

كلية الفجر للعلوم والتكنولوجيا

Alfajr College for Science and
Technology

مقترح برنامج بكالوريوس العلوم
(شرف) في تقانة المعلومات

A Proposal for the Bachelor of
Science (Honours) Programme in
Information Technology

كلية الفجر للعلوم والتكنولوجيا

منهج بكالوريوس الشرف في تقانة المعلومات

(1) التمهيدي:-

أ - تكوين اللجنة

تكونت لجنة إعداد المنهج من

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الجامعة الإسلامية

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جامعة الرباط

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ب - أسلوب عمل اللجنة

عقدت اللجنة عدد من الاجتماعات لمناقشة البرنامج، واستعانت بأراء عدد من ذوي الاختصاص في مجال الحاسوب والمجالات الأخرى ذات العلاقة من داخل وخارج الجامعة كما التزمت اللجنة بالتقرير النهائي لـ (IT 2008 Curriculum) الصادر من اللجنة المنبثقة من قبل الهيئة العالمية لعلوم الحاسوب وهيئة مهندسي الكهرباء و الإلكترونيات ACM/IEEE-CS كما اطلعت اللجنة على عدد من البرامج المشابهة في جامعات أخرى عبر شبكة المعلومات العالمية (الإنترنت) على المستوى المحلي والإقليمي والعالمي. استعانت اللجنة أيضا بموجهات تقرير مشروع وموجهات كلية الحاسوب الأنموذج الصادر من لجنة الحاسوب بوزارة التعليم العالي البحث العلمي في مايو 2005.

(2) المقدمة:-

شهدت العقود الأربعة الماضية تطورا هائلا في مجال الحوسبة، من مجموعة صغيرة من الأكاديميين بشكل أساسي في الرياضيات والهندسة الكهربائية، إلى مجال أكاديمي كامل يعرف باسم علوم الحاسوب، إلى المزيد من التخصصات ذات الصلة بالحاسوب. التخصصات ذات الصلة بالحاسوب كما ورد في تقرير مناهج الحوسبة تشمل علوم الحاسوب، وهندسة الحاسوب، ونظم المعلومات، وتقانة المعلومات، وهندسة البرمجيات.

مصطلح تقانة المعلومات له معنيان، ففي الإطار العام يستخدم اسم " تقانة المعلومات" للإشارة لجميع جوانب تقانة الحوسبة. وفي إطار أضيق يستخدم نفس الاسم ليعني برنامجا يمنح درجة علمية ويعد طلابه لمقابلة احتياجات المؤسسات المختلفة للتقانة الحديثة. كبرنامج أكاديمي، تركز تقانة المعلومات على القضايا المتعلقة بالمستخدمين وتلبية احتياجاتهم ضمن السياق التنظيمي والمجتمعي من خلال اختيار، وخلق، وتطبيق وتكامل وإدارة تقنيات الحوسبة. وقد برزت الدرجات العلمية في مجال تقانة المعلومات للوجود لأن البرامج في تخصصات الحاسوب الأخرى فشلت في إنتاج خريجين قادرين على مقابلة الاحتياجات العملية للمؤسسات المختلفة.

دفع كل ذلك الكلية لتقديم مقترح برنامج بكالوريوس العلوم (شرف) في تقانة المعلومات. و يهدف البرنامج لتزويد الدارسين بالمهارات والمعرفة اللازمة لتولي المناصب المهنية المناسبة في مجال تقانة المعلومات بعد التخرج والترقي للمناصب القيادية أو متابعة البحث العلمي أو الدراسات العليا في المجال.

(3) أهداف البرنامج:-

الهدف الأساسي لهذا البرنامج هو تخريج الطلاب بدرجة بكالوريوس الشرف في تقانة المعلومات بعد دراسة 160 ساعة معتمدة في فترة ثمانية فصول دراسية.

- ويتوقع للطالب عند إكماله البرنامج أن يلم بالآتي:-
- المعارف والمهارات الأساسية في مجال تقنية المعلومات.
- المعارف والمهارات الأساسية في مجال البرمجة
- المعرفة التامة بمكونات الحاسوب وطرق تشغيله.
- إستخدام البرامج التطبيقية في الحاسوب بكفاءة.
- استخدام الحاسوب في حل المشكلات المختلفة واستغلاله الاستغلال الأمثل.
- المقدرة على الخلق والابتكار والتعليم الشخصي وكتابة الأبحاث العلمية.
- القدرة على تحليل وتصميم النظم لتحويل العمل اليدوي إلى آلي.
- القدرة علىالتواصل مع الآخرين وإيصال أفكاره عبر الوسائط المختلفة

(4) الدرجة الممنوحة

يمنح الطالب الذي يكمل هذا البرنامج بنجاح درجة بكالوريوس الشرف في تقانة المعلومات بعد إكمال الفترة الدراسية (160 ساعة معتمدة في مدة 4 سنوات) بنجاح

(5) مخرجات التعلم

- لدى إكمال هذا المقرر بنجاح يجب أن يكون الطالب قادرا على
- ✓ تطبيق معرفته وخبرته في مجال تقانة المعلومات على مختلف مجالات العمل
- ✓ تحليل المسألة وتحديد المتطلبات الحاسوبية المناسبة للحل.
- ✓ القدرة على تحليل وتصميم وتطبيق وتقويم الأنظمة الحاسوبية على مجالات العمل المختلفة
- ✓ القدرة على العمل في شكل فرق أو مجموعات لتحقيق أهداف محددة
- ✓ فهم الجوانب المهنية، الأخلاقية، القانونية، الأمنية، القضايا، والمسؤوليات الاجتماعية والعمل وفقها.

(6) فرص العمل

يقوم هذا البرنامج بإعداد خريجين يمتلكون معرفة عملية للأسس النظرية و القدرات التطبيقية في تحليل و تصميم و تنفيذ حلول المسائل المطلوبة لتطوير تقانة المعلومات بالمؤسسات . لذلك فإن فرص العمل ستكون متاحة لخريجي هذا البرنامج في مجالات عديدة منها :

1. الشركات العاملة في مجال البرمجيات .
2. شركات الإتصالات بأنواعها .
3. البنوك والمؤسسات و الشركات .
4. المؤسسات الأكاديمية و التعليمية .
5. المصالح والهيئات الحكومية

(7) نظام الدراسة

تعمل الكلية بالنظام الفصلي المعدل والذي يتكون من فصلين دراسيين كل فصل منها مدته 15 أسبوعاً (لا تشمل الإمتحانات)
تحدد مواد الدراسة بعدد الساعات المعتمدة لكل مادة.
أساليب التدريس يتم اختيارها وفقاً لأحداث كل مادة وتحتوي على المحاضرات والتطبيق العملي والتمارين والسمنارات والمشاريع والتدريب.

(8) شروط القبول:-

يتطلب القبول لهذا البرنامج النجاح في الشهادة السودانية بمساقها العلمي أو الأدبي وإحراز نسبة مئوية لا تقل عن الحد الأدنى الذي تحدده الكلية في العام المعني مع النجاح في مادة الرياضيات.

تقييم الطلاب:-

- يتم تقييم الطلاب بناء على عدة طرق منها
- ✓ حضور المحاضرات والأنشطة المختلفة للمادة
 - ✓ الاختبارات العملية
 - ✓ الاختبارات والامتحان النهائي والتي تشمل على:
 - طريقة إختيار الإجابة الصحيحة (MCQs)
 - طريقة الأسئلة القصيرة المباشرة
 - طريقة الأسئلة التحليلية المقالية الطويلة
- ويكون تقييم الطلاب عن طريق المعدل التراكمي والذي يتكون من أربعة نقاط

(9) مكونات البرنامج

جدول مجالات المعرفة :-

رقم	مجال المعرفة	الساعات المعتمدة	النسبة المئوية
1-	العلوم الرياضية	15	
2-	هندسة الحاسوب	6	
3-	علوم الحاسوب	34	
4-	هندسة البرمجيات	8	
5-	نظم المعلومات	7	
6-	تقانة المعلومات (إجباري واختياري)	60	
7-	مطلوبات التعليم العالي	20	
8-	علوم إنسانية وإدارية	10	
	المجموع	160	

جداول تفصيلية لكل مجال :-

1. العلوم الرياضية :-

رمز المادة	اسم المادة	الساعات		
		المعتمدة	المحاضرة	المعمل
MH 101	الحسبان	3	2	2
MH 202	الجبر الخطي	3	2	2
MH 203	الرياضيات المتقطعة I	3	2	2
MH 304	الرياضيات المتقطعة II	3	2	2
MH 305	مبادئ الإحصاء والاحتمالات	3	2	2
	المجموع	15	10	10

2. هندسة الحاسوب :-

رمز المادة	اسم المادة	الساعات		
		المعتمدة	المحاضرة	المعمل
CE 301	بيئة ومعدات الحاسوب	3	2	3
CE 502	معمارية وتنظيم الحواسيب	3	2	-
	المجموع	6	4	3
				2

3. علوم الحاسوب

رمز المادة	اسم المادة	الساعات		
		المعتمدة	المحاضرة	المعمل
CS 101	مبادئ علوم الحاسوب	4	2	3
CS 202	اساسيات البرمجة	4	2	3
CS 303	أساليب البرمجة	4	2	3
CS 404	هياكل البيانات والخوارزميات	4	2	3
CS 405	مفاهيم قواعد بيانات	4	2	3
CS 406	مفاهيم نظم التشغيل	4	2	3
CS 507	تحليل وتصميم الخوارزميات	3	2	-
CS 608	الذكاء الاصطناعي	3	2	3
CS 709	شبكات الحاسوب	4	2	3
	المجموع	34	18	30
				16

4. هندسة البرمجيات

رمز المادة	اسم المادة	الساعات		
		المعتمدة	المحاضرة	المعمل
SE 501	هندسة البرمجيات 1	4	2	3
SE 602	هندسة البرمجيات 2	4	2	3
	المجموع	8	4	6
				4

5. نظم المعلومات

رمز المادة	اسم المادة	الساعات		
		المعتمدة	المحاضرة	المعمل
IS 301	تحليل وتصميم نظم	3	2	-
IS 502	تطبيقات قواعد البيانات	4	2	3
	المجموع	7	4	3
				4

6. تقانة المعلومات

رمز المادة	اسم المادة	الساعات		
		المعتمدة	المحاضرة	المعمل
IT 201	أساسيات تقانة المعلومات	4	2	3
IT 402	تفاعل الانسان والحاسوب	4	2	3
IT 403	تقنيات الإنترنت	4	2	6
IT 504	الحوسبة السحابية	3	2	3
IT 605	إدارة نظم قواعد البيانات	4	2	3
IT 606	أمن المعلومات	3	2	-
IT 607	نظم الوسائط المتعددة	4	2	3
IT 708	تقنيات الموبايل	4	2	3
IT 809	قواعد البيانات الموزعة	4	2	3
IT 810	إدارة شبكات الحاسوب	4	2	3
ES701	مادة إختيارية 1	4	2	3
ES702	مادة إختيارية 2	4	2	3
ES 803	مادة إختيارية 3	4	2	3
ES804	مادة إختيارية 4	4	2	3
GR 701	مشروع التخرج 1	3	-	6
GR 802	مشروع التخرج 2	3	-	6
	المجموع	60	28	54
				24

7. مطلوبات التعليم العالي

رمز المادة	اسم المادة	الساعات		
		المعتمدة	المحاضرة	المعمل
UR 101	اللغة العربية I	3	2	2
UR 204	اللغة العربية II	3	2	2
UR 102	اللغة الإنجليزية I	3	2	2
UR 205	اللغة الإنجليزية II	3	2	2
UR 106	الثقافة الإسلامية I	3	2	2
UR 206	الثقافة الإسلامية II	3	2	2
UR 507	الدراسات السودانية	2	2	-
	المجموع	20	14	12

8. علوم إنسانية وإدارية

التمارين	المعمل	المحاضرة	الساعات المعتمدة	اسم المادة	رمز المادة
2		2	3	مبادئ الاقتصاد	MG 101
-		2	2	مبادئ الإدارة	MG 102
2		2	3	مبادئ المحاسبة	MG 303
-		2	2	قضايا مهنية وأخلاقية	MG 604
4		8	10	المجموع	

السنة الأولى

الفصل الدراسي الأول

اسم المادة	الرمز	محاضرة	معمل	تمارين	معتمدة	Subjec
اللغة العربية I	UR 101	2	-	2	3	Arabic Language 1
اللغة الإنجليزية I	UR 102	2	-	2	3	English Language 1
الثقافة الإسلامية I	UR 103	2	-	2	3	Islamic Studies 1
مبادئ علوم الحاسوب	CS 101	2	3	2	4	Introduction to Computer Science
مبادئ الإقتصاد	MG 101	2	-	2	3	Introduction to Economucs
مبادئ الإدارة	MG 102	2	-	-	2	Management Principals
مبادئ الحسبان	MH 101	2	-	2	3	Introduction to Calculus
المجموع		14	3	14	21	

الفصل الدراسي الثاني

اسم المادة	الرمز	محاضرة	معمل	تمارين	معتمدة	Subject
اللغة العربية II	UR 204	2	-	2	3	Arabic Language 2
اللغة الإنجليزية II	UR 205	2	-	2	3	English Language 2
الثقافة الإسلامية II	UR 206	2	-	2	3	Islamic Studies 2
أساسيات تقانة المعلومات	IT 201	2	3	2	4	Information Technology Fundamentals
الجبر الخطي	MH 202	2	-	2	3	Linear Aljabra
الرياضيات المنقطعة I	MH 203	2	-	2	3	Discrete Math 1
أساسيات برمجة	CS 202	2	3	2	4	Peograming Fundamentals
المجموع		14	6	14	23	

السنة الثانية

الفصل الدراسي الثالث

Subject	معمدة	تمارين	معمل	محاضرة	الرمز	اسم المادة
Accounting Principals	3	2	-	2	MG 303	مبادئ المحاسبة
Discrete Math II	3	2	-	2	MH 304	الرياضيات المتقطعة II
Programing Methods	4	2	3	2	CS 303	أساليب البرمجة
Computer Hardware	3	-	3	2	CE 301	بيئة ومعدات الحاسوب
System Analysis and Desging	3	2	-	2	IS 301	تحليل وتصميم النظم
Statistics and Probabilities Basics	3	2	-	2	MH 305	مبادئ الإحصاء والإحتمالات
	19	10	6	12		المجموع

الفصل الدراسي الرابع

Subject	معمدة	تمارين	معمل	محاضرة	الرمز	اسم المادة
Data Structures and Algorithms	4	2	3	2	CS 404	هياكل البيانات والخوارزميات
Human-Computer Interaction	4	2	3	2	IT 402	تفاعل الإنسان والحاسوب
Database Concepts	4	2	3	2	CS 405	مفاهيم قواعد البيانات
Internet Technology	4	2	6	2	IT 403	تقنيات الإنترنت
Operating Systems Concepts	4	2	3	2	CS 406	مفاهيم نظم التشغيل
	20	10	15	10		المجموع

السنة الثالثة

الفصل الدراسي الخامس

Subject	معمدة	تمارين	معمل	محاضرة	الرمز	اسم المادة
Sudanese Studies	2	-	-	2	UR 507	الدراسات السودانية
Software Engineering	4	2	3	2	SE 501	هندسة البرمجيات 1
Cloud Computing	3	-	3	2	IT 504	الحوسبة السحابية
Database Applications	4	2	3	2	IS 502	تطبيقات قواعد البيانات
Algorithms Analysis & Design	3	2	-	2	CS 507	تحليل وتصميم الخوارزميات
Computer Architecure	3	2	-	2	CE 502	معمارية وتنظيم الحواسيب
	19	8	9	12		المجموع

الفصل الدراسي السادس

Subject	معمدة	تمارين	معمل	محاضرة	الرمز	اسم المادة
Professional and Ethical Issues	2	-	-	2	MG 604	قضايا مهنية وأخلاقية
Software Engineering	4	2	3	2	SE 602	هندسة البرمجيات 2
Database Systems Management	4	2	3	2	IT 605	إدارة نظم قواعد البيانات
Information Security	3	2	-	2	IT 606	أمن المعلومات
Artificial Intelligence	3		3	2	CS 608	الذكاء الاصطناعي
Multimedia Systems	4	2	3	2	IT 607	نظم الوسائط المتعددة
	20	8	12	12		المجموع

السنة الرابعة

الفصل الدراسي السابع

Subject	معمدة	تمارين	معمل	محاضرة	الرمز	اسم المادة
Elective Course	4	2	3	2	ES 701	مادة إختيارية 1
Elective Course	4	2	3	2	ES 702	مادة إختيارية 2
Mobile Technology	4	2	3	2	IT 708	تقنيات الموبايل
Computer Networks	4	2	3	2	CS 709	شبكات الحاسوب
Graduation Project	3		6	-	GR 701	مشروع التخرج 1
	19	8	18	8		المجموع

الفصل الدراسي الثامن

Subject	معمدة	تمارين	معمل	محاضرة	الرمز	اسم المادة
Distributed Database	4	2	3	2	IT 809	قواعد البيانات الموزعة
Networks Management	4	2	3	2	IT 810	إدارة شبكات الحاسوب
Elective Course	4	2	3	2	ES 803	مادة إختيارية 3
Elective Course	4	2	3	2	ES 804	مادة إختيارية 4
Graduation Project	3	-	6	-	GP 802	مشروع التخرج 2
	19	8	18	8		المجموع

المواد الاختيارية

الساعات				اسم المادة
المعمدة	التمارين	المعمل	المحاضرة	
4	2	3	2	قواعد بيانات متقدمة
4	2	3	2	تقنيات انترنت متقدمة
4	2	3	2	شبكات حاسوب متقدمة
4	2	3	2	وسائط متعددة متقدمة
4	2	3	2	إدارة المعرفة
4	2	3	2	التجارة الإلكترونية
4	2	3	2	مواضيع مختاره في تقانة المعلومات

توصيف المقررات

Course Description

1. متطلبات التعليم العالي :-

لغة عربية I

الهدف:

يهدف هذا المقرر الى تنمية الحس الادبي والتذوق الفني لدى الطلاب من خلال التحليل

الأدبي والبلاغي للنص المدروس - تنمية الحس اللغوي لدى الطلاب من خلال التدريب على

المهارات اللغوية المختلفة ، وإدراك الفروق الدقيقة بين التراكيب المختلفة - تدريب الطلاب على الكتابة السليمة الخالية من العيوب واستخدام الأسلوب المناسب حسب مقتضى المقام .

المحتوي:

- عناصر البناء اللغوي.
- عناصر البناء التعبيري.
- القواعد الأساسية للإملاء.
- علامات الترقيم.
- وسائل الربط، الربط الجزئي الربط الكلي.
- تدرج دلالة الكلمات وتنوعها من خلال نصوص المختارة (يتم اختيار مجموعة من النصوص المختلفة تشمل: نصا قرانيا كريما ، نصا من الحديث الشريف ، ونصا نثريا من جيد كلام العرب، ومالا يقل عن ثلاث قصائد شعرية من مختلف العصور الأدبية).
- التحليل الأدبي والمهارات اللغوية (في الأدب والبلاغة ، في النحو والصرف).

طريقة التقويم

- الامتحان النهائي (70%)
- أعمال السنة (30%)

المراجع :

- 1/ إبراهيم محمود خليل ، مدخل إلى علم اللغة ، 2014م .
- 2/ توفيق إبراهيم صالح ، دراسات معاصرة في الشعر الجاهلي ، 2012م .

II لغة عربية

الهدف:

يهدف المقرر إلى التعريف بخصائص اللغة العربية دورها في مواكبة ثقافات العصر، ويتناول المقرر بعض المسائل النحوية والصرفية والبلاغية والإملائية والنصوص الأدبية والشعر.

المحتوي:

- معنى كلمة (أدب) لغةً واصطلاحاً.
- أقسام الأدب ومكوناته، مقارنة نقدية بين الشعر والنثر.
- تذوق الشعر (معنى التذوق – معايير تذوق الشعر – خطوات تذوق الشعر).
- معينات تذوق الشعر (القصيدة : تعريفها وأنواعها – بيت الشعر – أغراض الشعر العربي).
- نقد الشعر : (معنى النقد – فكرة عن تاريخ النقد عند العرب).

- ثقافة الناقد : (علم العروض - الزحاف - العلة - بحور الشعر العربي - التفصييلة القافية) ((إعطاء معلومات تامة فى هذه المفردات))، .
- عناصر الأدب : (العاطفة - الخيال - المعانى - الأسلوب).
- تطبيقات نحوية وبلاغية من خلال النصوص الشعرية التى ترد ضمن المفردات السابقة.

طريقة التقويم

- الامتحان النهائي (70%)
- أعمال السنة (30%)

المراجع :

- 1/ عبدالله علي مصطفى ، مهارات اللغة العربية ، 2014م .
- 2/ نعمات متولي ، متفرقات في قواعد اللغة العربية ، 2014م .

I ثقافة إسلامية

الهدف:

يهدف هذا المقرر الى ربط الطالب الإسلامي ربطاً مستتيراً مبنياً على الفكر والعلم والقيم السمة، تزويد الطلاب الذين يدرسون في مختلف التخصصات بالمعارف الإسلامية في مجالات العقيدة والفكر والاجتماع والسياسة والاقتصاد وغيرها. كما يهدف الى إكساب الطلاب مفهوم ترابط الأمة الإسلامية وربط الدين بالعمل وأنماط السلوك.

المحتوي:

- تعريف الثقافة الإسلامية (مصادرها، طرق تحصيلها).
- العقيدة الإسلامية وتشمل (إثبات وجود الله، إبطال الإلحاد، الإيمان بالملائكة والكتب والرسل واليوم الآخر والقدر خيره وشره).
- العبادات وتشمل (تعريف العبادة والحكمة منها وبيان شمولها، مباحث حول الطهارة والصلاة).
- دراسة موجزة للأديان والمذاهب المعاصرة (اليهودية، النصرانية، الشيوعية، العمالان، الروافض).

طريقة التقويم

- الامتحان النهائي (70%)
- أعمال السنة (30%)

المراجع :

- 1/ محمد عبد السلام ، عمر الأشقر ، دراسات فى الثقافة الإسلامية ، 2013م .
- 2/ محمد علي سلامة ، مدخل إلى الثقافة الإسلامية ، 2012م .

ثقافة إسلامية II

الهدف:

يهدف هذا المقرر الى ربط الطلاب الإسلامي ربطاً مستتيراً مبنياً على الفكر والعلم والقيم السمحة، والى تزويد الطلاب الذين يدرسون في مختلف التخصصات بالمعارف الإسلامية في مجالات العقيدة والفكر والاجتماع والسياسة والاقتصاد وغيرها. كما يهدف الى ربط الدين بالعمل وأنماط السلوك وتقوية الإيمان بالله الواحد الخالق المدبر لهذا الكون في نفوس الطلاب.

المحتوي:

- دراسة بعض شبهات تثار حول الإسلام.
- قضايا المرأة في تعدد الزوجات والطلاق والشهادة والميراث.
- شبهات حول الحدود ونظام العقوبات.
- شبهات حول نظام الحكم.
- مدخل إلى علوم القرآن ويشمل: تعريفه، تدوينه، بيان بعض وجوه الإعجاز.
- مدخل إلى علوم السنة ويشمل: تعريفها، تدوينها، أقسامها، حجيتها. مدخل إلى أصول الفقه ويشمل: تعريفها، الحكم الشرعي وأقسامه، الاجتهاد وضوابطه.

طريقة التقويم

- الامتحان النهائي (70%)
- أعمال السنة (30%)

المراجع :

- 1/ سمير مراد ، مقاصد الشريعة ضمن قواعد المصالح والمفاسد ، 2012م .
- 2/ نبيل الجيالي ، الحضارة الإسلامية (أهدافها ، مظاهرها ، إنتشارها) ، 2012م

دراسات سودانية

الهدف:

يهدف هذا المقرر لتعريف الطالب بتاريخ السودان السياسي والاقتصادي وتأثير ذلك على البيئة المحيطة إقليمياً وعالمياً. تزويد الطالب بتاريخ و ثقافات وحضارة السودان منذ عهود ما قبل الميلاد.

المحتوي:

- مقدمة تعريفية عن تاريخ وجغرافية السودان.
- تطور الدولة السودانية كوحدة سياسية مستقلة، تطور النظام الادارى فى السودان.
- الفكر السياسى والادارى فى السودان.
- مصادر الثقافة السودانية والتكوين العرقى للبلاد.
- أثر الاسلام والعروبة والافريقية على خصائص لشخصية السودانية ومكوناتها.
- الدور الجغرافى والسياسى للسودان فى المنطقة وبخاصة فى القرن الافريقى، الاقتصاد السودانى.

طريقة التقويم

- الامتحان النهائى (70%)
 - أعمال السنة (30%)
- المراجع: كتاب الدراسات السودانية. — جامعة السودان للعلوم والتكنولوجيا ، 2011م

1- English Language (1)

Course Objectives

This course aims at improving the language proficiency of the students in basic skills and sub-skills (reading, writing, vocabulary, spelling and grammar). By the end of this course students should be able to:

- 1- Expand students' knowledge of the English language
- 2- Develop practice of writing mechanics
- 3- Develop basic reading skills
- 4- Take students from completely guided to free writing.
- 5- Cultivate and sharpening students' awareness of grammatical accuracy.
- 6- Train students to increase their vocabulary

Course content:

- 1) 6 units of grammar in context
- 2) Activities of language in use
- 3) Punctuation rules and application
- 4) Spelling rules and application
- 5) Exercises of handwriting
- 6) 10 short reading passages

Course Assessment:

- Tests and home works (30)
- Final examination (70)

References

- 1/ our world Through English .pupils Books (A).
- 2/ our world Through English .pupils Books (B).
- 3/ Alan .Duff.Translation.

English Language (2)

Course Objectives

This course aims at improving the students writing and reading skills and equips them with the necessary language skills for their future professional life. By the end of this course students are expected to master the techniques of proper correct writing in English. Writing exercises shall be accompanied by extensive selected readings that harmonize with the content subjects taught in each school. Students are also expected to master some language skills like writing letters, reports, advertisements, filling forms, telephoning, taking part in and presiding meeting, taking minutes, discussing in professional context, etc.

Course content:

- a. Reading related to content subjects.
- b. Learning English Common Idioms and various expressions in relation with each school's specializations.
- c. Learning Common and specialized abbreviations.
- d. Using the appropriate language according to the different situations of communication skills.
- e. Sentence structure.
- f. Paragraphing and paragraph writing.
- g. Summary writing.

Course Assessment:

- Tests and home works (30)
- Final examination (70)

References

- 1/ our world Through English .pupils Books (A).
- 2/ our world Through English .pupils Books (B).
- 3/ Alan .Duff.Translation.

حسابان

CALCULUS**LEARNING OUTCOMES:**

Students will be able to evaluate limits and continuity, and compute derivatives and integrals of selected functions. Students will display proficiency by demonstrating the following competencies:

- a. Define a limit.
- b. Use algebraic techniques to evaluate limits.
- c. Evaluate a one-sided limit.
- d. Evaluate limits at infinity.
- e. Define continuity and determine whether or not a function is continuous at a point and on an interval.
- f. Define a derivative and use the definition to differentiate selected functions.
- g. Use the product, quotient, and chain rules to differentiate selected functions.
- h. Differentiate selected trigonometric functions.
- i. Differentiate the natural and general exponential and logarithmic functions.
- j. Implicitly differentiate selected two-variable equations.
- k. Differentiate inverse trigonometric functions.

Course Contents:**1. Limits and Derivatives**

- a. The Tangent and Velocity Problems
- b. The Limit of a Function
- c. Calculating Limits Using the Limit Laws
- d. The Definition of a Limit
- e. Continuity
- f. Limits at Infinity; Horizontal Asymptotes
- g. Derivatives and Rates of Change
- h. The Derivative as a Function

2. Differentiation Rules

- a. Derivatives of Polynomials and Exponential Functions
- b. The Product and Quotient Rules
- c. Derivatives of Trigonometric Functions
- d. The Chain Rule
- e. Implicit Differentiation
- f. Derivatives of Logarithmic Functions
- g. Rates of Change in the Natural and Social Sciences
- h. Exponential Growth and Decay
- i. Related Rates
- j. Linear Approximations and Differentials
- k. Hyperbolic Functions

3. Applications of Differentiation

- a. Maximum and Minimum Values
- b. The Mean Value Theorem
- c. How Derivatives Affect the Shape of a Graph
- d. Indeterminate Forms and L'Hôpital's Rule
- e. Curve Sketching
- f. Optimization Problems
- g. Newton's Method
- h. Ant derivatives

4. Integrals

- a. Areas and Distances

- b. The Definite Integral
- c. The Fundamental Theorem of Calculus
- d. Indefinite Integrals and the Net Change Theorem
- e. The Substitution Rule
- f. The Logarithm Defined as an Integral

Course Assessment:

- Tests and home works (30)
- Final examination (70)

TEXTBOOK: Stewart, James. Calculus: Early Transcendentals. 7th ed. Brooks/Cole, Cengage Learning 2012.

کتابخانه
الفجر

Course Title:3- Linear Algebra

Aims

- To provide students with a good understanding of the concepts and methods of linear algebra, described in detail in the syllabus.
- To help the students develop the ability to solve problems using linear algebra.

Learning Outcomes

- Understand linear equations
- Understand matrices and their applications
- Demonstrate the application of linear programming and linear regression in computer science problems

Syllabus Outline

- Linear equations: Solutions of systems of linear equations
- Matrices: matrix multiplication, determinant, Cramer's rule, Matrix Inverse, Matrix Representation of Linear Maps, linear Dependence, Linear Independence and Bases, Eigenvalues and Eigenvectors. Vectors and subspaces. Simple algorithms. Traversal strategies.
- Computer applications: wavelets, transformations in computer graphics, computer vision, Google's PageRank algorithm,
- Linear programming, linear regression, Markov chains, linear and nonlinear optimization, control theory, combinatorial optimization, and analysis of electrical networks.
- Use of MatLabs.

Teaching Methods

- Lectures
- Tutorials

Assessment

- Final exam (30 %)
- Test, reports, class work and home work (70%)

Reference

Basic College Mathematics (4th Edition) 4th Edition, by Elayn Martin-Gay
 Publisher: Pearson; 4 edition (September 23, 2010), ISBN-10: 0321649400,
 ISBN-13: 978-0321649409

Course Title: 1- Discrete Mathematics1

Aims

This course introduces the foundation of discrete mathematics as they apply to computer science, focusing on proving a solid theoretical foundation for further work.

Learning Outcomes

- Understand and construct mathematical arguments
- Prove simple arguments
- Develop recursive algorithms based on mathematical induction
- Know basic properties of relations
- Know essential concepts in graph theory and related algorithms

Syllabus Outline

- Introduction to logic and proofs
- Fundamental Structures:
- Boolean algebra: Boolean values; standard operations on Boolean values; de Morgan's laws.
- Propositional logic: Logical Connectives; truth table; normal forms (conjunctive and disjunctive); validity.
- Digital logic: Logic Gates, flip-flops, counters; circuit minimization.
- Elementary Number theory :Factorability; properties of primes; greatest common divisors and least common multiples; Euclid's algorithm; modular arithmetic; the Chinese Remainder theorem.
- Basic 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
- Matrices: Basic properties; applications
- Computational complexity : Order analysis ; standard complexity classes
- Elementary computability.
- Discrete probability :

Teaching Methods

- Lectures
- Tutorials

Assessment

- Final exam (70 %)
- Test, reports, class work and home work (30%)

Reference

Discrete Mathematics with Applications, by Susanna S. E Publication Date: August 4, 2010 | ISBN-10: 0495391328 | ISBN-13: 978-0495391326 | Edition: 4

Course Title: 1- Discrete Mathematics2**Aims**

This course studies the mathematical elements of computer science including propositional logic, predicate logic, sets, functions and relations, combinatorics, mathematical induction, recursion, algorithms, matrices, graphs, trees, and Boolean logic. During the semester students will learn to recognize and express the mathematical ideas graphically, numerically, symbolically, and in writing. They will become self-regulated learners and help other students become cooperative learners

Learning Outcomes

- Outline the basic structure of and give examples of each proof technique described in this unit.
- Discuss which type of proof is best for a given problem.
- Relate the ideas of mathematical induction to recursion and recursively defined structures.
- Illustrate by example the basic terminology of graph theory, and some of the properties and special cases of each.
- Demonstrate different traversal methods for trees and graphs.
- Model problems in computer science using graphs and trees.
- Relate graphs and trees to data structures, algorithms, and counting.

Syllabus Outline

- 1. Functions**
 - Functions (surjections, injections, inverses, composition)
 - Finite State Automata
- 2. Relations**
 - Relations (reflexivity, symmetry, transitivity, equivalence relations)
 - Simplifying Finite State Automata
- 3. Recursion**
 - Recursively defined Sequences
 - Solving recurrence relations by Iteration
- 4. Graphs And Trees**
 - Undirected graphs
 - Directed graphs
 - Paths and Circuits
 - Trees
 - Spanning trees/forests
 - Traversal strategies
- 5. Discrete Probability**
 - Finite probability space, probability measure, events
 - Conditional probability, independence, Bayes' theorem
 - Integer random variables, expectation
 - • Law of large numbers

Teaching Methods

- Lectures
- Tutorials

Assessment

- Final exam (70 %)
- Test, reports, class work and home work (30%)

Reference

Discrete Mathematics with Applications, by Susanna S. E Publication Date: August 4, 2010 | ISBN-10: 0495391328 | ISBN-13: 978-0495391326 | Edition: 4

Course Title: Statistics and Probabilities Basics

Aims

Make the participants able to perform a standard statistical analysis of their own data and relate the results to the practical application. The participants will be able to carry out statistical analyses using the statistical package

Learning Outcomes

- Describe the goals of various statistical methodologies conceptually.
- Apply statistical techniques in the context of everyday life
- Understand different sampling strategies.
- Use descriptive statistics and graphical methods to summarize data accurately.
- Use inferential statistics to make valid judgments based on the data available.
- Select the appropriate course tools to analyze a particular problem.
- Develop a healthy skepticism toward statistical studies and their results based on sensible consideration of the techniques employed.

Syllabus Outline

- Introduction to Finite Mixture Models – Latent Class Analysis
- Univariate Distributions – Structured and Unstructured Mixtures
- Multivariate Distributions – Structured and Unstructured Mixtures
- Introduction to SEM – Theoretical Foundation
- Mixtures in SEM - Estimation, Interpretation, Application
- Introduction to LGCM – Theoretical Foundation
- Growth Mixture Modeling – Estimation, Interpretation, Application
- Other Applications and/or Methodological Extension
- Introduction to IRT – Theoretical Foundation
- Mixtures in IRT – Model Specification, Estimation, Interpretation
- Latent DIF & Model-Based Standard Setting – Applications in Psychometrics
- Introduction to DCM
- Other Applications and/or Methodological Extension

Teaching Methods

- Lectures
- Lab Session

Assessment

- Final Exam 50%
- Mid Term 20%
- Practical Exam 30%

Reference

Principles of Applied Statistics, by Professor D. R. Cox, Professor Christl A. Donnelly

Publisher: Cambridge University Press; 1 edition (September 5, 2011), ISBN-10: 1858059089

ISBN-13: 978-1858059082

Computer Hardware

Aims

This course is an in-depth exposure to computer hardware and operating systems. Students learn the functionality of hardware and software components as well as suggested best practices in maintenance and safety issues. Through hands-on activities and labs, students learn how to assemble and configure a computer as well as install multiple operating systems and diagnostic application utilities. In addition, an introduction to networking is included. This course prepares for the CompTIA's A+ certification through the use of materials that align to the A+ Exams. Students registering for this course should be proficient in daily computer use (such as downloading and installing software from the Internet) and should be familiar with computer terms.

Syllabus Outline

Students study the basics of computer architecture and learn to use a contemporary operating system. Hardware requirements, hardware components, software compatibility, and system installation topics are covered along with post-installation, storage, security and system diagnosis, and repair. Topics also include discussion of current and future technology industry trends.

Assessment

- Tests 20%
- Laboratories Assignments 20%
- Final Examination 60%

References

- Lectures notes

Course Title: Computer Architecture

Aims

To become familiar in how Computer Systems work & its basic principles, how to analyze the system performance, concepts behind advanced pipelining techniques, the current state of art in memory system design, how I/O devices are being accessed and its principles.

Learning Outcomes

- Explore the different processors used inside the PC
- Deal with different memory types and how to connect each to the computer
- Explore the Computer architectures used by the PC
- Know the support units and the function of each unit
- Deal with parallel and serial ports
- RISC CISC .Explore the characteristics of RISC machines and compare it to the CISC machines

Syllabus Outline

- Intel family processors: Pin layout, Internal structure, general characteristics
- Comparison Between Intel and Motorola Families
- Memory types and its interface to the PC
- ISA PCI Mother Board types and standards from ISA to PCI and the characteristics of each
- PIC PIT DMA Support chips with a detail study of some units like PIC, PIT, and DMS. And how to program each
- CISC RISC RISC CISC and RISC machines, with a details study of one of the RISC machines

Teaching Methods

- Weekly Lectures
- Supervised computer laboratories

Assessment

- Tests 20%
- Laboratories Assignments 20%
- Final Examination 60%

Reference

Computer Organization and Architecture, by William Stallings, Publisher: Pearson; 10 edition (January 22, 2015), ISBN-10: 0134101618, ISBN-13: 978-0134101613

Software Engineering1

Course Description :

This is a first core course, presenting the basic principles and concepts of software engineering: Requirements engineering, designing, implementation, testing and maintaining software systems, and giving a firm foundation for many other courses such as Requirements analysis, Software design, Software maintenance ... etc. It gives broad coverage of the most important terminologies and concepts in software engineering and review of principles of object oriented design using UML.

Course Objective:

- To introduce the fundamental concepts of Software Engineering and to explain its importance.
- To set out the answers to key questions about Software Engineering.
- To make students familiar with tools and techniques for medium & large scale software system.
- To produce a high-quality with a cost-effective development of software systems that satisfies the user requirements.
- To learn how to document all phases of the software development processes.
- To learn how to work as a member of a team on a software engineering project.

Course Outlines:

1. Introduction to System and Software Engineering
2. Software Development Processes
3. Software Requirements
4. Requirements Engineering Process
5. Project Management
6. Architectural Design
7. Rapid Software Development
8. Software Evolution
9. Validation and Verification
10. Software Testing

Course Outcomes:

Upon completion of this course, students will have the ability to:

- Understand some of current software process methodologies and be able to apply critical facilities to evaluating methodologies as they become fashionable.
- Apply technical and process solutions to the problems of particular 'straightforward' software development.
- Articulate the special problems of scale in the development of large software, and in particular that those problems lack general solutions.
- Demonstrate knowledge of the distinction between critical and non-critical systems.
- Discuss software development in an analytic manner.
- Use appropriate CASE-tools for documenting software requirements.
- Demonstrate proficiency in rapid software development techniques.

- Develop clear, concise, and sufficiently formal requirements for extensions to an existing system, based on the true needs of users and other stakeholders
- Create a number of different UML models such as class model, use-cases, sequence diagram, activity diagram, and state charts.
- Be an effective member in software engineering team.
- Manage a project including planning, scheduling and risk assessment/management.
- Demonstrate an appreciation for the breadth of software engineering.

Course Assessments:

- Final Exam: (50% of the total mark).
- Course work: (Midterm Exam, Tests, Quizzes, Seminars, Assignments (25%)).
- Final Project: (25%).

References :

- Ian Sommerville, Software Engineering, Prentice hall, 8th ed. 2006.
- Roger Pressman, Software Engineering-A Practitioner's Approach, McGraw-Hill, 6th edition, 2004.

Software Engineering2

Course Description :

This course teaches the advanced concepts in software engineering, and covers the methods of ensuring and certification in software engineering. It deals with advanced concepts to be tested in the software. It also covers the scientific methods to estimate the costs of building software, quality control, and development operations.

Course Outlines:

1. Software engineering confirmation and authentication.
2. Methods and ways of software testing.
3. Building and managing software development teams.
4. Scientific and practical methods for calculating the costs of software development.
5. Quality management in software development.
6. Processes Development in software production.
7. Reconstruction management in software production

Course Outcomes:

Upon completion of this course, students will have the ability to:

- To understand the basics of conformation and authentication in software engineering and methods of software testing.
- To build and manage teams of software developments, scientific, and practical methods for – calculating the costs of software development.
- To know the basic concepts of quality management in software development.
- To possess development Skills in software production.
- To understand the management restructuring in software production.

Course Assessments:

- Final Exam: (50% of the total mark).
- Course work: (Midterm Exam, Tests, Quizzes, Seminars, Assignments (25%)).
- Final Project: (25%).

References :

- - I. Sommerville, “Software Engineering”, 7th Ed., Addison Wesley, 2004, ISBN 0321210263.
- H. Apperly et al, “Service- and Component-based Development: Using the Select Perspective and UML,” First Edition 2003, Addison-Wesley Professional.

Course Title: Introduction to Computer Science

Aims

This course aims to examine some of the fundamental ideas of the science of computing.

Learning Outcomes

- Know Computer types and Computer Components (I/O/Storage).
- Get familiar with Number system and data presentation in Computer and flow of data inside the computer.
- Know different programs types.
- Deal with networking and the internet.
- Convert small program to flow chart.
- Know some information about viruses. And Electronic Commerce.

Syllabus Outline

- Generations of Computer.
- Types & Classifications of Computer.
- Components of the Computer (Input units- Processing unit – Output units).
- Storage Devices (Internal & External).
- Number Systems (Binary – Octal – Hexa decimal).
- Programming Languages (Machine Language – Assembly Language – High Level Language), Software types.
- Logical gates (OR-AND- NOT– XOR – NAND – NOR).
- Operating System, Word Processing, Databases, Spreadsheets.
- Flowcharts.
- Networks & Internet.
- Viruses.

Teaching Methods

- Lectures and Laboratory

Assessment

- Tests, home works and Reports. (50 %)
- Final Examination. (50%).

Reference

Computer Science: An Overview, 11th Edition. by J. Glenn Brookshear, Publisher: Addison-Wesley; (January 31, 2011), ISBN-10: 0132569035, ISBN-13: 978-0132569033

مقدمة علوم الحاسوب ، د. مضوي مختار المشرف ، د. عبدالرحمن الشريف ، بابكر حسين ، دار الرباط للنشر 2013م

أساسيات برمجة

Principals of Programming

Course Objectives:

To provide a cursory presentation of major aspects of computing and set a sound foundation for various programs of Computer Science.

Course Content:

Simple techniques in program development; top-bottomup designs; Introductory notions in: algorithm design; abstraction and problem solving; recursion; Notion of proofs: need to verify/validate programs; Importance of efficiency, appropriateness and correctness of algorithms; problems insights and tools in large scale program development ("programming in the large"); Further use of programming language notions: user defined types; pointer types and simple uses; functions/procedures, parameter passing; scope of identifiers; side-effects; Assorted general purpose algorithms on simple data structures (sets, arrays, records, text files); search and sorting algorithms (e.g. on arrays); operating systems; files and simple file system organisation; databases (hierarchical, network and relational models); Artificial Intelligence and related topics; need/importance of computer networks; Parallel distributed computing; current trends in computer architecture.

Textbook: How to Design Programs: An Introduction to Programming and Computing. By: Matthias Felleisen, Robert Bruce Findler, Matthew Flatt and Shriram Krishnamurthi. Publisher: Copy materials Masschusetts Institute of Technology MIT 2001.

Course Title: Programming Methods

Aims

The main purpose of the course introduction to C++ / Java language programming methods, based on new approaches in computer science.(OOP)

Learning Outcomes

- Deal with Abstract Data Types like Strings and arrays
- Understand fundamentals of Software development methodology
- Learn the testing methods and how to debug the program
- Write large programs, trace, debug and document it

Syllabus Outline

- Review of control structure, functions, and primitive data type.
- More about methods
- Recursion
- Fundamental design concepts and principles
- Arrays , Multi-dimensional arrays
- Concepts of OOP (Classes & Objects)
- Strings, String processing and data representation in memory
- Testing and debugging Tools and Debugging in IED.
- Programming Documentation

Teaching Methods

- Lectures
- Laboratory

Assessment

- Tests, homework, tutorials and Reports. (25 %)
- Lab work and practical exams (25%)
- Final Examination. (50%)

Reference

Programming for the Absolute Beginner, by Jerry Lee Ford Jr.

Publisher: Cengage Learning PTR; 1 edition (April 23, 2007), ISBN-10: 1598633740, ISBN-13: 978-1598633740

Course Title: Data Structures & Algorithms

Aims

This course aims to introduce a number of popular data structures and algorithms, along with the basic techniques in algorithm analysis.

Learning Outcomes

- Illustrate by example the basic terminology of graph theory and trees
- Write programs that use each of the following data structures: arrays, records, strings, linked lists, stacks, queues, and hash tables.
- Describe the concept of recursion
- Determine the time and space complexity of simple algorithms.
- Describe the several kinds of algorithm (brute force, greedy, divide-and-conquer, backtracking, branch-and-bound, and heuristic).
- Design and implement the most common sorting algorithms.

Syllabus Outline

- Review of elementary programming concepts
- Fundamental data structures: Stacks; queues; linked lists; hash tables; trees; graphs
- Fundamental computing algorithms: simple searching and sorting algorithms; hash tables, including collision-avoidance strategies; binary search trees; representations of graphs; depth- and breadth-first traversals
- Recursion:
- Basic algorithmic analysis: Asymptotic analysis of upper and average complexity bounds; identifying differences among best, average, and worst case behaviors; big “O,” little “o,” omega, and theta notation; standard complexity classes; empirical measurements of performance; time and space tradeoffs in algorithms; using recurrence relations to analyze recursive algorithms
- Algorithmic strategies: Brute-force algorithms; greedy algorithms; divide-and-conquer; backtracking; branch-and-bound; heuristics; pattern matching and string/text algorithms; numerical approximation algorithms
- Overview of programming languages: Programming paradigms

Teaching Methods

- Lectures.
- Practical Sessions.
- Internet Resource.

Assessment

- Final Exam: (50% of the total mark).
- Course work: Assignments, Tests, Homework, and Tutorial (25%).
- Lab work and practical: (25%).

Reference

Data Structures and Algorithms Made Easy: Data Structure and Algorithmic Puzzles, Second Edition, by Narasimha Karumanchi, Publisher: CreateSpace Independent Publishing Platform; 2 edition (December 19, 2011), ISBN-10: 1468108867, ISBN-13: 978-1468108866

Course Title: Operating System Concepts

Aims

Aims to become familiar with, general understanding of structure of modern computers, purpose, structure and functions of operating systems, illustration of key OS aspects by example

Learning Outcomes

- Know the different types of Operating systems and the characteristics of each
- Explore the Operating system view of a process and the offered services to the process including the scheduling algorithms
- Understand the memory management system
- Explore the file management methods and how to improve the performance of the storage devices
- Understand the communication and the Mutual Authentication Problem and its solutions and the concurrency
- Understand the deadlock problem and its solutions

Syllabus Outline

- Operating Systems evolution and types
- Operating system structure
- Operating system components
- Operating system view of a process
- Process, process states, process PCB and process lists, Operating system services for the process, Scheduling algorithms and types, performance criteria's
- Deadlock reasons and solutions
- Memory management, non paged systems, paged systems, swapping, performance problems and solutions
- Virtual memory, Page-replacement algorithms, Locality of reference
- Disk scheduling algorithms
- Process Communication and synchronization, Mutual exclusion solutions: Busy waiting algorithms, hardware support solutions, Semaphores, Monitors

Teaching Methods

- Weekly Lectures
- Supervised computer laboratories

Assessment

- Tests 20%
- Laboratories Assignments 20%
- Final Examination 60%

Reference

Operating System Concepts, by Abraham Silberschatz , Peter B. Galvin, Greg Gagne, Publisher: Wiley; 9 edition (December 17, 2012), ISBN-10: 1118063333, ISBN-13: 978-1118063330

Course Title: Database Concepts

Aims

- 1) To learn the relational model and relational algebra
- 2) To be able to query databases using SQL
- 3) To understand how to build database applications
- 4) To practice designing databases using ER/UML diagrams
- 5) To develop with current database systems

Learning Outcomes

- Explain the characteristics, goals, functions, models, components, applications, and social impact of database systems.
- Describe the modeling concepts and notation of the entity-relationship model and UML, including their use in data modeling.
- Describe the main concepts of the OO model and relational data model.
- Demonstrate queries in the relational algebra and relational calculus.
- Explain and demonstrate the concepts of entity integrity constraint and referential integrity constraint
- Prepare a relational schema from a conceptual model developed using the entity relationship model
- Explain the concepts of Physical database design

Syllabus Outline

- Information models and systems
- Database systems
- Data modeling
- Relational databases: Mapping conceptual schema to a relational schema; entity and referential integrity; relational algebra and relational calculus
- Physical database design: Storage and file structure; indexed files; hashed files; signature files; b-trees; files with dense index; files with variable length records; database efficiency and tuning

Teaching Methods

- Lectures.
- Practical Sessions

Assessment

- Lab work and practical: (25%).
- Final Exam: (50% of the total mark).
- Course work: Includes Assignments, Tests, Homework Assignments, and Tutorial Sessions. (25%).

Reference

Database Systems: A Practical Approach to Design, Implementation, and Management (6th Edition) 6th Edition, by Thomas Connolly, Carolyn Begg, Publisher: Pearson; 6 edition (January 18, 2014), ISBN-10: 0132943263, ISBN-13: 978-0132943260

Algorithm Analysis & Design

Course Description:

In this course, we will study algorithm analysis and design; explore algorithm paradigms and advanced data structures; and uncover classes of apparently hard problems.

Course Objectives:

This course has two major goals. The first is to introduce students to analysis of algorithm methods, focusing on both the underlying mathematical theory and practical considerations of algorithm efficiency (complexity). The second goal focuses on algorithm design strategies, it introduces brute force, divide and conquer, decrease & conquer, transform & conquer, space & time tradeoff.

Course Outcomes

Students who complete this course should be:

1. Able to explain the mathematical concepts used in describing the efficiency (complexity) algorithms.
2. Capable of selecting and applying appropriate algorithm to a particular situation.
3. Know the major algorithm efficiency classes and design strategies classes.

Course Contents

1. Basic algorithmic analysis: Asymptotic analysis:
2. Big O , Ω and Θ notations; standard efficiency (complexity) classes; empirical measurements of performance;
3. Nonrecursive algorithm analysis techniques.
4. Recursive algorithm analysis techniques.
5. fundamental algorithm design strategies: Brute-force; divide-and-conquer; decrease and conquer, transform and conquer, time and space tradeoff.

Teaching Method

- Class lectures
- Quizzes and home works

Course Assessment

- Course work: Includes Assignments, Quizzes, and Tests, (50%).
- Final Exam: (50% of the total mark).

References:

- Introduction to the design and analysis of algorithms, Anany Levitin

Artificial Intelligence

Course Description:

This course covers the basic concepts of artificial intelligence, and some applications, also covers selected topics updated in artificial intelligence

Course Objectives:

The objective of this course is to develop the students' ability to understand the concepts of AI. The students will be taught and required to practice the informed and un-informed search techniques, problem formulation, optimization techniques, knowledge representation and detailed game theory. The students are expected to present their skills by a course project.

Course Outcomes:

By the end of this course the student will be able to

- Know the AI and its applications.
- Explore the knowledge base in AI.
- Practice the searching methods in AI.
- Discover the expert systems & neural networks.
- Know the new selected topics in AI.

Course Contents:

- Introduction to AI.
- Fundamental issues in AI.
- AI applications.
- Knowledge representation and reasoning.
- Searching methods.
- Machine learning and Artificial Neural network.
- AI planning systems.
- Expert Systems and Fuzzy logic.
- Selected topics (Genetic Algorithm, Data Mining, Multi-Agent Systems, Introduction to Computer Vision and Pattern Recognition...)

Teaching methods

- Lectures
- laboratories.

Course Assessment

- Tests, homework and reports. (50%)
- Laboratory and practical exams. (50%)
- Final examinations (100%).

References & Textbooks

1. Artificial Intelligent handout , Ustaza Ammal Hassen Almutasm
2. Alison Cawsey, The essence of Artificial Intelligence
3. Stuart Russell. Peter Norvig, Artificial Intelligence A modern Approach, Second Edition

شبكات الحاسوب

Computer Networks

Course Objective:

The student will be familiar with importance of networking terms how do computer networks and internets operate, describe various network topologies protocols and topologies, identify and use network transmission media; explain the OSI/TCP model; and distinguish between LANs WANs, knowing networks HUB ,Switch ,Router, identify and use IP addressing.

Course content

1. Introduction and network tools.
2. Transmission media and Asynchronous communication.
3. Long distance communication and extending LANs
4. Hardware and IP addresses
5. LAN Topologies and Technology
6. NICs and Ethernet networks.
7. Internetworking, WAN Technologies and Routers.
8. Long distance digital connection technologies.
9. Network ownership, services, paradigm, and performance.
10. IP datagram and datagram forwarding
11. CMP and ARP Protocols.

TCP: Reliable Transport Services

Course outcomes

By the end of this course the student will be able to

1. The student will be familiar with importance of networking terms and symbols.
2. Know how computer networks and internets operate.
3. Identify Network Tools.
4. Can calculate transmission delays in different contexts.
5. Describe various network topologies.
6. Identify and use network transmission media.
7. Explain the OSI and TCP models.
8. Recognize the primary network topologies/protocols. And identify their characteristics, and determine which would be most appropriate for a proposed network.
9. Distinguish between Local Area Networks (LANs) and Wide Area Networks (WANs) and identify the components used to expand a LAN into a WAN.
10. Identify IP addresses and subnetting.

Teaching Method

Lectures and Discussions

Course Assessment

- Quizzes + exercises+ home works 15%
- Attendance+ discussion 5 %
- Tests 30%
- Final Exam 100

References & Text book:

1. Data communication and Networking. Version WB 17.0. WestNet Publishing. ISBN: 1-58676-114-5.
2. Computer networks and internet, Doglas E. Commer

6. مجال نظم المعلومات
تحليل وتصميم النظم

System analysis & design

Course objectives:

This course introduces established and evolving methodologies for the analysis, design, and development of an information system. Emphasis is placed on system characteristics, managing projects, prototyping, CASE/OOM tools, and systems development life cycle phases. Upon successful completion of this course, the student will be able to:

- (a) Define and describe the five phases of the system development life cycle.
 - (b) State at least five expected benefits from systems projects.
 - (c) Explain at least three ways in which information systems support business requirements.
 - (d) Describe how systems analysts interact with users, management, and other information systems professionals.
 - (e) Develop data flow diagrams and decision tables.
 - (f) Perform a feasibility study.
 - (g) Evaluate systems development alternatives.
 - (h) Solve realistic systems analysis problems.
 - (i) Determine methods for evaluating the effectiveness and efficiency of a system.
- Work as an effective team member on assigned projects.

Course Contents:

I. Introduction

- A. Information system components
- B. Types on information systems
- C. System development life cycles
- D. The systems analyst

II. Systems planning

- A. Systems requests
- B. Objectives
- C. Preliminary investigation

III. Determining requirements

- A. Interviews
- B. Other fact-finding techniques
- C. Recording facts
- D. JAD and RAD
- E. Object-oriented systems development

IV. Analyzing requirements

- A. Data flow diagrams
- B. Data dictionary
- C. Process description
- V. Evaluating alternatives
 - A. Software alternatives
 - B. Evaluating software packages
 - C. Hardware alternatives
 - D. CASE tools

VI. Systems design

- A. Output design
- B. Input design
- C. File and database design
- D. System architecture

VII. Systems implementation

- A. Quality assurance
- B. Application development

- C. Documentation
- D. Management approval
- E. Installation
- F. Evaluation
- G. System operation

Textbook: Shelly/Cashman. Systems Analysis and Design. 6 th ed. .

کتابخانه
الفجر

Course Title: Database Applications

Aims

This course aims to know how to design, manipulate and manage databases. The course participants are exposed to the various forms, types and models of database systems to enable them make viable choices. Supportive and complimentary concepts of managing data and documents are thoroughly examined to give a wholesome view of data/information management. The ultimate aim is to encourage the usage of database management systems for effective data management

Learning Outcomes

- Deal with the Database query languages
- Determine the functional dependency between two or more attributes that are a subset of a relation.
- Describe what is meant by 1NF, 2NF, 3NF, and BCNF.
- Identify whether a relation is in 1NF, 2NF, 3NF, or BCNF.
- Describe the issues specific to efficient transaction execution.
- Explain when and why rollback is needed and how logging assures proper rollback.
- Explain the effect of different isolation levels on the concurrency control mechanisms.
- Explain the techniques used for Distributed databases

Syllabus Outline

- Database query languages
- Relational database design: Database design; functional dependency; normal forms; multivalued dependency; join dependency; representation theory
- Transaction processing: Transactions; failure and recovery; concurrency control
- Distributed databases: Distributed data storage; distributed query processing; distributed transaction model; concurrency control; homogeneous and heterogeneous solutions; client-server
- Seminars (Advanced topics in database)
- The course should be supplemented by assignment covering database design for a realistic application, and its implementation using SQL on a relation database system.

Teaching Methods

- Lectures.
- Practical Sessions.

Assessment

- Final Exam: (50% of the total mark).
- Course work: Includes Assignments, Tests, seminars, and Tutorial Sessions. (25%).
- Lab work and practical: (25%).

Reference

Database Systems: A Practical Approach to Design, Implementation, and Management (6th Edition) 6th Edition, by Thomas Connolly, Carolyn Begg, Publisher: Pearson; 6 edition (January 18, 2014), ISBN-10: 0132943263, ISBN-13: 978-0132943260

Information Technology Fundamentals

Aims

This course provides a basic grounding and fluency in the basic information technology (IT) skills necessary for information professionals. The course introduces students to, and provides practical exercises on, several areas of information technology

Learning Outcomes

- Outline the history of computing technology, the Internet, and the World-Wide Web.
- Explain how computing and society impact one another.
- Explain the relationship between IT and related and informing disciplines.
- Explain how and to what extent IT has changed various application domains.
- Explain how IT has impacted the globalization of world economy, culture, political systems, health, security, warfare, etc.
- Explain how the components of an IT system interrelate.
- Explain how and why complexity occurs in IT.

Syllabus Outline

- History of computing technology
- Social history of computing impacts
- Development of user interaction
- History of the Internet
- IT and Its Related and Informing Disciplines
- IT Application Domains (Bio-informatics & medical applications, Business applications, Law enforcement, Political processes, E-commerce, Manufacturing, Education, Entertainment, Agriculture, Software development)
- User centeredness and advocacy
- IT systems model
- Management of complexity (abstraction, modeling, best practices, patterns, standards, and use of appropriate tools, including versioning and group collaboration tools)
- Information and communication technologies
- Adaptability
- Data versus information

Teaching Methods

- Lectures.
- Self Learning

Assessment

- Seminars and reports (30%)
- Mid Term exam (20%)
- Final examinations (50%).

Reference

Fundamentals of Information Technology, by Deepak Bharioke, Publisher: Excel Books (July 14, 2012), ISBN-10: 935062060X, ISBN-13: 978-9350620601

Human-Computer interaction

Course objectives:

The objective of this course is to provide the concepts in human-computer interaction. Students will learn how to design and evaluate user interfaces for computer-based systems, at the end of this course the student should be able to:

- apply user-centered design approaches and techniques design software user interfaces using established design principles.
- produce conceptual and physical designs through prototyping methods evaluate software user interfaces using heuristics and usability testing.

Course Contents:

This course covers topics include cognition, interaction frameworks, design process, evaluation methods, user research, design principles, prototyping techniques, and interaction paradigms. The focus of this course is on developing usable windows-based software applications for desktop computing environments.

Textbook: Human-Computer Interaction: Developing Organizational Information Systems, Dov Te'eni, Jane Carey, & Ping Zhang, John Wiley and Sons, Inc., 2007.

Course Title: Internet Technologies

Aims

The main objectives of this course are to enable students to understand the key design principles used to build the internet and the details of internet protocol and also provide students with a fundamental understanding of web site is developed, implemented, and maintained

Learning Outcomes

- Implement simple web pages using HTML.
- Creating Lists and Forms in HTML.
- Performing Client-side input Validation in JavaScript.
- Implement simple web pages in Visual Studio 2005.
- Using most frequently used web controls (input & lists controls).
- Practicing web environment's error handling.
- Collecting valid data from web forms through input-validation mechanisms "Client and/or Server side scripting", in addition to generating customized dynamic page content.

Syllabus Outline

HTML + Client-side Scripting

- Introducing HTML (basics)
- HTML (Lists & Forms)
- Client-side Scripting (JavaScript)
- Validation (Client-side)

ASP.NET (Server-side Scripting)

- Introducing the .NET Framework
- Learning VB 2005 Language (basics)
- Introducing Visual Studio 2005
- Web Form Fundamentals
- Web Controls
- Error Handling
- Validation using web controls

Teaching Methods

- A set of (in LAB) lectures supported by acceptable practice sessions to provide a good understanding of ASP.NET Web applications.
- Free Lab sessions required.

Assessment

- Exercises & Assignments 80%
- Final Exam 20%

Reference

ASP.NET For Beginners: The Simple Guide to Learning ASP.NET Web Programming Fast!, by Tim Warren, Publisher: CreateSpace Independent Publishing Platform (August 22, 2015), ISBN-10: 1516998235, ISBN-13: 978-1516998234

Cloud Computing

Course Description

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.

Objectives/Learning Outcomes/Capability Development

Program Learning Outcomes

This course contributes to the following program learning outcomes:

- **Enabling Knowledge:**

You will gain skills as you apply knowledge effectively in diverse contexts.

- **Critical Analysis:**

You will learn to accurately and objectively examine and consider computer science and information technology (IT) topics, evidence, or situations, in particular to: analyse and model requirements and constraints for the purpose of designing and implementing software artefacts and IT systems

- **Problem Solving:**

Your capability to analyse problems and synthesise suitable solutions will be extended as you learn to: design and implement software solutions that accommodate specified requirements and constraints, based on analysis or modelling or requirements specification.

- **Communication:**

You will learn to communicate effectively with a variety of audiences through a range of modes and media, in particular to: present a clear, coherent and independent exposition of software applications, alternative IT solutions, and decision recommendations to both IT

and non-IT personnel via technical reports of professional standard and technical presentations.

- **Team Work:**

You will learn to work as an effective and productive team member in a range of professional and social situations, in particular to: work effectively in different roles, to form, manage, and successfully produce outcomes from teams, whose members may have diverse cultural backgrounds and life circumstances, and differing levels of technical expertise.

Course Learning Outcomes

Upon successful completion of this course you should be able to:

- compare the operation, implementation and performance of cloud computing systems, and the relative merits and suitability of each for complex data-intensive applications
- explain and characterise different cloud computing models, namely, infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS)
- identify security implications in cloud computing
- analyse the trade-offs inherent in Cloud Computing
- compare, contrast, and evaluate the key trade-offs between multiple approaches to cloud system design
- identify appropriate design choices when solving real-world cloud computing problems
- write comprehensive case studies analysing and contrasting different cloud computing solutions
- make recommendations on cloud computing solutions for an enterprise
- work in teams to contribute, evaluate, and feedback on case studies on different cloud computing solutions.

Overview of Learning Activities

The learning activities included in this course are:

- key concepts will be explained in lectures, industry experts will also present on current industry examples of applications and solutions
- tutorials and labs you will learn the tools and techniques, such as how to use cloud computing tools offered by industry leaders, like Amazon, Microsoft, Google, and practice report writing with case studies
- project-based learning, where you will work in a group to analyse and solve industry-related problems with cloud computing solutions

- private study, working through the course as presented in classes and learning materials, group discussions (including online forums), and gaining practice at solving conceptual and technical problems.

Overview of Learning Resources

You will make extensive use of computer laboratories and relevant software provided by the School. You will be able to access course information and learning materials through myRMIT. Lists of relevant reference texts, resources in the library and freely accessible Internet sites will be provided.

کتابخانه
الوفیر

Database Management Systems (DBMS)

Course Objectives:

To study databases from three viewpoints:

1. The database user,
2. The database designer,
3. The database manager.

Teach the use of a database management system (DBMS) by treating it as a black box, focusing only on its functionality and its interfaces.

Sub-objectives:

1. Understand the principles of relational database management Systems and their languages SQL.
2. Learn the methodology for building applications on top of database management systems –data modeling
3. Learn issues related to the management of large-scale DBMSs – Performance monitoring, tuning, security, privacy.

Contents:

1. Introduction to Databases and Transactions:
 - 1.1 What is database system, purpose of database system, view of data, relational.
 - 1.2 Databases, database architecture, transaction management.
2. Data Models:
 - 2.1 The importance of data models, Basic building blocks, Business rules, The evolution.
 - 2.2 of data models, Degrees of data abstraction.
3. Database Design ,ER-Diagram and Unified Modeling Language:
 - 3.1 Database design and ER Model: overview, ER-Model, Constraints, ER-Diagrams, ERD.
 - 3.2 Issues, weak entity sets, Codd's rules, Relational Schemas, Introduction to UML.
 - 3.3 Relational database model: Logical view of data, keys, integrity rules.
 - 3.4 Relational Database design: features of good relational database design, atomic domain and Normalization (1NF, 2NF, 3NF, BCNF).
4. Relational Algebra and Calculus:
 - 4.1 Relational algebra: introduction, Selection and projection, set operations, renaming,
 - 4.2 Joins, Division, syntax, semantics. Operators, grouping and ungrouping,
 - 4.3 Relational comparison.
 - 4.4 Calculus: Tuple relational calculus, Domain relational Calculus, calculus vs algebra.
 - 4.5 Computational capabilities.
5. Constraints, Views and SQL:
 - 5.1 What constraints, types are of constrains, Integrity constraints.
 - 5.2 Views: Introduction to views, data independence, security, updates on views.
 - 5.3 Comparison between tables and views.

- 5.4 SQL: data definition, aggregate function, Null Values, nested sub queries, Joined relations. Triggers.
6. Transaction management and Concurrency control:
- 6.1 Transaction management: ACID properties, serializability and concurrency control.
- 6.2 Lock based concurrency control (2PL, Deadlocks), Time stamping methods.
- 6.3 Optimistic methods, database recovery management.

Textbook:

- A Silberschatz, H Korth, S Sudarshan, "Database System and Concepts", fifth Edition McGraw-Hill, Rob, Coronel, "Database Systems", Seventh Edition, Cengage Learning.

أمن المعلومات

Information Security Management

Course objectives:

This course provides an in depth exposure to information security principles, practices, methods, and tools.

Course contents:

This course covers the following topics

- ☐ Introduction to Security
- ☐ System Threats and Risks
- ☐ Protecting Systems
- ☐ Network Vulnerabilities and Attacks
- ☐ Network Defenses
- ☐ Wireless Network Security
- ☐ Access Control Fundamentals
- ☐ Authentication
- ☐ Performing Vulnerability Assessments
- ☐ Conducting Security Audits
- ☐ Basic Cryptography
- ☐ Applying Cryptography
- ☐ Business Continuity Planning and Procedures
- ☐ Policies and Legislation

Textbook: Matthew Bishop, Computer Security: Art and Science Addison- Wesley, 2003.

Course Title: Multimedia Systems

Aims

This course covers contemporary, interactive multimedia technology systems, focusing on types, applications, and theories of operation. In addition to the computer generated media, text, still graphics, and sound, the student will learn how to digitize and manipulate images, voice, video materials, and software computer generated multimedia applications. They will explore the user interface, design and implementation of real multimedia.

Learning Outcomes

- Identify and differentiate the attributes and characteristics of 5multimedia elements (graphics, text, audio, video and animation)
- Implement proper methodology in multimedia production. design and create multimedia elements using authoring software. A
- ppply multimedia development skill in a real world context.
- Demonstrate teamwork through group project.

Syllabus Outline

- Introduction to Multimedia
- Introduction to Making Multimedia
- Multimedia Skills – Storyboard
- Understanding Multimedia Elements (Text, Sound, Image, Animations, Video)
- principles of computer graphic
- Description and modelling of three-dimensional objects
- Display and rendering
- The graphics-pipeline
- Reflection models
- Illumination
- The radiosity method
- Ray tracing techniques
- Colors in computer graphics
- Image-based rendering and photo-modeling

Teaching Methods

- Lectures
- Lab

Assessment

- Final Exam: 60
- Project: 40%

Reference

Dastbaz, Mohammad. (2002).*Design and development of interactivemultimediasystems*.NewYork: McGraw

Distributed Databases -

Course objectives:

This course will introduce principles and foundations of distributed databases, including architecture, design issues, integrity control, query processing and optimization, transactions, and concurrency control.

Prerequisites: Students should be familiar with basic concepts in databases (including relational databases, SQL, and relational algebra) and algorithms, as well as having good programming skills. This material is taught in the courses Introduction to Databases, Introduction to Programming, and Data Structures and Algorithms. Moreover, some knowledge about database management systems (including indexing and query processing) is helpful.

Syllabus:

- Introduction to Distributed Databases (2hours)
- DDBMS Architecture (2hours)
- Distributed Database Design (4hours)
- Semantic Integrity Control (2hours)
- Distributed Query Processing and Optimization (8 hours)
- Transactions, Concurrency Control (4 hours)
- Reliability (2 hours)

Textbook:

M. Tamer Oezsu, Patrick Valduriez ``Principles of Distributed Database Systems, Second Edition" Prentice Hall, ISBN 0-13-659707-6, 1999

Network using and management

This course is designed to enable students to:

- ☐ ☐ Plan what network model to apply to your network.
- ☐ ☐ Explain the new features in Windows server and/ Unix.
- ☐ ☐ Describe the file systems that are compatible with Windows server and choose the file system that is right for your server.
- ☐ ☐ Explain basic network concepts, including network terms, types of networks, and network cards.
- ☐ ☐ Install Windows Server using different methods, including from a CD-ROM, from the installation disks, over a network, unattended, and from another operating system
- ☐ ☐ Troubleshoot installation problems and uninstall Windows Server.
- ☐ ☐ Create and manage accounts, including setting up a new account, configuring account properties, delegating account management, and renaming, disabling, and deleting an account.
- ☐ ☐ Manage objects, such as folders, through user rights, attributes permissions, share permissions, auditing, and Web permissions.
- ☐ ☐ Use the System Monitor to monitor page file, memory, processor, disk and other critical server performance functions and to tune these functions as needed.
- ☐ ☐ Troubleshoot configuration, security, connectivity, and network printing problems.

Course Outlines:

- Networking with Microsoft Windows Server and/or Unix.
- Planning Network Protocols and Compatibility.
- Planning for Server Hardware Compatibility, Disk Storage, and Operating System Requirements.
- Planning the Active Directory Implementation.
- Server Installation.
- Server Configuration.
- Configuring Storage, Backup, and Performance Options.
- Managing the Server and Clients through Accounts and Groups.
- Managing Server Folders, Security, and Software Installation.
- Printer Installation and Management.
- Server Monitoring and Optimization.
- Network Monitoring and Tuning.
- Troubleshooting

Mobile Applications Development

Course objectives:

Mobile Computing: Building Applications for Handheld Devices: Mobile devices are becoming more prevalent and the demand for applications that can run on these mobile devices keeps growing.

Course Contents:

This course will focus on the strengths and limitations of mobile devices. Students will explore these topics through the conception and creation of applications for the iPhone/iPod Touch architecture. By the end of the semester, all students will be developing iPhone applications and testing them on devices. This course will be hands on and project based

مشروع تخرج

Graduation Project (1+2)

Objectives:

To give students the opportunity to work in a guided but independent fashion to explore a substantial related computing information system problem in depth, making practical use of principles, techniques and methodologies acquired elsewhere in the course. To give experience of carrying out a large piece of individual work and in producing a dissertation. To enhance communication skills, both oral and written.

Learning outcomes: After completing the module students should be able:

- To specify a substantial problem, and produce a plan to address the problem
- To manage their time effectively so as to carry out their plan
- To locate and make use of information relevant to their project
- To design a solution to a substantial problem
- To implement and test their solution
- To evaluate in a critical fashion the work they have done, and to place it in the context of related work
- To prepare and deliver a formal presentation
- To prepare and deliver a demonstration of software
- To structure and write a dissertation describing their project

Course Contents:

All projects should contain the following elements: research, design, realization and evaluation. Particular topics are allocated on an individual basis.

قواعد بيانات متقدمة

Advanced database

Description

This course covers advanced aspects of database management systems including advanced normalization and denormalization, query optimization, object-oriented and object-relational databases, data warehousing, data mining, distributed databases, XML, XSL, and databases for web applications. There is extensive coverage of SQL and database instance tuning. Students learn about the advanced object-relational features in DBMS such as Oracle, including navigational query, BLOBs, abstract data types, and methods. Students learn about database programming in Oracle's PL/SQL language, including triggers, stored procedures, and methods. By the end of the course, students should understand the basic concepts in all of these advanced database topics. Students define independent

advanced database term projects, which may be related to their work or other interests. The students prepare reports and audio-video presentations for their classmates using PowerPoint and Impatica

Course Objective

will cover a number of advanced topics in big data, databases, and modern data-intensive systems. The specific topics include advanced concurrency control techniques, query processing and optimization strategies for relational database systems, advanced indexing methods, parallel and distributed database systems, map-reduce/hadoop, NoSQL, database-as-a-service (DB clouds), data mining on large databases, data on the web, and topics in database security and privacy.

In addition to learning advanced topics in databases, this course will also give you an opportunity to practice important research skills:

- You will gain experience reading and critically evaluating original research papers.
- You will practice communicating complex technical material, both orally and in written form.
- You will complete a small-scale original research project of your own choosing.

تقنيات انترنت متقدمة

Course Title: Advanced Internet Technologies

Aims

The aim of this course is to explore the advanced technologies which are implemented, developed or under research in the rapid changing area of the Internet. It is also to examine the internal mechanisms and technologies that have been developed to support voice, data, and multimedia communications over Internet.

Learning Outcomes

- Implement Web based navigation techniques.
- Working with database through web application.
- Implement Website security strategy.
- Maintaining the WebEnvironmentState "Global variables & cross-page posting".
- Transferring data across web pages using deferent mechanisms.

Syllabus Outline

Website Navigation

- Site Maps
- Navigation Controls (Menu &TreeView)

State Management

- ViewState
- Transferring information (Cross-Page & Query String)
- SessionState

Working with Database

- ADO.NET fundamentals
- Data Binding
- Data Controls

Website Security

- Forms Authentication

Teaching Methods

- A set of lectures supported by acceptable practice sessions to provide a good understanding of ASP.NET Web applications.
- During the practical sessions students need to work individually and in groups for the coursework.
- Free Lab sessions required.

Assessment

- Exercises & Assignments 60%
- Final Exam 40%

Reference

ASP.NET For Beginners: The Simple Guide to Learning ASP.NET Web Programming Fast!, by Tim Warren, Publisher: CreateSpace Independent Publishing Platform (August 22, 2015), ISBN-10: 1516998235, ISBN-13: 978-1516998234

شبكات حاسوب متقدمة

Advanced Computer Networks

This course will cover the principles of networking with a focus on algorithms, protocols, and implementations for advanced networking services. We will begin with a brief retrospection on the design of the Internet, its basic mechanisms and protocols. We will examine a variety of ideas that were proposed to enhance the Internet, why some of these enhancements were successful while others were not. Subsequently we will move on to a select set of advanced topics in networking, primarily at recent and ongoing advances in "the edges" of the Internet. We will focus on:

- The "physical edge" of the Internet, i.e., access networks. In particular, we will examine how proliferation of mobile, wireless access techniques affect choice of algorithms, protocols, and their implementations.
- The "logical edge" of the Internet, i.e., overlay-based (peer-to-peer) systems.

All topics in this course will be covered through research papers. In each class I will lead a discussion on one or two papers. In order to have a discussion, students will be expected to have read these papers prior to class.

Each student in the class will be expected to do a research project. In the first two classes I will discuss a number of possible projects. However, students are encouraged to define their own ideas for research projects. For each research project, a student should submit a written project plan, a summary at the end of the semester and an oral presentation on the project.

References:

[Computer Networks: A Systems Approach](#) (3rd Edition)

by Larry Peterson and Bruce Davie. Morgan Kaufmann, 2003.

ISBN: 1-55860-832-X

[Computer Networking: A Top-Down Approach Featuring the Internet](#)

by Jim Kurose and Keith Ross, Addison-Wesley.

ISBN: 0-201-61274-7

Advanced Multimedia Applications

introduces students to the exciting world of multimedia, a combination of sound, animation, graphics, and video. Students will work with a variety of software including programs used for sound and video production, multimedia presentations, web and desktop publishing, and photo & image editing. This course incorporates lecture, tutorials, and hands-on activities, which build skills and techniques for a variety of software programs to create and edit multimedia content. Once students have developed proficiency with these software programs, they will complete individual and group projects utilizing interactive methodologies to turn their creative visions into projects. A final project will be required in both sections. At the end of the course, students will understand current multimedia data types, efficient design solutions and established standards for multimedia, and gain experiences in multimedia processing. The core of this class is creativity! Let your mind, gifts, and talents come alive here!

Explores technical fundamentals of creating multimedia projects with related hardware and software. Students will learn to manage resources required for multimedia production and evaluation and techniques for selection of graphics and multimedia software.

nt using digital media; video clips, still images, and audio (sounds, music, and narration).

References:

Vaughan, Tay. *Multimedia: Making it Work*, 7th ed. New York: McGraw-Hill, 2008.

PaintShop Pro Photo X2 Software

تجارة الكترونية

E- Commerce

Course objectives:

This course is designed to provide an overview of E-Commerce models, applications, decisions and issues. Examples of materials covered in this course are E-Commerce Business and revenue models, E-Commerce Strategies and marketing concepts, specific applications such as B2B, web 2.0, E-Learning and E-Government, as well as technology, security and payments. This course will benefit students with an interest in working in an E-Commerce environment, starting their own E-Commerce business or evaluating E-Commerce activities.

Upon successful completion of this course, students will be able to:

1. Outline a basic model of the Internet technology infrastructure.
2. Assess E-Commerce strategies and applications, including online marketing, Government,
3. E-Learning and global E-Commerce.
4. Discuss the significance of Web 2.0 content and social networks in E-Commerce.
5. Differentiate electronic marketplaces and give examples of E-tailing products and services.
6. Compare B2B and B2C E-Commerce strategies, including market segmentation.
7. Categorize advantages and disadvantages of different online payment options.
8. Discuss common legal, ethical and tax issues in E-Commerce.

9. Use the knowledge of online security issues to assess existing websites.
10. Use the knowledge of the major E-Commerce revenue models to evaluate existing websites.
11. Build an E-Commerce application.

Course Contents:

1. Overview of Electronic Commerce (EC).
2. E-Marketplaces (Auctions, Portals etc.).
3. E-Tailing Products and Services.
4. Online Marketing and Online Consumer Behavior.
5. Business- to-Business E-Commerce.
6. E-Government and E-Learning.
7. Web 2.0, Social Networks and Search Engine Optimization.
8. E-Commerce Security.
9. Payment Solutions and Order Fulfillment.
10. E-Commerce Strategy and Global Issues.
11. Legal, Ethical and Tax Issues.
12. Launching an E-Commerce Business.
13. E-Commerce Business Analysis Term Project.

Textbook:

- Turban, King & Lang. Introduction to Electronic Commerce. 2nd. edition. Pearson Prentice Hall, 2009.

إدارة المعرفة

Course Title: Knowledge Management

Aims

The goal of this course is to give you a solid foundation covering the major problems, challenges, concepts, and techniques dealing with the organization and management of knowledge with the help of computers.

Learning Outcomes

1. Identify and illustrate different forms of knowledge
2. Understand the relationship between individual and organisational knowledge and learning processes.
3. Evaluate the potential of knowledge management tools to support knowledge creation and transfer in particular contexts.
4. Demonstrate their potential to make an informed contribution to future knowledge management projects.

Syllabus Outline

1. **Introduction:** Data information and knowledge; knowledge elicitation, analysis and representation; background to recent interest in knowledge management in organisations.
2. **Understanding Knowledge in Organisations:** Different categories of knowledge, e.g. tacit and explicit; embodied, embedded, embrained, encultured, encoded; propositional, practical, experiential; knowledge in action; knowing as culturally situated, artefact mediated, socially distributed, personal and provisional; communities of practice; organisational knowledge and learning; individual, social and critical perspectives.
3. **Managing Knowledge in Organisations:** Assessing, organising and creating knowledge in organisations; the process of knowledge management as generation, codification and transfer; techniques and technologies for knowledge management; epistemological, ontological and

- temporal dimensions of knowledge creation; Nonaka and Takeuchi's knowledge spiral.
4. **Issues for the Future:** Potential and pitfalls of knowledge management projects; trust, intellectual property; implications for research and practice.

Teaching Methods

- Lectures
- Seminars

Assessment

- Final Exam: 60
- Class Presentations: 20%
- Mid Term Exam: 20%

Reference

Knowledge Management Systems: Information and Communication Technologies for Knowledge Management, by Ronald Maier, Publisher: Springer; 3rd edition (July 31, 2007), ISBN-10: 3540714073, ISBN-13: 978-3540714071

Course Title: Economics Fundamentals

Aims

This course aims for students to develop a basic understanding of economic principles in order to discuss issues at the level covered by the other subjects and public media

Learning Outcomes

- Improve economic literacy
- Improve critical thinking and problem solving skills by using economic models to explain and predict economic relationships
- Improve student's abilities to evaluate views and opinions related to economics and develop their own perspectives based on sound reasoning
- Improve student's understanding of economics issues and events

Syllabus Outline

- Economics and Economic Reasoning
- Microeconomics
 - Supply and Demand
 - Welfare Economics
 - Firm Behavior in a Competitive Market
 - Property Rights and Market Failures
 - Market Power and Regulation
 - Factor Markets
- Macroeconomics
 - The Real Economy in the Long-run
 - Money, Banking and Prices
 - Open Economies
 - Macroeconomic Fluctuations and Stabilization

Teaching Methods

- Lectures.
- Tutorial

Assessment

- Final Exam: 50%
- Course work: Includes Assignments, Tests, Homework Assignments, and Tutorial Sessions. 25%
- Mid Term Exam 25%

Reference

Fundamentals of Economics, by William Boyes, Michael Melvin, Publisher: South-Western College Pub; 4 edition (January 15, 2008), ISBN-10: 0618992677, ISBN-13: 978-0618992676

Principles of Accounting

Course Objectives:

Accounting plays a vital role as an information system for monitoring, problem solving and decision-making. However, the first step is to generate and present information in a manner that is useful. In recognition of this, this course is the first part of a two-semester's course, upon completion of it; students should be able to:

1. Describe the nature of a business and the role of Accounting in business.
2. Understand the difference between the specialized fields of Accounting in practice.
3. Summarize the development of accounting principles and relate them to practice.

Develop a thorough understanding of accounting records and how to record transactions in them (i.e. describe and illustrate how business transactions can be analyzed, recorded and summarized).

Course Content:

1. Nature of business and accounting.
2. The role of accounting in business.
3. Profession of accounting (i.e. specialized fields of accounting in practice).
4. Business stakeholders (users of accounting information).
5. Theoretical framework of accounting: Concepts & Principles
6. Business transactions and the accounting equation.
7. Elements of financial statements and their definitions.
8. Financial Statements of a proprietorship and their interrelation
9. Analyses of transactions.
10. Double Entry bookkeeping.
11. Using Accounts to record transactions.
12. Journalizing transactions.
13. Posting journal entries to the Ledger.
14. Preparation of unadjusted Trail Balance.

Course Title: Management Fundamentals

Aims

To assist students in learning how to handle the basic responsibilities of a managerial position. And understand the different process of management

Learning Outcomes

- Make plans to establish, organize, control, and supervise organizations.
- Prepare budgets.
- Lay down policies for communications, decision-making, storing, improvement, and evaluation using statistical methods.

Syllabus Outline

- Management philosophy.

<ul style="list-style-type: none"> • The main four management functions: Planning, Organization, Direction, Control • Communication: its importance, its elements, its types, its barriers and its tools. • The new management theory, Dr. Deming 14 points, its implementation and success in Japan. • Statistical process control and control charts. • Obstacles standing in the way of management reforms. • Time management. • Budgets. • Operation research: types of problems and their solutions. • Organizations profit curves to control projects. • Critical path method for network analysis. • Decision making policies: types of policies, types of decisions, how to make a decision, tools and theory. • Main principles for stores management.

Teaching Methods
<ul style="list-style-type: none"> • Lectures. • Workshops. • Seminar Presentations.

Assessment
<p>1- Course Work (50%): Attendance, Quiz's, Seminar Presentations, Mid-Term Tests.</p> <p>2- Final Exam (50%)</p>

Reference
<p>Management Fundamentals: Concepts, Applications, Skill Development by Robert N. Lussier, Publisher: Cengage Learning; 5 edition (June 10, 2011) , ISBN-10: 1111577528, ISBN-13: 978-1111577520</p>

أخلاقيات مهنية

Course Title: Professional, Ethics

Aims
The course concentrates on the theory and practice of computer ethics. The aim of the course is to study the basis for ethical decision-making and the methodology for reaching ethical decisions concerning computing matters.

Learning Outcomes
<ul style="list-style-type: none"> • Social context of computing: Introduction to the social implications of computing; social implications of networked communication; growth of, control of, and access to the Internet; gender-related issues; international issues • Methods and tools of analysis: Making and evaluating ethical arguments; identifying and evaluating ethical choices; understanding the social context of design; identifying assumptions and values • Professional and ethical responsibilities • Risks and liabilities of computer-based systems: • Intellectual property: Foundations of intellectual property; copyrights, patents, and trade secrets; software piracy • Privacy and civil liberties • Computer crime: History and examples of computer crime; "Cracking" and its effects; viruses, worms, and Trojan horses; crime prevention strategies

Syllabus Outline

- History of computing 1 core hour
- Social context of computing 3 core hours
- Methods and tools of analysis 2 core hours
- Professional and ethical responsibilities 3 core hours
- Risks and liabilities of computer-based systems 2 core hours
- Intellectual property 3 core hours
- Privacy and civil liberties 2 core hours
- Computer crime 3 hours
- Economic issues in computing 2 hours
- Philosophical frameworks 2 hours

Teaching Methods

- Lectures

Assessment

- Final Exam: 30
- Class Presentations: 40%
- Assignments: 30%

Reference

Computer Ethics, by Deborah G. Johnson, Publisher: Pearson; 4 edition (January 3, 2009), ISBN-10: 0131112414, ISBN-13: 978-0131112414

أخلاقيات حوسبة ، د. مضوي مختار المشرف و د. عبدالرحمن الشريف ، دار الرباط للنشر 2011م