**

Credits 3 Hours
Prerequisites IS212
Contents Overview of transaction processing systems and their implementation for applications such as airline reservations, banking, and inventory control. Evolution and history of transaction processing systems. Fault tolerance, processing monitors and their implementation. Lock managers, recovery managers, file management and access paths, and disaster recovery and data replication. Understanding replication including single-master and multi-master replication.

IS417 **Multimedia Databases** **قواعد بيانات الوسائط المتعددة**

Credits 3 Hours
Prerequisites IS212, CS241
Contents Types of multimedia information; multimedia database applications; characteristics of multimedia objects; components of a multimedia database management system; Multimedia storage and retrieval; Multimedia object storage; file retrieval structures; disk scheduling and server admission; Multimedia information modeling; Metadata for multimedia; multimedia data access; Object-oriented models temporal models, spatial models and multimedia authoring; Querying multimedia databases; Query processing and query languages; multimedia database architecture.

IS441 **Quality Assurance of Information Systems** **ضمان جودة نظم المعلومات**

Credits 3 Hours
Prerequisites IS101
Contents Quality Assurance in designing information systems. Data quality in information systems. Quality Assurance in Designing the Supply Chain Network. Supply Chain Performance, Metrics, and Quality Attributes. Optimization and Uncertainty of Supply Chain Network. Demand Uncertainty: Forecasting. Managing Uncertainty in the Supply Chain (Safety Inventory). Decision-Support Systems for Supply Chain.

IS442 **IS Application Development** **تطوير تطبيقات نظم المعلومات**

Credits 3 Hours
Prerequisites IS212, IS413
Contents Database access. Development approaches: Object-oriented; Procedural; Declarative; Rapid application; Structured. Application integration. Prototyping. Development of various applications in information systems.

IS443 **Data Modeling** **نمذجة البيانات**

Credits 3 Hours
Prerequisites **IS212, IS413**
Contents Data modeling • Conceptual models (e.g., entity-relationship, UML diagrams) • Spreadsheet models • Relational data models • Object-oriented models (cross-reference PL/Object-Oriented Programming) • Semi-structured data model (expressed using DTD or XML Schema, for example)

IS418 **Information Storage and Retrieval** **تخزين واسترجاع المعلومات**

Credits 3 Hours
Prerequisites **IS212, IS413**
Contents Documents, electronic publishing, markup, and markup languages • Tries, inverted files, PAT trees, signature files, indexing • Morphological analysis, stemming, phrases, stop lists • Term frequency distributions, uncertainty, fuzziness, weighting • Vector space, probabilistic, logical, and advanced models • Information needs, relevance, evaluation, effectiveness • Thesauri, ontologies, classification and categorization, metadata • Bibliographic information, bibliometrics, citations • Routing and (community) filtering •

Multimedia search, information seeking behavior, user modeling, feedback • Information summarization and visualization • Faceted search (e.g., using citations, keywords, classification schemes) • Digital libraries • Digitization, storage, interchange, digital objects, composites, and packages • Metadata and cataloging • Naming, repositories, archives • Archiving and preservation, integrity. Spaces (conceptual, geographical, 2/3D, VR) .Architectures (agents, buses, wrappers/mediators), interoperability . Services (searching, linking, browsing, and so forth) . Intellectual property rights management, privacy, and protection (watermarking)

IS418 Analysis and Design of Information Systems

تحليل وتصميم نظم المعلومات

This module aims at enabling the students to understand the range of life cycle approaches, methodologies, tools and techniques available for the design of various aspects of information systems. This module builds on the module Information Systems Analysis and Design I, which would be assumed to have given the students systems analysis skills using at least one systems analysis methodology and related tools and techniques. The course content includes the architectural design (including the identification of architectural alternatives and evaluating them), software and information systems design & application architecture design; the design of IS interfaces.

IS451 **Social Information Systems** **نظم المعلومات الاجتماعية**

Credits 3 Hours
Prerequisites IS413
Contents Identifying the major social and technical elements of an online community, drawing on relevant social science theories. Analysis of online communities' technology and social support needed to make these social interactions successful. Understanding specific social network design choices and their implications on the community. Guiding an on-line community through the startup phase and the selection and configuration of new social and technical features and activities. Current research in analysis and security of social networks.

IS451 **Social networks: Technology and Society** **الشبكات الاجتماعية: التقنية والاجتماعية**

Credits 3 Hours
Prerequisites IS451
Contents The proliferation of social media – social networking websites, blogging and microblogging, and other forms of online interaction and content generation – has introduced a powerful tool for people to communicate and share information. This course will introduce methods for analyzing and understanding how people use these technologies and their societal implications. The course will introduce students to the science and social science of network analysis. Through real world examples, including analysis of their own social networks, students will develop skills for describing and understanding the patterns and usage of services like Facebook, Twitter, YouTube, and others. Students will read classic and cutting edge articles and books about these topics and discuss their applicability to this new social media. The class will culminate with a capstone project in which students will apply the analysis methods they have learned to understanding a particular question about social networks and social media.

IT311 **Network Security** **أمن الشبكات**

Credits 3 Hours
Prerequisites IT351
Contents Fundamentals of cryptography. Applications of cryptography to networks. Secret-key algorithms; Public-key algorithms; Authentication protocols; Digital Signatures; VPN applications. Network security protocols, Network attack scenarios (DOS, Intrusion, Repudiation, Malicious SW…etc). Firewalls. Intrusion detection. Wired, wireless and mobile network security.

IT 412 Real time systems **نظم الزمن الحقيقي**

Introduction to real time systems ; Typical real time applications ; Hard versus soft real time systems ; A reference model of real time systems ; Commonly used approaches to hard real time scheduling ; Clock-driven scheduling ; Priority-driven scheduling of periodic tasks ; Scheduling periodic and Sporadic tasks ; Resources and resource access control ; Multiprocessor scheduling and resource access control ; Scheduling flexible computations and tasks with temporal distance constraints ; Real time communications ; Real time operating system ; Real time programming languages.

IT331 **Network Management** **إدارة الشبكات**

Credits 3 Hours
Prerequisites IT351
Contents Management models FCAPS & OAMP. Management layers, Manager/agents, MIB, OID, management communication patterns, polling, event based management. Management protocols SNMP, netflow, netconfig. CLI, Management metrics, SLA. Labs experiment.

IT411 **Information Assurance and Security** **ضمان المعلومات وحمايتها**

Credits 3 Hours
Prerequisites IT351
Contents Threats to information systems. Technology-based safeguards. Human-based safeguards. Information systems security planning and management. Identification and authentication, authorization rules. Different encryption and decryption techniques, different types of ciphers, characteristics of good ciphers, crypt analysis, public–key system, single–key system and data encryption standards. Computer virus protection, privacy and data protection, designing of secure system, models of security, database security, reliability and integrity, sensitive data.

IT431 **Wireless and Mobile Computing** **الحوسبة اللاسكية والمحمولة**

Credits 3 Hours
Prerequisites IT251
Contents Overview of the history, evolution, and compatibility of wireless standards. The special problems of wireless and mobile computing. Wireless local area networks and satellite-based networks. Mobile Internet protocol. Mobile aware adaptation.

Extending the client-server model to accommodate mobility. Mobile data access: server data dissemination and client cache management. The software packages to support mobile and wireless computing. The role of middleware and support tools. Performance issues. Emerging technologies.

IT432 **Network Programming** **برمجة الشبكات**

Credits 3 Hours
Prerequisites IT351
Contents Programming aspects of computer networks. Computer networks and communication protocols, socket programming, inter-process communication, and development of network software.

IT433 **Network Forensics** **الأدلة الشرعية في الشبكات**

Credits 3 Hours
Prerequisites IT351
Contents Fundamentals of computer and network forensics, forensic duplication and analysis, network surveillance, intrusion detection and response, incident response, anonymity and pseudonymity, cyber law, computer security policies and guidelines, court report writing and presentation, and case studies.

IT441 **Enterprise Architecture** **المعمارية التكنولوجيةللشركات**

Credits 3 Hours
Prerequisites IT351
Contents Design, selection, implementation and management of enterprise IT solutions. Applications and infrastructure and their fit with the business. Frameworks and strategies for infrastructure management, system administration, data/information architecture, content management, distributed computing, middleware, legacy system integration, system consolidation, software selection, total cost of ownership calculation, IT investment analysis, and emerging technologies. Managing risk and security within audit and compliance standards.

IT451 **Network Analysis and Design** **تحليل وتصميم الشبكات**

Credits 3 Hours
Prerequisites IT351, MA202
Contents Introduction to the design and performance analysis of local computer networks. Emphasis is on performance analysis of representative multi-access procedures.

IT452 **Networked Embedded Systems** **الأنظمة المدمجة الشبكية**

Credits 3 Hours
Prerequisites IT351, CE422
Contents Why networked embedded systems. Example networked embedded systems: automobiles, factory automation systems. The OSI reference model. Types of network fabrics. Network performance analysis. Basic principles of the Internet protocol. Internet-enabled embedded systems.

IT471 **E-commerce technology** **تقنيات التجارة الإلكترونية**

Credits 3 Hours
Prerequisites IT271

Contents An overview of the technologies relevant to electronic commerce. Communications and networking, web authoring tools, system security, databases and archiving, EDI, transaction processing, and factory/warehouse data networks. Provides competency to appraise tools such as HTTP servers, secure transaction software and firewalls, low and high-end database systems, heterogeneous networks, NNTP Servers, client software, procurement systems, and intelligent agents. Covers e-commerce models including agent-based and Java-based, electronic contracts and the electronic exchange of technical data, electronic cash systems and user security.

IT434 **Microcomputer Applications** **تطبيقات الحاسبات الصغيرة**

Credits 3 Hours
Prerequisites CS101
Contents This course provides hands-on experience with several software applications. Topics include intermediate and advanced word processing; spreadsheet design, formulas, and charts; database design principles and implementation; presentation design and techniques; and integration among these applications. Students will be required to apply each package on a semester project related to their major.

IT473 **Scripting for System Administration** **البرمجة لنظام الإدارة**

Credits 3 Hours
Prerequisites IT351, CS101
Contents This course will introduce task automation using shell scripting in a multi-OS environment using the Shell and the Perl programming languages. Topics covered will include scripting commands, control structures, functions, scalar data and lists, regular expressions, hashing, automating administration functions and debugging. Lessons will be enhanced through the use of hands-on exercises to strengthen comprehension.

IT414 **Ethical Hacking for SystemAdministrators** **اخلاقيات الاختراق للنظم الادارية**
Credits 3 Hours
Prerequisites IT351, CS101
Contents This course will explore the various means that an intruder has available to gain access to computer resources. Traditional security analysis often falls short due to the rapidly evolving threats that exist. The course was developed to teach how system and network vulnerabilities are found and exploited and what steps can be taken to mitigate the risk

IT455 **Systems Integration** **تكامل الانظمة**
Credits 3 Hours
Prerequisites IT271, CS101
Contents The course will introduce the major design, implementation & distributed deployment issues regarding system integration, Network Operating Systems (NOS), cross platform database integration, e-commerce and e-business applications implementation, cross-servers & multiple locations e-sessions migration and the related communications security.

IT456 **Virtual Instrumentation** **الأجهزة الظاهري التخيلية**
Credits 3 Hours

Prerequisites IT351, CS101
Contents An overview of the technologies relevant to electronic commerce. Communications and networking, web authoring tools, system security, databases and archiving, EDI, transaction processing, and factory/warehouse data networks. Provides competency to appraise tools such as HTTP servers, secure transaction software and firewalls, low and high-end database systems, heterogeneous networks, NNTP Servers, client software, procurement systems, and intelligent agents. Covers e-commerce models including agent-based and Java-based, electronic contracts and the electronic exchange of technical data, electronic cash systems and user security.

IT447 **Advanced Programming for Information Technology** البرمجة المتقدمة لتكنولوجيا المعلومات
Credits 3 Hours
Prerequisites IT351, CS101
Contents Problem solving techniques and program design knowledge are expanded with an eye toward IT-related applications. Various kinds of data structures are introduced, including classic containers such as lists, stacks, queues, and trees. Sorting and searching techniques are examined. The fundamentals of client/server programming and the use of sockets are covered. Recursion and its various applications are studied. The built-in class library features of an object-oriented programming language are exploited throughout.

Cloud Computing **الحوسبة السحابية**
CS332
Credits 3 Hours
Prerequisites CS211
Contents Cloud Computing is a large-scale distributed computing paradigm which has become a driving force for information technology over the past several years. The exponential growth data size in scientific instrumentation/simulation and social media has triggered the wider use of cloud computing services. This course covers topics and technologies related to Cloud Computing. We will explore solutions and learn design principles for building large network-based systems to support both compute and data intensive computing across geographically distributed infrastructure. Topics include resource management, programming models, application models, system characterisations, and implementations. You will also get an insight into deployed Cloud Computing systems, such as Amazon EC2 and S3, Microsoft Azure, Google AppEngine, Google's MapReduce, Yahoo's Hadoop, and many other systems.

MM302 **Introduction to Digital Video** **مقدمة في الفيديو الرقمي**
Credits 3 Hours
Prerequisites CS241, MA202
Contents This course introduces principles and current technologies of digital video. Topics include video compression, digital video formats, and video and audio standards such as JPEG, MPEG, and H.26x. This course introduces the basic concepts of

digital video editing operations such as import video and audio media, layout video and audio media, edit media, insert transitions and digital effects, export final products to different digital video formats. This course also discusses image and video manipulation tools.

MM321 **3D Modeling and Animation** **النمذجة والحركة ثلاثية الأبعاد**

Credits 3 Hours
Prerequisites CS101
Contents This course addresses how 3D modeling and animation software packages such as 3D Studio MAX, Maya and Mudbox software are used in various industries. Focus is on developing the basic skills required to navigate the program's various modules. The student explores computer generated modeling concepts, such as parametric and primitives, spline, sub-object, and mesh. The course also covers basic lofting techniques, Boolean Operations, and camera and lighting concepts and techniques, material mapping and placement, and rendering concepts and techniques. In addition, this course introduces animation and visual effects principles, timing and spacing, mass and weight, overlapping action, anticipation, follow-through, secondary animation, forward and inverse kinematics, character animation, facial animation principles, concepts of rigging, hair, and cloth. The course covers many visual effects such as snow, smoke, fire, sparks and plasma. The course also covers a large range of particles systems such as the standard Particle Flow, AfterBurn, FumeFx, and Cebas's Thinking Particles.

MM401 **Interactive Multimedia Development** **تطوير الوسائط المتعددة التفاعلية**

Credits 3 Hours
Prerequisites MM301
Contents Students learn and practice the principles of interactive multimedia authoring using software such as Flash as a development tool. Emphasis is placed on good planning and production practices, and on effective user interface design.

MM411 **Scripting and Storyboarding**

Credits 3 Hours
Prerequisites MM301
Contents This course will introduce students to the concepts and practices of developing and actualizing scripts and storyboards for projects in many media. The use of scripts, storyboards and animation for different purposes and outcomes will also be examined and applied. Emphasis is placed on telling a story in terms of action, storytelling with images, and an examination of narrative, documentary, and experimental approaches. In addition to analyzing the works of others, students will also produce their own projects thus, putting theory into practice.

MM403 **Digital Sound** **الصوت الرقمي**

Credits 3 Hours
Prerequisites MM301
Contents This course is an introduction to sound editing and sound design. The course examines the place of sound in cinema, both artistic and technological. The course

will cover the basics of sound, microphones, and analogue-to-digital conversion. Film clips will be used to illustrate the language of film sound, as practiced by film directors, sound designers, and editors. Students will learn to edit sound assignments with Pro Tools and current technologies.

MM402 **Virtual Reality** **الواقع الافتراضي**

Credits 3 Hours
Prerequisites CS352
Contents Stereoscopic display; Force feedback simulation, haptic devices; Viewer tracking; Collision detection; Visibility computation; Time-critical rendering, multiple levels of details (LOD); Image-base VR system; Distributed VR, collaboration over computer network; Interactive modeling; User interface issues; Applications in medicine, simulation, and training.

MM421 **3D Photography and Geometry Processing** **التصوير ثلاثي الأبعاد والمعالجة الهندسية**

Credits 3 Hours
Prerequisites MM301
Contents Computational Photography describes the convergence of computer graphics, computer vision, and the Internet with photography. Its goal is to overcome the limitations of traditional photography using computational techniques to enhance the way we capture, manipulate, and interact with visual media. In 3D Photography, cameras and lights are used to capture the shape and appearance of 3D objects represented as graphical models for applications such as computer animation, game development, electronic commerce, heritage preservation, reverse engineering, and virtual reality. This course covers 3D capture techniques and systems, surface representations and data structures, image completion/inpainting, Image based lighting and rendering, high dynamic range, Photo quality assessment, non photorealistic rendering as well as methods to smooth, denoise, edit, compress, transmit, simplify, and optimize very large polygonal models.

MM422 **Principles of 2D Animation** **أساسيات الحركة ثنائية الأبعاد**

Credits 3 Hours
Prerequisites MM301
Contents This is an introductory course in 2D animation. Students will study the historical

context of 2D animation, its current applications, animation principles, and styles and methods of animation – with emphasis on 2D digital animation.

MM423 **Game Architecture and Design** **معمارية تصميم الالعاب**
Credits 3 Hours
Prerequisites CS341, MM412, CS351, CS353
Contents Course introduces students to the core concepts and design methodologies integral to designing and developing games and other Entertainment software.

MM424 **Game Modification and development** وبناء وتعديل الالعاب
Credits 3 Hours
Prerequisites CS341, **MM423**
Contents This course introduces students to the basic concepts of game programming and development. Students will learn how to reprogram a professional game engine, or Modification (Mod) development as it is referred to in the industry. Students will work with C intensively. Students will work on their own game projects utilizing the professional game engine.

MM425 **Game Development** برمجة وبناء الالعاب
Credits 3 Hours
Prerequisites CS341, **MM423**
Contents This course introduces students to the core concepts and skills necessary for the development of games utilizing 2D graphics. Students will learn how to set up and program their own 2D graphics based game engine. The engine will integrate 2D graphics, audio, input handling and network socket programming. Students will learn how to utilize their own custom 2D graphics and sounds into their projects. Once complete, students will have created two fully functional game

MM426 **Foundations of Game Production** اساسيات انتاج الالعاب
Credits 3 Hours
Prerequisites CS341, **MM423**
Contents This class introduces students to many of the tools and design methodologies needed for electronic game production. This class will focus heavily on scripting, level design and content control as applied to game development. Students will learn a few scripting languages that are used in the games industry such as Unreal Script and Python. Students will work on projects to develop the levels, controls and scripts in order to create a new game experience with a professional game.

MM413	**3D User Interfaces and Augmented Reality**	واجهات المستخدم ثلاثية الابعاد والتخيل الخقيقى
Credits	3 Hours	
Prerequisites	CS341, **MM412**	
Contents	3D user interfaces are already essential to fields as diverse as visualization and video games, and are becoming even more important as the major personal computer and smartphone user interfaces incorporate increasingly powerful 3D technology. COMS W4172 provides an introduction to this exciting way of interacting with computers, with an emphasis on methods for designing and developing effective 3D user interfaces. The course's name acknowledges the major role played in our projects by *augmented reality*—dynamically overlaying virtual media on our experience of the real world	

MM412	**Human Computer Interaction foundation**	**اساسيات تفاعل الإنسان والحاسب**
Credits	3 Hours	
Prerequisites	CS341	
Contents	Foundations of human-computer interaction: Motivation; contexts for HCI; human centered development and evaluation; human performance models; human performance models; accommodating human diversity; principles of good design and good designers; engineering tradeoffs; introduction to usability testing. Human-centered software evaluation: Setting goals for evaluation; evaluation without users; evaluation with users. Human-centered software development: Approaches, characteristics, and overview of process; functionality and usability; specifying interaction and presentation; prototyping techniques and tools. Graphical user-interface design: Choosing interaction styles and interaction techniques; HCI aspects of common widgets; HCI aspects of screen design; handling human failure; beyond simple screen design; multi-modal interaction; 3D interaction and virtual reality. Graphical user-interface programming: Dialogue independence and levels of analysis; widget classes; event management and user interaction; geometry management; GUI builders and UI programming environments; cross-platform design. HCI aspects of multimedia systems: Categorization and architectures of information; information retrieval and human performance; HCI design of multimedia information systems; speech recognition and natural language processing; information appliances and mobile computing. HCI aspects of collaboration and communication: Groupware to support specialized tasks; asynchronous group communication; synchronous group communication; online communities; software characters and intelligent agents.	

MM413	**Human Factors and Security**	**العوامل البشرية والأمن**
Credits	3 Hours	
Prerequisites	CS341, MM412	
Contents	Applied psychology and security policies • Security economics • Regulatory environments – responsibility, liability and self-determination • Organizational	

vulnerabilities and threats • Usability design and security • Pretext, impersonation and fraud, e.g., phishing and spear phishing (cross-reference IAS/Threats and Attacks) • Trust, privacy and deception • Biometric authentication (camera, voice) • Identity management

MM414 **Designing Interaction** **تصميم التفاعل**

Credits 3 Hours
Prerequisites CS341, MM412
Contents Students need a minimal set of well-established methods and tools to bring to interface construction. Topics: • Principles of graphical user interfaces (GUIs) • Elements of visual design (layout, color, fonts, labeling) • Task analysis, including qualitative aspects of generating task analytic models • Low-fidelity (paper) prototyping • Quantitative evaluation techniques, e.g., keystroke-level evaluation • Help and documentation • Handling human/system failure • User interface standards

MM441 **Interactive Visualization** **الرؤيا التفاعلي**

Credits 3 Hours
Prerequisites CS302
Contents This sub-area is related to modeling and simulation. Most topics are discussed in detail in other knowledge areas in this document. There are many ways to present data and information, including immersion, realism, variable perspectives; haptics and heads-up displays, sonification, and gesture mapping. Interactive visualization in general requires understanding of human perception (GV/Basics); graphics pipelines, geometric representations and data structures (GV/Fundamental Concepts); 2D and 3D rendering, surface and volume rendering (GV/Rendering, GV/Modeling, and GV/Advanced Rendering); and the use of APIs for developing user interfaces using standard input components such as menus, sliders, and buttons; and standard output components for data display, including charts, graphs, tables, and histograms (HCI/GUI Construction, HCI/GUI Programming)

MM415 **Programming Interactive Systems** **برمجة الأنظمة التفاعلية**

Credits 3 Hours
Prerequisites CS341, MM412, MM414
Contents Software Architecture Patterns, e.g., Model-View controller; command objects, online, offline (cross reference PL/Event Driven and Reactive Programming, where MVC is used in the context of event-driven programming) • Interaction Design Patterns: visual hierarchy, navigational distance • Event management and user interaction • Geometry management (cross-reference GV/Geometric Modelling) • Choosing interaction styles and interaction techniques • Presenting information: navigation, representation, manipulation • Interface animation techniques (e.g., scene graphs) • Widget classes and libraries • Modern GUI libraries (e.g. iOS, Android, JavaFX) GUI builders and UI programming environments (crossreference PBD/Mobile Platforms) • Declarative Interface

Specification: Stylesheets and DOMs • Data-driven applications (database-backed web pages) • Cross-platform design • Design for resource-constrained devices (e.g. small, mobile devices)

MM441**Speech Processing** **معالجة الكلام**

Credits 3 Hours

Introduction to speech production ; general properties of speech signal ; Time domain processing of speech ; Frequency domain processing of speech ; Linear prediction analysis ; Cepstral analysis ; Feature extraction for speech processing ; Introduction to statistical speech recognition ; Introduction to speech coding.

MM437 **Introduction to Robotics** **مقدة فى الانسان الالى**

Credits 3 Hours
Prerequisites CS351
Contents The objective of this course is to use a **hands-on** approach to introduce the basic concepts in robotics, focusing on mobile robots and illustrations of current state of the art research and applications. Course information will be tied to lab experiments; students will work in teams to build and test increasingly more complex LEGO-based mobile robots, culminating in an end-of-semester *robot contest*. This course introduces fundamental concepts in Robotics. In this course, basic concepts will be discussed, including coordinate transformations, sensors, path planning, kinematics, feedback and feedforward control, stressing the importance of integrating sensors, effectors and control. These topics will be exemplified with LEGO Robot Kit labs. The last part of the course will focus on applying the knowledge from the initial lectures to the key approaches to mobile robot control (reactive, behavior-based, and hybrid), and briefly discuss robot learning and multi-robot systems. In the lab, robot kits will be used in weekly exercises illustrating lecture material; the last month of the lab will be spent in applying the learned material to a final project, in which the students will design and build a robot for a final competition. This course is intended for undergraduate students with interests in Robotics, Visual Computing, AI. Prerequisites include a foundation in Linear Algebra and Calculus, and the ability to program, preferably in C/C++.

MM432 **Clones, Drones and Cyborgs** **أساسيات الحركة ثنائية الأبعاد**

Credits 3 Hours
Prerequisites **MM428**
Contents According to some thinkers technology is what makes us human. Others argue that new technologies threaten human dignity and perhaps our very existence. We'll explore how different technologies like the internet, virtual reality, cloning, artificial

intelligence, performance enhancing drugs, etc. raise ethical and social challenges as well as create possibilities for desirable human advancement. We will also talk about and learn to use some very practical technologies that might help you in your college career.

CE421 **Advanced Computer Architecture** **معمارية الحاسب المتقدمة**

Credits 3 Hours
Prerequisites CE321
Contents Single-threaded execution, traditional microprocessors, DLP, ILP, TLP, memory wall, Parallel architecture and performance issues, Shared memory multiprocessors, Synchronization, small-scale symmetric multiprocessors on a snoopy bus, cache coherence on snoopy buses, Scalable multiprocessors, Directory-based cache coherence, Interconnection network, Memory consistency models, Software distributed shared memory, multithreading in hardware, Chip multiprocessing, Current research and future trends.

CE422 **Embedded Systems** **الأنظمة المدمجة**

Credits 3 Hours
Prerequisites CE321
Contents Nature of embedded systems, particular problems, special issues; role in information technology; embedded microcontrollers, embedded software; real time systems, problems of timing and scheduling; testing and performance issues, reliability; low power computing, energy sources, leakage; design methodologies, software tool support for development of such systems; problems of maintenance and upgrade.

مقررات المشروعات والتدريب

CS381	**Software Development and Professional Practice**	**تطوير البرمجيات والممارسة المهنية**
Credits	3 Hours	
Prerequisites	CS211, CS391	
Contents	Event-driven programming–Foundations of human-computer interaction–Using APIs–Building a graphical user interface–Graphic systems– Professional issues of software processes including software requirements and specifications; Software design; Software validation; Software evolution–Software project management–Methods and tools of analysis–Professional and ethical responsibilities–Risks and liabilities of computer-based systems.	

IS221	**Project Management**	**إدارة المشروعات**
Credits	2 Hours	
Prerequisites	CS101	
Contents	Managing the system life cycle: requirements determination, design, implementation; system and database integration issues; network management; project tracking, metrics, and system performance evaluation; managing expectations of managers, clients, team members, and others; determining skill requirements and staffing; cost-effectiveness analysis; reporting and presentation techniques; management of behavioral and technical aspects of the project; change management. Software tools for project tracking and monitoring. Team collaboration techniques and tools.	

MM403 Selected topics in MM (1) **موضوعات مختارة في الوسائط المتعددة 1**

Topics which are not included in the curriculum and seems to be needed should be suggested as an elective course by MM department.

MM404 Selected topics in MM (2) **موضوعات مختارة في الوسائط المتعددة 2**

Topics which are not included in the curriculum and seems to be needed should be suggested as an elective course by MM department.

CS492 Selected topics in CS (1) **موضوعات مختارة في علوم الحاسب 1**

Topics which are not included in the curriculum and seems to be needed should be suggested as an elective course by MM department.

CS493 Selected topics in CS (2) **موضوعات مختارة في علوم الحاسب 2**

Topics which are not included in the curriculum and seems to be needed should be suggested as an elective course by MM department.

IT401 Selected topics in IT (1) **موضوعات مختارة في تكنولوجيا المعلومات 1**

Topics which are not included in the curriculum and seems to be needed should be suggested as an elective course by IT department.

IT402 Selected topics in IT (2) **موضوعات مختارة في تكنولوجيا المعلومات 2**

Topics which are not included in the curriculum and seems to be needed should be suggested as an elective course by IT department.

IS454 Selected topics in IS (1)**موضوعات مختارة في نظمالمعلومات 1**

Topics which are not included in the curriculum and seems to be needed should be suggested as an elective course by IS department.

IS455 Selected topics in IS (2)**موضوعات مختارة في نظمالمعلومات 2**

Topics which are not included in the curriculum and seems to be needed should be suggested as an elective course by MM department.

CS481 **Capstone Project I** **مشروع التخرج١**

Credits 3 Hours
Prerequisites CS381, IS221
Contents Computer Science Capstone Project I course will provide coverage of some of the material from the body of knowledge, such as: Foundations of human-computer interaction – Graphical user-interface design – Graphical user-interface programming – Software design – Using APIs – Software tools and environments – Software processes – Software requirements and specifications – Software validation – Software evolution – Software project management – Team management – Communications skills.
The focus of the course must remain on the project, which gives students the chance to reinforce through practice the concepts they have learned earlier in a more theoretical way.

CS482 **Capstone Project II** **مشروع التخرج ٢**

Credits 3 Hours
Prerequisites CS481

Contents Computer Science Capstone Project II course gives the student more practical and professional skills in developing a project.

IS451 **Capstone Project I** **مشروع التخرج ١**

Credits 3 Hours
Prerequisites CS381, IS221
Contents Information Systems Capstone Project I course will provide coverage of some of the material from the body of knowledge, such as: Foundations of human-computer interaction – Graphical user-interface design – Graphical user-interface programming – Software design – Using APIs – Software tools and environments – Software processes – Software requirements and specifications – Software validation – Software evolution – Software project management – Team management – Communications skills.
The focus of the course must remain on the project, which gives students the chance to reinforce through practice the concepts they have learned earlier in a more theoretical way.

IS452 **Capstone Project I** **مشروع التخرج ٢**

Credits 3 Hours
Prerequisites IS451
Contents Information Systems Capstone Project II course gives the student more practical and professional skills in developing a project.

IT461 **Capstone Project I** **مشروع التخرج ١**

Credits 3 Hours
Prerequisites CS381, IS221
Contents Information Technology Capstone Project I course will provide coverage of some of the material from the body of knowledge, such as: Foundations of human-computer interaction – Graphical user-interface design – Graphical user-interface programming – Software design – Using APIs – Software tools and environments – Software processes – Software requirements and specifications – Software validation – Software evolution – Software project management – Team management – Communications skills.
The focus of the course must remain on the project, which gives students the chance to reinforce through practice the concepts they have learned earlier in a more theoretical way.

IT462 **Capstone Project II** **مشروع التخرج ٢**

Credits 3 Hours
Prerequisites IT461
Contents Information Technology Capstone Project II course gives the student more practical and professional skills in developing a project.

MM431 **Capstone Project I** **مشروع التخرج ١**

Credits 3 Hours
Prerequisites CS381, IS221
Contents Multimedia Capstone Project I course will provide coverage of some of the material

from the body of knowledge, such as: Foundations of human-computer interaction – Graphical user-interface design – Graphical user-interface programming – Software design – Using APIs – Software tools and environments – Software processes – Software requirements and specifications – Software validation – Software evolution – Software project management – Team management – Communications skills.
The focus of the course must remain on the project, which gives students the chance to reinforce through practice the concepts they have learned earlier in a more theoretical way.

MM432	**Capstone Project II**	**مشروع التخرج ٢**
Credits	3 Hours	
Prerequisites	MM431	
Contents	Multimedia Capstone Project II course gives the student more practical and professional skills in developing a project.	

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[9]. Computer Science Curricula 2013 Curriculum Guidelines for Undergraduate Degree Programs in Computer Science December 20, 2013 The Joint Task Force on Computing Curricula Association for Computing Machinery (ACM) IEEE Computer Society