



المناهج الدراسية لفرع البرامجيات
2024-2023



First Year – First Semester

Code	Title	Hours / Week			
		Lect.	Lab.	Tut.	ETCS
PRFU111	Programming Fundamental	4	2	1	8
MATH112	Mathematics	4	2	1	8
STPR113	Statistics and Probability	4		2	6
FUCT114	Fundamental of Computer Technology	2		2	4
DEHR105	Democracy and Human Rights	2			2
WSHS106	Workshop		3		2
Totals		16	5	9	30

First Year – Second Semester

Code	Title	Hours / Week			
		Lect.	Lab.	Tut.	Units
STPR121	Structured Programming	4	2	1	8
DIST122	Discrete Structure	3		1	5
COLD123	Computer Organization and Logic design	3	2	1	6
SODT124	Software Development Techniques	2		2	4
SOEN125	Software Engineering	2	2	1	5
WSHS106	Work shop	-	3	-	2
Total		14	9	6	30



Second Year – First Semester					
Code Lab.	Title Disc.	Hours / Week			
		Lect.	Lab.	Disc.	Units
CSC11	Object Oriented Programming 1	2	2	1	3
CSC13	Data Structures	2	2	1	3
CSC15	Mathematics 3	2	2	1	3
CSC17	Database Foundation	2	2	1	3
CSC46	Software Engineering 2	2	2	1	3
BAPC216	Baath Party Crimes	2	-	-	2
Totals		12	10	5	17

Second Year – Second Semester					
Code Lab.	Title Disc.	Hours / Week			
		Lect.	Lab.	Disc.	Units
CSC12	Object oriented programming2	2	2	1	3
CSC14	Sorting and Searching Algorithms	2	2	1	3
CSC16	Numerical Analysis	2	2	1	3
CSC18	DataBase Design	2	2	1	3
DEHR105	Democracy and Human Rights	2	-	-	2
CSS03	Analysis and Design of Algorithms	2	2	-	3
CSS04	Computational Complexity	2	-	-	2
CSC52	English Language 2	2	-	-	1
Totals		16	10	4	20



Third Year – First Semester					
Code	Title	Hours / Week			
		Lect..	Lab.	Disc.	Units
CSC21	Microprocessor	2	2	1	3
CSC23	Computation Theory	2	-	1	2
CSC53	English Language 3	2	-	-	1
CSC48	Machine Learning	2	2	1	3
CSS05	Computer Graphics and Visualization 1	2	2	1	3
CSS06	Parallel Programming Paradigms	2	2	1	3
CSS07	Software Modelling and analysis	2	2	-	3
CSS08	Information Retrieval Techniques	2	-	-	2
Totals		16	10	5	20

Third Year – Second Semester					
Code	Title	Hours / Week			
		Lect.	Lab.	Disc.	Units
CSC26	Computer Architecture	2	2	1	3
CSC28	Compiler Design	2	2	1	3
CSC42	Computer Network 1	2	2	1	3
CSS09	Computer Graphics and Visualization 2	2	2	1	3
CSS10	Data Mining and Data Warehousing	2	-	1	2
CSS11	SoftWare Design	2	-	-	2
CSS12	Mobile Application Design	2	2	-	3



Totals		14	10	5	19
Fourth Year – First Semester					
Code	Title	Hours / Week			
		Lect.	Lab.	Disc.	Units
CSC41	Static Web Programming	2	2	1	3
CSC43	Operating System 1	2	2	1	3
CSC29	Image Processing 1	2	2	1	3
CSC31	Data Security 1	2	2	1	3
CSS14	Windows Programming 1	2	2	1	3
CSS16	Human Computer Interaction	2	-	-	2
CSC50	Project	2	2	-	3
Totals		14	12	5	20

Fourth Year – Second Semester					
Code	Title	Hours / Week			
		Lect.	Lab.	Disc.	Units
CSC42	Dynamic Web Programming	2	2	1	3
CSC44	Operating System 2	2	2	1	3
CSC30	Image Processing 2	2	2	1	3
CSS13	Secure Software Engineering	2	-	-	2
CSS15	Windows Programming 2	2	2	1	3
CSC45	Intelligent Search Methods	2	2	-	3
CSC50	Project	2	2	-	3
CSC54	English Language 4	2	-	-	1

University of Technology
Computer Sciences Department

Software Branch

2023-2024



Totals	16	12	4	21
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المناهج الدراسية لفرع نظم المعلومات للعام الدراسي ٢٠٢٣-٢٠٢٤



First Year – First Semester										
Subject Code	Subject in English	SSWL (hr/w)			Pr (hr/w)	Exam	SWL	USSWL	SSWL	ECTS
		CL (hr/w)	Lab (hr/w)	Tut (hr/w)			hr/sem	hr/sem	hr/sem	
PRFU111	Programming Fundamental	4	2	1		3	108	92	200	8.00
MATH112	Mathematics	4	2	1		3	108	92	200	8.00
STPR113	Statistics and Probability	4		2		3	93	57	150	6.00
PRIS114	Principle of Information System	4		2		3	93	7	100	4.00
DEHR105	Democracy and Human Right	2				3	33	17	50	2.00
WSHS106	Workshops		3		3	2	47	3	50	2.00
Total		18	4	6	3	17	492	269	750	30.00

First Year – Second Semester										
Subject Code	Subject in English	SSWL (hr/w)			Pr (hr/w)	Exam	SWL	USSWL	SSWL	ECTS
		CL (hr/w)	Lab (hr/w)	Tut (hr/w)			hr/sem	hr/sem	hr/sem	
STPR121	Structured Programming	4	2	1		3	108	92	200	8.00
DIST122	Discrete Structures	3		1		3	63	62	125	5.00
COLD123	Computer Organization and Logic	3	2	1		3	95	55	150	6.00
E-TE124	E-Techniques	2	2	1		3	80	45	120	5.00
INTE125	Information Technology	2		2		3	63	37	100	4.00
WSHS106	Workshops		3		3	2	47	3	50	2.00
Total		14	9	6	3	17	455	295	750	30.00



Second Year – First Semester					
Subject Code	Subject in English	Number of Hours / Week			
		Theory	Lab	Tutorial	Units
CSCL2112	Object Oriented Programming 1	2	2	1	3
CSCL2114	Data Structures	2	2	1	3
CSCL2116	Mathematics 3	2	2	1	3
CSCL2118	Database Foundation	2	2	1	3
CSIS2104	Projects Management	2	-	1	2
CSCL2120	Crimes of the Baath Regime in Iraq	2	-	-	2
		12	8	5	16

Second Year – Second Semester					
Subject Code	Subject in English	Number of Hours / Week			
		Theory	Lab	Tutorial	Units
CSCL2213	Object oriented programming2	2	2	1	3
CSCL2215	Sorting and Searching Algorithms	2	2	1	3
CSCL2217	Numerical Analysis	2	2	1	3
CSCL2219	Database Design	2	2	1	3
CSIS2205	System Analysis and Design	2	2	-	3
CSIS2206	IT Projects Management	2	2	-	3
CSCL2221	Democracy and Human Rights	2	-	-	2
CSCL2122	English Language 2	2	-	-	1
		16	12	4	21



Third Year – First Semester					
Subject Code	Subject in English	/ Week Number of Hours			
		Theory	Lab	Tutorial	Units
CSCL3123	Microprocessor	2	2	1	3
CSCL3125	Computation Theory	2	-	1	2
CSCL3127	Operations Research	2	-	-	2
CSCL3129	Knowledge Representation	2	2	-	3
CSIS3107	Distributed database	2	2	1	3
CSIS3109	Computer Graphic	2	2	1	3
CSIS3111	Web Information Systems	2	2	1	3
CSCL3133	English Language 3	2	-	-	1
		16	10	5	20

Third Year – Second Semester					
Subject Code	Subject in English	Number of Hours / Week			
		Theory	Lab	Tutorial	Units
CSCL3224	Computer Architecture	2	2	1	3
CSCL3226	Compiler Design	2	2	1	3
CSCL3228	Optimization	2	-	-	2
CSCL3230	Intelligent Searching Techniques	2	2	-	3
CSIS3208	Data Warehouse	2	-	1	2
CSIS3210	Geographic Information System	2	2	1	3
CSIS3212	Business Application Development	2	2	-	3
		14	10	4	19



Fourth Year – First Semester					
Subject Code	Subject in English	/ Week Number of Hours			
		Theory	Lab	Tutorial	Units
CSCL4134	Static Web Programming	2	2	1	3
CSCL4136	Operating System 1	2	2	1	3
CSCL4138	Data Security 1	2	2	1	3
CSIS4113	Computer networking	2	2	1	3
CSIS4115	Soft Computing	2	2	1	3
CSIS4116	Management information System	2	-	-	2
		12	10	5	17

Fourth Year – Second Semester					
Subject Code	Subject in English	Number of Hours / Week			
		Theory	Lab	Tutorial	Units
CSCL4235	Dynamic Web Programming	2	2	1	3
CSCL4237	Operating System 2	2	2	1	3
CSCL4239	Data Security 2	2	2	1	3
CSIS4214	Cloud computing foundations	2	-	1	2
CSIS4217	Data Analysis Methods	2	2	1	3
CSIS4218	Accounting information systems	2	-	-	2
CSCL444	Project	2	2	-	6
CSCL4142	English Language 4	2	-	-	1
		16	10	5	23



المناهج الدراسية لفرع الذكاء الاصطناعي للعام الدراسي 2024-2023

المناهج الدراسية لفرع الذكاء الاصطناعي (٢٠٢٣-٢٠٢٤)

منهج المرحلة الاولى-نظام بولونيا- الكورس الاول

ECTS	USSWL	SSWL	Exam (Hours)	Tutorial	No. of .Lab hour	No. Of Theory hour	Subject Code	Subject	اسم المادة	ت
8	90	110	5	1	2	4	PRFU111	Programming Fundemental	اساسيات البرمجة	1
8	90	110	5	1	2	4	MATH112	Mathematics	الرياضيات	2
6	57	93	3	2		4	STPR113	Statistics and Probability	الاحصاء والاحتمالات	3
4	37	63	3	2		2	PRAI114	Principles of Artificial Intellig	مبادئ الذكاء الاصطناعي	4
2	17	33	3			2	HURD115	Human Right and Democracy	حقوق الانسان والديمقراطية	5
2	3.5	46.5	2		3		WORK106	Workshop	المعامل	6
30	294.5	455.5		6	7	16		Total		

منهج المرحلة الاولى-نظام بولونيا- الكورس الثاني

ECTS	USSWL	SSWL	Exam (Hours)	Tutorial	No. of .Lab hour	No. Of Theory hour	Subject Code	Subject	اسم المادة	ت
8	90	110	5	1	2	4	STPR121	Structure Programming	البرمجة الهيكلية	1
5	62	63	3	1		3	DIST122	Discrete Structures	الهياكل المتقطعة	2
6	55	95	5	1	2	3	COLD123	Computer Organization and	تركيب الحاسوب والتصميم المنط	3
5	45	80	5	1	2	2	PRLA124	Prolog Language	لغة برولوج	4
4	37	63	3	2		2	KNRM125	Knowledge Representation M	طرق تمثيل المعرفة	5
2	3.5	46.5	2				WORK106	Workshop	المعامل	6
30	292.5	457.5		6	6	14		Total		

منهج المرحلة الثانية-نظام كورسات- الكورس الاول

			No. of Units	Tutorial	No. of .Lab hour	No. Of Theory hour	Subject Code	Subject	اسم المادة	ت
			3	1	2	2	CSCL2112	Object Oriented Programming I	برمجة شينية ١	1
			3	1	2	2	CSCL2114	Data Structures	هياكل بيانات	2
			3	1	2	2	CSCL2116	Mathematics III	رياضيات ٣	3
			3	1	2	2	CSCL2118	Database Foundation	اساسيات قواعد البيانات	4
			3	1	2	2	CSAI2104	NLP and Python Language	معالجة لغات طبيعية ولغة بايثون	5
			2	-	-	2	CBRI216	Crimes of Baath Regime in Iraq	جرائم نظام البعث في العراق	6
			17	5	10	12		Total		

منهج المرحلة الثانية-نظام كورسات- الكورس الثاني

			No. of Units	Tutorial	No. of .Lab hour	No. Of Theory hour	Subject Code	Subject	اسم المادة	ت
			3	1	2	2	CSCL2213	Object oriented programming II	برمجة شينية ٢	1
			3	1	2	2	CSCL2215	Sorting and Searching Algorithms	خوارزميات البحث والترتيب	2
			3	1	2	2	CSCL2217	Numerical Analysis	تحليل عددي	3
			3	1	2	2	CSCL2219	Database Design	تصميم قواعد بيانات	4
			2	1	-	2	CSAI2205	Fuzzy Logic	منطق مضطرب	5
			3	1	2	2	CSAI2206	Searching Strategies	استراتيجيات البحث	6
			2	-	-	2	CSCL2120	Human Rights and Democracy	حقوق الانسان والديمقراطية	7
			1	-	-	2	CSCL2122	English Language II	لغة انكليزية ٢	8
			20	6	10	16		Total		

منهج المرحلة الثالثة نظام كورسات- الكورس الاول

ت	اسم المادة	Subject	Subject Code	No. Of Theory hour	No. of .Lab hour	Tutorial	No. of Units	
1	معالجة مايكروية	Microprocessor	CSCL3123	2	2	1	3	
2	نظرية احتسابية	Computation Theory	CSCL3125	2	-	1	2	
3	بحوث عمليات	Operations Research	CSCL3127	2	-	-	2	
4	رسوم الحاسوب ثنائية الابعاد	Computer Graphics 2D	CSAI3107	2	2	1	3	
5	معالجة اللغة الطبيعية	Natural Language Processing	CSAI3108	2	2	1	3	
6	الخوارزميات وتعقيدها	Algorithm and its Complexities	CSAI3109	2	2	-	3	
7	طرق البحث الموجهه	Heuristic Search Methods	CSAI3212	2	2	1	3	
8	لغة انكليزية ٣	English Language 3	CSCL3133	2	-	-	1	
Total							20	5

منهج المرحلة الثالثة نظام كورسات- الكورس الثاني

ت	اسم المادة	Subject	Subject Code	No. Of Theory hour	No. of .Lab hour	Tutorial	No. of Units	
1	معمارية الحاسوب	Computer Architecture	CSCL3224	2	2	1	3	
2	تصميم مترجمات	Compiler Design	CSCL3226	2	2	1	3	
3	الامتثلية	Optimization	CSCL3228	2	-	-	2	
4	المرئية الافتراضية	Visualization	CSAI3211	2	2	1	3	
5	الانظمة الخبيرة	Expert System	CSAI3110	2	2	-	3	
6	تمييز الكلام	Speech Recognition	CSAI3213	2	2	-	3	
7	تعلم الماكنة	Machine Learning	CSAI3214	2	2	-	3	
Total							20	3

منهج المرحلة الرابعة نظام كورسات- الكورس الاول

ت	اسم المادة	Subject	Subject Code	No. Of Theory hour	No. of .Lab hour	Tutorial	No. of Units	
1	برمجة المواقع الثابتة	Static Web Programming	CSCL4134	2	2	1	3	
2	نظم تشغيل ١	Operating system 1	CSCL4136	2	2	1	3	
3	امنية بيانات ١	Data Security1	CSCL4138	2	2	1	3	
4	شبكات الحاسوب	Computer Network	CSAI4115	2	2	1	3	
5	التخطيط والانسان الالى	Planning & Robotics	CSAI4116	2	2	-	3	
6	مخازن البيانات	Data Warehouse	CSAI4117	2	-	-	2	
Total							17	4

منهج المرحلة الرابعة نظام كورسات- الكورس الثاني

ت	اسم المادة	Subject	Subject Code	No. Of Theory hour	No. of .Lab hour	Tutorial	No. of Units	
1	برمجة مواقع متغيرة	Dynamic Web Programming	CSCL4235	2	2	1	3	
2	نظم تشغيل ٢	Operating system 2	CSCL4237	2	2	1	3	
3	امنية بيانات ٢	Data Security 2	CSCL4239	2	2	1	3	
4	الرويا بالماكنة	Machine Vision	CSAI4218	2	2	1	3	
5	بحث ذكي متقدم	Advanced Intelligent Search	CSA18	2	2	-	3	
6	تنقيب البيانات	Data Mining	CSAI4220	2	-	-	2	
7	اللغة الانكليزية ٤	English Language 4	CSCL4142	2	-	-	1	
8	المشروع	Project	CSCL444	4	4	-	6	
Total							24	4

University of Technology
Computer Sciences
Department

Computer and Cyber
Security Branch



المناهج الدراسية لفرع أمنية حاسوب والامن السيبراني للعام الدراسي 2023-2024

First Year Syllabus

مناهج المرحلة الأولى

Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	ECTS	Module Type
One	1	PRFU111	Programming Fundamental	اساسيات البرمجة	English	8.00	B
	2	MAITH112	Mathematics	الرياضيات	English	6.00	B
	3	STPR113	Statistics and Probability	الاحصاء والاحتمالات	English	6.00	B
	4	COOR114	Computer Organization	تركيب الحاسوب	English	4.00	B
	5	CYSP115	Cyber Security Principles	مبادئ الأمن السيبراني	English	4.00	C
	6	WORK106	Workshop	المعامل	Arabic	2.00	S
					Total	30.00	
Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	ECTS	Module Type
Two	1	STPR121	Structured Programming	البرمجة المهيكلة	English	8.00	
	2	DIST122	Discrete Structures	الهياكل المتقطعة	English	5.00	B
	3	LODE123	Logic Design	التصميم المنطقي	English	6.00	B
	4	COTE124	Coding Techniques	تقنيات الترميز	English	4.00	C
	5	NUTH125	Number Theory	نظرية الأرقام	English	5.00	C
	6	WORK106	Workshop	المعامل	Arabic	2.00	S
					Total	30.00	

Second Year Syllabus

مناهج المرحلة الثانية

المرحلة الثانية – الفصل الاول							
ت	رمز الدرس	عنوان الدرس	Subject in English	عدد الساعات في الاسبوع			
				النظري	العملي	المناقشة	الوحدات
1	CSCL2112	برمجة شينية 1	Object Oriented Programming 1	2	2	1	3
2	CSCL2114	هياكل بيانات	Data Structures	2	2	1	3
3	CSCL2116	رياضيات 3	Mathematics 3	2	2	1	3
4	CSCL2118	اساسيات قواعد البيانات	Database Foundation	2	2	1	3
5	CSCS2104	التشفير الانسيابي	Stream Cipher	2	2	1	3
6	CSCS1203	حقوق انسان	Human Rights	2	-	-	1
Total				12	10	5	16

المرحلة الثانية – الفصل الثاني							
ت	رمز الدرس	عنوان الدرس	Subject in English	عدد الساعات في الاسبوع			
				النظري	العملي	المناقشة	الوحدات
1	CSCL2213	برمجة شينية 2	Object oriented programming2	2	2	1	3
2	CSCL2215	خوارزميات البحث والترتيب	Sorting and Searching Algorithms	2	2	1	3
3	CSCL2217	تحليل عددي	Numerical Analysis	2	2	1	3
4	CSCL2219	تصميم قواعد بيانات	Database Design	2	2	1	3
5	CSCS2205	أمنية تصميم البرمجيات	Secure Software Design	2	-	-	2
6	CSCS2206	أمن المعلومات والبيانات	Information & Data Security	2	-	-	2
7	CSCL2221	ديمقراطية	Democracy	2	-	-	1
8	CSCL2122	لغة انكليزية 2	English Language 2	2	-	-	1
Total				16	8	4	18

Third Year Syllabus

مناهج المرحلة الثالثة

المرحلة الثالثة – الفصل الاول							
ت	رمز الدرس	عنوان الدرس	Subject in English	عدد الساعات في الاسبوع			
				النظري	العملي	المناقشة	الوحدات
1.	CSCL3123	معالجة مايكرويه	Microprocessor	2	2	1	3
2.	CSCL3125	نظريه احتسابية	Computation Theory	2	-	1	2
3.	CSCL3129	تمثيل معرفه	Knowledge Representation	2	2	-	3
4.	CSCL3107	شبيكات الحاسوب 1	Computer Networks 1	2	2	1	3
5.	CSCS3107	الشفرات الخبيثة	Malicious codes	2	-	1	2
6.	CSCS3108	المفتاح العام	Public Key	2	2	1	3
7.	CSCS3109	مبادئ الوسائط المتعددة	Multimedia Fundamentals	2	2	-	3
8.	CSCL3133	لغة انكليزية 3	English Language 3	2	-	-	1
Total				16	10	5	20

المرحلة الثالثة – الفصل الثاني							
ت	رمز الدرس	عنوان الدرس	Subject in English	عدد الساعات في الاسبوع			
				النظري	العملي	المناقشة	الوحدات
1.	CSCL3224	معمارية الحاسوب	Computer Architecture	2	2	1	3
2.	CSCL3226	تصميم المترجمات	Compiler Design	2	2	1	3
3.	CSCL3230	تقنيات البحث الذكية	Intelligent Searching Techniques	2	2	-	3
4.	CSCS3210	أمنية الموبايل والشبكات	Mobile and network Security	2	-	1	2
5.	CSCS3211	القرصنة الاخلاقية	Ethical Hacking	2	-	1	2
6.	CSCS3212	التشفير الكتلي	Block Cipher	2	2	1	3
7.	CSCS3213	أمنية الوسائط المتعددة	Multimedia Security	2	2	-	3
Total				14	10	5	19

Fourth Year Syllabus

مناهج المرحلة الرابعة

المرحلة الرابعة – الفصل الاول							
ت	رمز الدرس	عنوان الدرس	Subject in English	Number of Hours / Week			
				Theory	Lab	Tutorial	Units
1.	CSCL4134	برمجة مواقع ثابتة	Static Web Programming	2	2	1	3
2.	CSCL4136	نظم تشغيل 1	Operating System 1	2	2	1	3
3.	CSCS4116	أمنية الحوسبة السحابية	Cloud Computing Security	2	-	1	2
4.	CSCS4117	أخفاء المعلومات والعلامة المائية	Information Hiding & Watermarking	2	2	1	3
5.	CSCS4118	التشفير المتقدم	Advance Cryptography	2	-	-	2
6.	CSCS4119	أنظمة ذكية	Intelligent Systems	2	2	1	3
7.	CSCL444	مشروع	Project	2	2	-	3
Total				14	10	5	19

المرحلة الرابعة – الفصل الثاني							
ت	رمز الدرس	عنوان الدرس	Subject in English	Number of Hours / Week			
				Theory	Lab	Tutorial	Units
1.	CSCL4235	برمجة مواقع متحركة	Dynamic Web Programming	2	2	1	3
2.	CSCL4237	نظم تشغيل 2	Operating system 2	2	2	1	3
3.	CSCS4220	تحليل شفرة	Crypt Analysis	2	-	1	2
4.	CSCS4221	التحويل والتحكم بالوصول	Authentication and Access Control	2	-	1	2
5.	CSCS4222	الامن السيبراني	Cyber Security	2	-	-	2
6.	CSCS4223	الحوسبة المرنة	Soft Computing	2	2	-	3
7.	CSCL444	مشروع	Project	2	2	-	3
8.	CSCL4142	لغة إنكليزية 4	English Language 4	2	-	-	1
Total				16	8	4	19

المرحلة الاولى / الفصل الاول (مسار بولونيا)

First Year Syllabus

مناهج المرحلة الأولى

Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	ECTS	Module Type
One	1	PRFU111	Programming Fundamental	اساسيات البرمجة	English	8.00	B
	2	MAITH112	Mathematics	الرياضيات	English	6.00	B
	3	STPR113	Statistics and Probability	الاحصاء والاحتمالات	English	6.00	B
	4	COOR114	Computer Organization	تركيب الحاسوب	English	4.00	B
	5	CYSP115	Cyber Security Principles	مبادئ الأمن السيبراني	English	4.00	C
	6	WORK106	Workshop	المعامل	Arabic	2.00	S
					Total	30.00	
Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	ECTS	Module Type
Two	1	STPR121	Structured Programming	البرمجة المهيكلة	English	8.00	
	2	DIST122	Discrete Structures	الهياكل المتقطعة	English	5.00	B
	3	LODE123	Logic Design	التصميم المنطقي	English	6.00	B
	4	COTE124	Coding Techniques	تقنيات الترميز	English	4.00	C
	5	NUTH125	Number Theory	نظرية الأرقام	English	5.00	C
	6	WORK106	Workshop	المعامل	Arabic	2.00	S
					Total	30.00	

First Year/ First Course

1. Programming Fundamental - 1st Course

- Introduction, Procedural Programming Principles
- Introduction to algorithm, Algorithms example
- Flowchart definition and its symbols, Flowchart examples
- C++ Language Basics
- C++ programming language
- Structure of C++ program
- Reserved words and Header files
- Character set and Identifiers
- Variable and Constant
- Data type (int , float , char , void)
- Cout , Cin Bitwise Operator.
- Constant
- % operator
- IF statement
- Compound IF statement
- IF / ELSE statement

- && , || with if statement
- ELSE IF statement
- Switch statement
- Nested switch statement
- C++ operators : Arithmetic ,
 - Assignment ,Comparison ,Logical
- Operators precedence
- Unary operators (++ , --)
- Prefix ,Postfix notation
- Examples of order evaluation
- “math.h” library : Exp,Log,Sin,
- Cos,Tan,Pow,Sqrt
- While statement
- Do / While statement
- For loop statement

References:

Mastring C++, Amman-Jordan, AL-Shorok, 2002.

2. Mathematics - 1st Course

- Mathematical background
- Matrix
 - Types of matrix
 - Matrix addition, subtraction, and multiplication
 - Determinant, transpose, symmetric of matrix and rank of matrix
 - Inverse of matrix, absolute value, and polynomials
 - Grammar rule for solving system of equation.
- Functions
 - Function Definition
 - Domain and range of functions
 - Graphing of function
- Limits
 - Definition of limits
 - Theorems of limits
 - Type of limits
 - One side and two sides limits
 - Limits as infinity
 - Sandwich theorem and continues functions
- Derivation
 - Mathematical definition of derivation, rule of derivation
 - Derivation of trigonometric, inverse trigonometric, logarithm, exponential hyperbolic, inverse of hyperbolic function.
 - Implicit derivation, chain rule, higher derivation
 - L’hopital rule, Application of derivation, velocity and acceleration
- Series
- Integration,

- Indefinite integral, Rules of integral.
- Method of integration
- Multiple integral, Definite integral, Application of integral area under the curve, Area between two curves.

References:

- 1- Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesley, 1999.

3. Statistics and Probability- 1st Course

- Population, samples, type of samples, Random variables discrete variable, continuous variable, Data Organization.
- Frequency distribution, histogram
- Measurement of central tendency - mean ,median, mode.
- Measurements of variation -standard deviation, variance ,coefficient of variation
- Probability Theory -sample space, events, rules of probability, Venn Diagram. tree diagram, probability theorems -Addition theorem.
- Multiplication theorem.
- Counting techniques :Factorial, Permutations, Combinations, Conditional probability
- Bayes theorem, Independent of events, Discrete Probability distributions.
- Binomial distribution, Multinomial distribution.
- Poisson distribution, Continuous Probability Distributions-Uniform distribution.
- Normal distribution, Exponential distribution.
- Correlation and Regression.

References:

- Probability and statistics, theory and applications, Gunnar Blom, Springer , 1989
- Probability and statistics for engineers, Richard L. Scheaffer
- Statistics: theories and applications, Joseph Inungo, 2006.
- Introductory Statistics , Ronald J. Wonnacott

4. Computer Organization – 1st Course

- Computer Generations
- Computers classification
- Operating system
- Examples of Operating systems
- Architecture of Computer System
- Input/ Output Devices, Ports Unit, Buses, BIOS
- Motherboard, Microprocessor (Central Processing Unit (CPU))
- Storage types
- Data representation in computers

- Numbering systems
- Numbering systems
- Floating-Point Representation
- Instruction Format with Memory
- Introduction to programming concepts

References:

1. Computer System Architecture, M. Morris Mano, Third Edition, 1993.
2. Computer Science: An Overview" by J. Glenn Brookshear and Dennis Brylow
3. Computing Fundamentals: Introduction to Computers" by Faithe Wempen

5. Cyber Security Principles – 1st course

- Introduction to Data security
 - Requirements for Computers Protection
- Security mechanisms,
 - Authentication,
 - Chain of Authority,
- Access Control,
 - Permissions-Based Access Control,
 - Understanding hacking(Vectors that hackers exploit)
 - Direct Intrusion,
 - Dial-Up
- Hacking techniques
- Firewall,
 - Firewall Definition,
 - Firewall Concept
 - Conditions.
- The components of cryptographic system
 - ,Encryption algorithms
 - Traditional ciphers (Transposition encryption algorithms), columnar , fixed period
 - Traditional ciphers(substitution algorithms), keyword , additive.
 - Traditional ciphers(substitution algorithms), multiplication , affine).
 - Traditional ciphers(substitution algorithms), vigenere , beaufort methods)
 - Homophonic substitution cipher :
 - Beal cipher Higher
 - High order homophonic algorithm
 - Polygram substitution cipher systems:
 - Play fair cipher,
 - Hill cipher
- Cyber security definitions,
 - The Importance of cyber security,
 - the elements of cyber security
- Types of Cyber Threats.
 - Challenges of Cyber Security

References:

William Stallings, Cryptography and Network Security, (Principles and Practice), 2023

6. Workshop – 1st Course
(workshops_module_1_and_2_semester_for_Computer_Sci_and_Applied_Sci)

First Year/ Second Course

1- Structured Programming - 2nd Course

- Functions , program in functions, Passing parameters
- Arrays
 - One dimensional array
 - Two dimensional array
- String
 - Member function of strings
- Structures
 - Type of Structure declaration
 - Array of Structures
 - Structure within structure
 - Functions and structures
- Pointers
 - Pointers declaration
 - Pointers and functions parameters passing
 - Pointers and arrays
 - Arrays of pointers
 - Pointers to pointers

References:

Mastring C++, Amman-Jordan, AL-Shorok, 2002.

2- Discrete Structures - 2st Course

- Set theory
 - Sets and subsets
 - How to specify sets, Operations on sets
 - Algebra of sets and its proves
 - Power set, Classes of sets, Cardinality
 - Sets of numbers, Finite sets and counting principle
- Mathematical induction
- Relations
 - Computer representation of relations and Digraph
 - Manipulation of relations, Properties of relations
 - Composition of relations
- Functions
 - Type of function (one-to-one & invertible function)
 - Geometrical characterization of functions
 - Sequences of sets, Recursively defined functions, Definition, Graphs. Sub graph, and multigraphs
 - Degree of graph, Connectivity, Special graph, Walk & length of walk, Trail, path, cycle
 - The bridges of Konigsberg, Traversable multigraphs, Labeled graphs, Minimal path, Minimum spanning tree

- Matrices and graph, Trees, rooted tree, ordered rooted tree, polish notation, with examples
- Finite state machines: Finite automata
- Optimistic approach to construct FSM, Deterministic Finite state automata

References:

1. Theory and problems of Discrete mathematics, by Seymour Lipschutz & Marc Lars Lipson, Schaum's Outline Series, third edition 2007
2. Mathematical foundation of computer science, Y.N. Singh, 2005.
3. Discrete Mathematics and Its Applications, Seventh Edition, Kenneth H. Rosen, AT&T Laboratories, 2012

3- Logic Design - 2'nd Course

- Number system
 - Decimal.
 - Binary
 - Octal.
 - Hexadecimal
- Addition and subtraction
 - binary
 - octal
 - Hexadecimal.
- Logic gates.
- Boolean algebra and simplification and demorgan's.
- K-map.
- Combinational universal NAND and NOR logic.
- Half-adder
- full-adder
- 4- bit parallel adder, and Subtract adder.
- Decoder, encoder
- multiplexer, and demultiplexer.
- Sequential logic circuits and Flip-flop, SR, D, and JK flip-flop.
- Shift register 3-bit and 4-bit.
- Binary counter 3-bit and 4-bit.
-

References:

1. Computer System Architecture M.Morris Mano
2. Digital fundamentals by Floyd, 2009
3. Fundamental of digital logic and Microcomputer design, fifth addition.

4- Coding Techniques - 2nd course لا يوجد له وصف مقرر حسب منهاج بولونيا

- Principles of information theory.
- Introduction to coding techniques.
- Entropy, Average length of a code.
- code efficiently, code redundancy.
- Fixed length coding.
- Variable length coding, Shannon-Fano coding algorithm.
- Mid Exam
- Lempel-Ziv coding algorithm.
- Arithmetic coding algorithm
- Huffman coding
 - Huffman Binary coding.
 - Huffman Ternary coding.
- Extension of a source
- Error Control
- Types of errors, Single-bit Error, Burst Error
- Hamming code.
 - Error detection
 - Error Correction
- Error detection:
 - One-dimension Parity Check
 - Two-dimension Parity Check
 - Checksum
 - Cyclic Redundancy Checks (CRC), CRC performance.
- Single-bit error correction algorithm

References:

1. Coding and Information Theory, Richard Wesley Hamming Prentice-Hall, 1986
2. Information Theory and Coding, Dr. J. S. Chitode Technical Publications, Jan 1, 2021
3. An introduction to Information theory by fazlollah

5- Number Theory- 2nd Course

- General introduction
- Divisibility and Prime numbers
- Algebra preliminaries
- Prime numbers
- The group and ring
- Finite Galois field
- Great common divisor and Euclidean algorithm
- Messene primes
- Theory of Congruence's
- Congruent modulo
- Fermat little theorem
- Divisibility tests
- Properties of congruence's

- Residue classes and Carmichael theorem
- The Chinese remainder theorem

References:

1-Elementary Number Theory ,William Stein, 2004

6- Workshop – 2'st Course

(workshops_module_1_and_2_semester_for_Computer_Sci_and_Applied_Sci

المرحلة الثانية / الفصل الاول

1. Object Oriented Programming 1 - 1st course

- Overview for functions and parameter transmission
- Introduction of OOP and its main features
- Classes in OOP
 - Defining a Simple Class with Inline Member Functions
 - Constructors and destructors functions
 - Friends functions • Constant Members
 - Static Members
 - Default Arguments and Implicit Member Argument →
- Overloading
 - Function overloading
 - Operators overloading.

References:

1. "Mastering C++", Prof. OqeiliSaleh and others, Dar Al-Shorok, Amman-Jordan, 2004.
2. "Object Oriented Programming Language with C++", BjarneStroustrup, Addison-Wesley Publication, 2003.
3. " An Introduction to Object-Oriented Programming with Java, Fifth Edition", C.Thomas Wu, 2010.
4. "Simply Java—An Introduction to Java Programming", Charles River ,2006

2. Data Structure- 1st course

- Introduction to Data Structures
- Types of data structure
- Memory representation for 1D and 2D arrays
- Linear list and Linear list types
- Stack
 - Stack Operations
 - Applications of stack
- Queue
 - Queue Operations
 - Applications of queue
- Circular Queue
 - CQueue Operations
 - Applications of CQueue
- Linked List
 - Linked-Stack
 - Linked-Queue
 - Linked-CQueue
- Recursion

References:

1. Data structures and Algorithms with Object- Oriented design Patterns in C++ by: Bruno R. Preiss, B.A.Sc., M.A.Sc.Ph.D., P.Eng. Associate Professor, Department of electronic and computer engineering, university of waterloo.
2. Data Structures and algorithm analysis in C, By: Mark Allen Weiss.

3. Data Structures and algorithms in Java PDF file.
4. Data Structures using C and C++, Yedidyah language, Moshe J. augenstein, Aaeon M. Tenenbaum, Brooklyn College.

3. Mathematical III -1st Course

1-Partial Derivative

Partial Derivative, of two variables

-Total Differential

2- Differential Equations (d.e)

First Order Differential Equations

1-Variable Separable

2-Homogeneous Differential Equation (h.d.e)

3-Exact Differential Equation

3.1- Integrating Factor

4- First – Order Linear Differential Equation

4.1-The Bernoulli Equation

Second – Order Differential Equation

1-Homogeneous-Second – Order (D. E) With Constant Coefficient

2-Non-Homogeneous-Second – Order (D. E) With Constant Coefficient

2.1-Method of Undetermined Coefficient

2.2- Variation of Parameter

3-Laplace Transformation (L. T)

Definition

Laplace Transformation of Some Function

Laplace Transformation of Differential

Properties of L. T

(1) Shifting

(2) L. T of Integrals:

(3) Multiplication by t^n

(4) Division by t

(5) Unit Step Function $u_a(t)$.

5-Inverse Laplace Transformation

Some Properties of Inverse L. T

1-Partial Fraction

2-Application of Laplace Transformation

Linear (D. E) With Constant Coefficient

References:

- 1- Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesley, 1999.

4. Data Base Foundation - 1st Course

➤ Centralized database system

- Introduction and the purpose of database
- Comparing between a file processing system and DBMS

➤ Data Abstraction and file system disadvantage

➤ Entity relationship model

- Entities and entity sets
- Relationships and relationship set
- Attributes and mapping

- Constraints and keys
- Relational model
 - Data representation in relational model (Tables, Records, and keys)
- Tables joining, Instant and schema
- Weak entity in ER model
- ER model and relational model examples
- Indexing
 - Primary indexing
 - Secondary indexing
 - Index update
 - Hash index

References:

1. Date C. J., "An Introduction to Database Systems", 2004
2. Abraham Silberschatz, Henry F. Korth, S. Subarshan, " Database System Concepts", 2006
3. David M. Kroenke, "Database Concepts", 2005.

5. Stream Cipher – 1st course

- Introduction for Stream Cipher
- Important element for design a stream cipher
- Types of stream ciphers,
- Polynomial Arithmetic,
- Primitive polynomial,
- Irreducible Polynomial Introduction SR, key stream generator,
- Feedback Function,
- TAP Sequence, Maximal Length Tap Sequences,
- Linear Equivalence,
- Nonlinear Shift Register,
- Nonlinear combination generators,
- Five Basic Tests.

References:

1. Schneider, B., " Applied Cryptography: Protocols, Algorithms and Source code in C", Second Edition , New York © John Wiley & Sons, 1996.
2. Beker, H. and Piper, F., "Cipher Systems", Wiley, 1982
3. William Stallings, " Cryptography and network security Principle and Practice". by , 2011

6. Human Rights– 1st course

- 1- مفهوم الحقوق (تعريف الحقوق- خصائص الحقوق).
- 2- حقوق الانسان في الشرائع السماوية (الديانتين المسيحية واليهودية- الدين الاسلامي).
- 3- مصادر حقوق الانسان (المصادر الدولية- المصادر الوطنية).
- 4- ضمانات حقوق الانسان (الضمانات على الصعيد الداخلي- الضمانات على الصعيد الدولي).
- 5- التقدم التكنولوجي واثره على الحقوق والحريات (الاحزاب السياسية- حماية الملكية الفكرية).

1. Object Oriented Programming 2 – 2^{ed} course

- Template
 - Function Template Definition
 - Function Template Instantiation
 - Class Template Definition
 - Class Template Instantiation
- Inheritance and Derived Classes
 - Single inheritance and Multiple inheritances
 - Virtual Functions and polymorphism
- The Visual Programming Development Environment
 - Designing the Application Window
 - Adding Code to the Application
 - Creating the Dialog Box Icon
 - Adding Maximize and Minimize Buttons
- The Basic Windows Controls
 - The Static Text Control
 - The Edit Box Control
 - The Command Button Control
 - The Check Box Control
 - The Radio Button Control
 - The Drop-Down List Box Control

References:

1. Coding and information theory by Richard w. hamming
2. Information Theory and Coding by J. S. Chitode – 2006
3. An introduction to information theory byFazlollah M. Reza

2. Sorting and searching Algorithms– 2^{ed} Course

- **Sorting Algorithm**
 - Insertion Sort
 - Selection Sort
 - Bubble Sort
 - Heap Sort
 - Quick Sort
 - Merge Sort
- **Searching algorithm**
 - Sequential Search
 - Binary Search
- **Trees**
 - Types of Tree
 - Binary tree
 - Binary tree scan
 - Represent Regulars expression using trees

- Binary Search Tree

References:

1. Data structures and Algorithms with Object- Oriented design Patterns in C++ by: Bruno R. Preiss, B.A.Sc., M.A.Sc.Ph.D., P.Eng. Associate Professor, Department of electronic and computer engineering, university of waterloo.
2. Data Structures and algorithm analysis in C, By: Mark Allen Weiss.
3. Data Structures and algorithms in Java PDF file.
4. Data Structures using C and C++, Yedidyah language, Moshe J. augenstein, Aaeon M. Tenenbaum, Brooklyn College

3. Numerical Analysis -2nd Course

- Numerical Analysis
 - Solution of Non-Linear Equations.
 - Newton-Rap son Method for Approximating.
 - Lagrange Approximation.
 - Numerical Differentiation and Integration.
 - Approximate Integration.
 - Integration Equal Spaces.
 - The Trapezoidal Rule.
 - Simpson's Rule.
 - Simpson's (3/8) Rule.
- Fourier series
 - Periodic Function Definition
 - Fourier series of Even and Odd Function
 - Half-Range Series
 - Change of Interval
- Partial Differential Equations
 - Definition
 - Solution of First Order Linear (P. D. E)
 - Méthode of Variable Séparable.
 - Wave Equation
 - Heat Equation
- Ordinary Differential Equation.
 - Numerical Differentiation.
 - Euler Method.
 - Modified Euler Method (Euler Trapezoidal Method).
 - Rung Kutta Method.
 - Rung- Kutta-Merson Method.
- System of Linear Equation.
 - Cramer's Rule.
 - Solution of Linear Equations by using Inverse Matrices.
 - Gauss Elimination Method.
 - Gauss Siedle Methods.

المصادر

- 1- Calculus and Analytic Geometry by Thomas.
- 2- Gerald C. F and Wheatley P. O. "Applied Numerical Analysis," Addison Wesley, 1999.

4. Data Base Design 2nd Course

- Database Administrator and database design process
- Data base cardinality
- Normalization
- System architecture
- Transaction
- Database security
 - Access control
 - Encryption
- Fundamental of relational algebra:
- Query processing

References:

1. Date C. J., "An Introduction to Database Systems", 2004
2. Abraham Silberschatz, Henry F. Korth, S. Subarshan, "Database System Concepts", 2006
3. David M. Kroenke, "Database Concepts", 2005.

5. Secure Software Design – 2nd course

1. Introduction to software security: software security goals, problems of producing secure software, software project goals, the notion of software security, software security vs. application security, software security vs. information security, Hackers.
2. Overview of software development stages, Secure software development model (SSDM)
3. The three pillars of software security
4. Selecting technologies: choosing a language, choosing an operating system, authentication technologies, open source and closed source, code obfuscation
5. Buffer overflows: buffer overflow is a security problem, defending against buffer overflows, stack overflows
6. Random numbers: pseudo-random number generator (PRNG), determining what kind of random numbers to use
7. Random numbers: getting random integers, getting random integer in a range
8. Input/ data validation: source of input, approaches to validate input data
9. Password authentication
10. Access control: understanding the Unix access control model, understanding the windows access control model
11. Access control: determining whether a user has access to a file, determining whether a directory is secure, Erasing files securely

References?????

6. Information & Data Security – 2nd course

1. Introduction to Systems Threats and Risks (Software attacks, Hardware attacks).
2. Protecting Systems (Hardening the operating system, Hardening the web browser, Hardening web and network services, Controlling network access)

3. Network Vulnerabilities and Attacks (Media and network device vulnerabilities, Categories of attack, Methods of attack)
4. Network defenses (Secure network design, Secure network technologies, Network security devices, Intrusion detection and prevention, Protocol analyzers)
5. Wireless Network Security (Weaknesses and hardening of wireless networks, Wireless encryption systems)
6. Access Control (Logical versus physical, Mandatory, discretionary, and role-based access control)
7. Authentication, Authorization, and Accounting (Credentials and identity, Privilege management)
8. Vulnerability Assessments (Threat and risk assessment, Risk management models and tools, Identifying vulnerabilities)
9. Security Audits (Privilege auditing, management, and assignment, Usage auditing, Auditing tools)
10. Cryptography (Encryption algorithms, Hashing algorithms, Symmetric encryption, Asymmetric encryption, Network, drive, and file encryption)
11. Disaster Recovery and Business Continuity (Disaster Recovery planning and execution, Disaster recovery policies and procedures)
12. Security Policies and User Training (Organizational security policies, Types of Security policies, User education, Social engineering)

References?????

7. Human Rights– 2nd course

مادة الديمقراطية(الكورس الثاني)

- 1- مفهوم الديمقراطية(تعريف الديمقراطية- مزايا الديمقراطية).
- 2- اشكال الديمقراطية(الديمقراطية المباشرة- الديمقراطية شبه المباشرة-الديمقراطية النيابية-المجلس النيابي).
- 3- الية النظام النيابي-الانتخاب-(مفهوم الانتخاب-هيئة الناخبين-تنظيم عملية الانتخاب-نظم الانتخاب).

8. English Language 2 - 2nd course

- **Listening and Speaking :-** (by listening to a selected conversations on technical topics)
 - How to understand a conversion
 - How to avoid silence in conversion
 - Focus and study the pronunciation.
 - Deal with different situations academic and non academic.
 - Express ideas and give detailed accounts of experiences, and describing feelings.
 - Engage in extended conversation on most topics
 - Give opinions by providing relevant explanations, arguments and comments.

- Give clear, detailed description of subjects within field of study or interest.
- Vocabulary and phrases for making presentations
- Give clearly developed presentations on subjects in the field of study.

➤ **Translation**

- What is the translation , kinds and steps of translation
- Scientific translation nature and steps
- How to use a dictionary and machine translation.

References :

1. English for computer users By SantiagR.Esteras, Fourth Edition, Cambridge University Press, 2008.
2. English Grammar In Use By Raymond Murphy, Third Edition, Cambridge University Press, 2004.
3. English Grammar and Composition By Wren and Martin, Revised by N.O.PrasadaRao,S.Chand,, Company Ltd., New Delhi, 2007.

المرحلة الثالثة / الكورس الاول

1. Microprocessors – 1st course

- Introduction to Microprocessor and Microcomputer system.
 - Microprocessor Architecture and Register Set.
 - System Buses
 - Memory types and physical addressing.
 - I/O devices
- Instruction Set and Format
- Addressing Modes
- Introduction to Assembly Programming Language.
 - Arithmetic and logical Instructions (Shift and Rotate).
 - Program Control (interrupt and subroutine call).

References:

1. Abel P., "IBM PC Assembly Language and Programming", 4th Edition, Prentice Hall, 1998..
2. Thorne M., "Computer Organization and Assembly Language Programming", 2nd Edition, Benjamin/Cummings, 1990.

2. Computation Theory 1st course

- Regular Expression,
- Finite Automata, DFA and NFA, Equivalence of NFA and DFA,
- The equivalence of mealy and moor machine,
- Introduction to Crammers, Phrase Structure Grammar, Context sensitive
- Grammar, Context Free grammar,
- Chomsky Normal Form,
- Tree, leftmost and rightmost derivations,
- Regular grammar, Left linear grammar, Right linear grammar, Push down
- automata, Top down –bottom up derivation,
- Turing machine.

References:

1. H.R.Lewis And G.H Papadimitiou,"Elements Of The Theory of Computation", Prentig-Hall, 1981.
2. R.W.Floyd And R.Beigel,"The Languae Of Machine:An Introduction To Computability And Formal Languages",Computer Science Press, Network, 1994.
3. M.Sipser."Introduction To The Theory Of Computation", Boston Pws Pub ,1996.

3. Knowledge Representation – 1st course

- Introduction to Programming in Logic,
 - Prolog Language Structure,
 - Prolog Language Components,
 - Facts, Simple Rules,
 - Built in Functions in Prolog Language,

- Recursion in Prolog (Tail Recursion),
- Non Tail Recursion,
- Fail Structure,
- List Processing,
- String Processing,
- Database Structure and Properties,
- Files in Prolog and Applications with Database,
- Introduction to Artificial Intelligence,
 - Knowledge Representation,
 - Logical Representation (propositional calculus & predicate logic) ,
 - non-logical Representation (production rules, semantic net & frames),
 - Problem State Space Characteristics,
 - Problem Solving,

References: ??????

4. Computer Networks 1 – 1st course

1. Introduction to data communications (components, data representation, data flow)
2. Networks (distributed processing, Network criteria, physical structure, Network models, Network categories)
3. layered tasks (sender, receiver, carrier, hierarchy, OSI MODEL, TCP Model)
4. Physical layer (Transmission Media)
 - guided media (twisted pair, coaxial cable, fiber optical cable)
 - (Unguided Media (Radio Waves, Microwaves, Infrared)
5. Data link Protocols (Error detection and correction)
6. Network Layer
 - Logical addressing (Address space, IPV4 Addressing, IPV6 Addressing)
 - Dynamic Addressing, routable and non-routable
7. Transport layer (TCP and UDP protocols)
8. Application layer (FTP, TELNET, HTTP)

References:

1. Data communications and Networking, fourth edition, Behrouz A.Forouzan

5. Malicious codes – 1st Course

1. Types of Malicious Software
 - Backdoor
 - Logic Bomb
 - Trojan Horses
 - Mobile Code
 - Multiple-Threat Malware
2. Viruses
 - The Nature of Viruses
 - Viruses Classification
 - Virus Kits

- Macro Viruses
 - E-Mail Viruses
3. Virus Countermeasures
 - Antivirus Approaches
 - Advanced Antivirus Techniques
 4. Virus Classifications by Concealment Strategy
 - 4.1 No Concealment
 - 4.2 Encryption
 - 4.3 Stealth
 - 4.4 Oligomorphism
 - 4.5 Polymorphism
 - 6.6 Metamorphism
 - 4.7 Strong Encryption
5. ANTI-VIRUS TECHNIQUES
 - 5.1 Detection: Static Methods
 - 5.1.1 Scanners
 - 5.1.2 Static Heuristics
 - 5.1.3 Integrity Checkers
 - 5.2 Detection: Dynamic Methods
 - 5.2.1 Behavior Monitors/Blockers
 - 5.2.2 Emulation
 - 5.3 Comparison of Anti-Virus Detection Techniques
 - 5.4 Verification, Quarantine, and Disinfection
 - 5.4.1 Verification
 - 5.4.2 Quarantine
 - 5.4.3 Disinfection
 - 5.5 Virus Databases and Virus Description Languages
 - 5.6 Short Subjects
 - 5.6.1 Anti-Stealth Techniques
 - 5.6.2 Macro Virus Detection
 - 5.6.3 Compiler Optimization
 6. Worms
 - The Morris Worm
 - Worm Propagation Model
 - Recent Worm Attacks
 - State of Worm Technology
 - Mobile Phone Worms
 - Worm Countermeasures
 7. Distributed Denial Of Service Attacks
 - DDoS Attack Description
 - Constructing the Attack Network
 - DDoS Countermeasures

References

- 1- Cryptography And Network Security Principles And Practice Fifth Edition William Stallings
- 2- Computer Viruses and Malware by John Ay cock University of CalgaryCanada, 2006 Springer

6. Multimedia Fundamentals 1st Course

- Introduction to multimedia
 - Element of multimedia,
 - Multimedia productions,
 - Multimedia applications,
 - Multimedia on the web,
- Introduction to computer graphics:
 - Lines drawing algorithms,
 - Circle drawing algorithms,
 - 2D transform : translation,
 - scaling, Rotation, reflection, shearing,
 - Image Basic concept:
 - Image digitization,
 - Spatial resolution and quantization,
 - Image file formats, Arithmetic operation on image,
 - Logical operation an image,
 - Image histogram:
 - Histogram modification,
 - Histogram equalization,
- Image compression:
- Audio Basic Concept (Digitization of Audio, Quantization and transmission of Audio, Audio Compression),
- video basic concepts (Digitizing Video, Video compression).
 - Streaming stored Audio/Video,
 - Streaming Live Audio/Video,
 - Characteristic of Real-Time Interaction Audio and Video.

References:

1. Fundamentals of Multimedia by Ze-Nian , Li. Mark , S. Drew, 2004
2. Digital Multimedia by Nigel Chapman, Jenny Chapman, 2007.
3. Data Communication and Networking Behrouz A. Forouzan , 2007.

7. English language 3- 1st Course

- A world of difference
- The working week
- Good times, badtimes
- Getting it right
- Our changing world
- What matters to me
- Skills development
- IT depends how you look at it
- All things high tech

References:

- 1- New Headway 4th edition intermediate student book, Liz and John Soars.

المرحلة الثالثة / الكورس الثاني

1. Computer Architecture – 2nd course

- Introduction to Computer Organization
 - RISC and CISC
 - I/O Organization and Peripheral Control Strategies.
 - I/O Interfaces and Programming
 - Asynchronous data transfer
- Memory Management.
 - Memory types and Hierarchy
 - Main Memory address map.
 - Associative Memory and Content Addressable Memories.
- Parallel Processing
 - Pipeline (general consideration).
 - Arithmetic Pipeline.
 - Instruction Pipeline.
 - Difficulties and Solutions in Instruction Pipeline.
 - Vector processing and Array Processing.

References:

1. M.M Mano “Computer System Architecture “ third Edition, Prentice Hall, 1993.
2. David A. patterson And John L.Hennessy, ”Computer Organization And Design “ Morgan Kaufmann, 1998.

2. Compiler Design – 2nd course

- Introduction to Compiler,
- Lexical analysis,
- Syntax of Analysis,
- Problems of Compiler,
- First and Follow,
- Top down Parsing, Predictive Parsing Method, LL(1),
- Bottom up Parsing, Operation Precedence Parser, Simple Left to Right Parser, Canonical LR Parser,
- Semantic Analysis,
- Intermediate Code Generation,
- Code Optimization,
- Code Generation.

References:

Principles of Compiler Design, Alfred V. Aho, Jeffry D. Ulman 2003.

3. Intelligent Searching Techniques – 2nd course

- Search Techniques:
 - Blind search (depth & breadth),
- Heuristic Search :
 - hill climbing,
 - best first search,
 - A algorithm,
 - A* algorithm minmax and alpha-beta.
- The 8_Puzzle Problem,
- Tic tac toe problem, tour of Hanoi, Control Strategy (Forward Chaining, Backward Chaining),
- Hybrid Method (Rule Cycle),
- Expert system fundamentals.

References:

- 1- Elian Rich, Artificial Intelligence, Prentice Hall 1991.

4. Mobile and network Security – 2nd course

1. Introduction to Network and Mobile Security

- 1.1 Definition of security
- 1.2 introductions to network
- 1.3 Introduction Mobile cellular networks
- 1.4 IEEE wireless networks
- 1.5 Mobile Internet networks
- 1.6 Port Protection:
- 1.7 Traffic Control

2: Security in Network

- 4.1 Secure E-Mail
- 4.2 SSL (secure socket layer)
- 4.3 Firewalls
- 4.4 Intrusion Detection Systems
- 4.5 Kerberos Authentication System
- 4.6 Multilevel Security on Networks

3: Security in Mobile Telecommunication Networks

- 5.1. Introduction
- 5.2. Signaling
- 5.3. Security in the GSM
- 5.4. GPRS security
- 5.5. 3G security
- 5.6. Network interconnection

4 Security in Next Generation Mobile Networks

- 6.1. Introduction
- 6.2. The SIP
- 6.3. VoIP
- 6.4. IP Multimedia Subsystem (IMS)
- 6.5. 4G security
- 6.6. Confidentiality

References:

1. Wireless and Mobile Network Security, Hakima Chuouchi, Maryline Laurent_ Makharicius, Wiley, 2009.
2. Mobile Computing Principles, Reza R. Far, 2005.

5. Ethical Hacking – 2nd course (update)

- 1- Introduction to Ethical Hacking:
 - 1.1 Defining Ethical Hacking
 - 1.2 Ethical Hacking Types: - White Hats - Black Hats - Gray Hats
 - 1.3 Types of Hacking
 - 1.4 Advantages of Hacking
 - 1.5 Disadvantages of Hacking
 - 1.6 Purpose of Hacking
 - 1.7 System Hacking - Nontechnical Password Attacks - Technical Password Attacks
 - 1.8 The Phases of Ethical Hacking
- 2- TCP/IP Model Principles & Footprinting :
 - 2.1 introduction TCP/IP Primer; TCP , IP , UDP , Packets
 - 2.2 Handshake protocol;
 - 2.3 Footprinting Gathering Information
 - 2.3.1 Footprinting Tools :
- 3- Scanning and Enumeration :
 - 3.1 Scanning based on purpose - Port Scanning - Network Scanning - Vulnerability Scanning
 - 3.2 Scan types: - Sweep scan, TCP scanning, SYN scanning, UDP scanning, ACK scanning, Window scanning and FIN scanning.
- 4- Hacking Windows & Linux Hacking:
 - 4.1 Privilege Escalation,
 - 4.2 Preventing Privilege Escalation
 - 4.3 Extracting and Cracking Passwords
 - 4.4 Hacking Unix:
 - 4.4.1 Linux Hacking Tools and Services • Malicious actors • Password crackers • Linux network scanners • Linux vulnerability scanning software
 - 4.5 Hacking Code: -Buffer Overflows, - Input Validation, - Vulnerabilities – Exploits
 - 4.6 Wireless Hacking; - Kismet
 - 4.7 Web Server Hacking:
 - 4.7.1 Types of Attacks against Web Servers
 - 4.7.2 Web server attack tools
 - 4.7.3 How to avoid attacks on Web server?
- 5- Social Engineering:
 - 5.1 Social Engineering
 - 5.2 Human-Based Social Engineering
 - 5.3 Computer-Based Social Engineering , Identity Theft

References:

1. Certified Ethical Hacker, Study Guide book ,Kimberly Graves,2010
2. Certified Ethical Hacker,(CEH) Cert Guide book, Michael Gregg,,2014
3. Cryptography And Network Security Principles And Practice Fifth Edition William Stalling

6. Block cipher Cryptography – 2nd course

- Symmetric Cipher Model.
- Confusion and Diffusion.
- Feistel Mode .
- Data Encryption Standard DES
- Key of DES algorithm
- CAST algorithm
- GOST algorithm
- RC5 algorithm
- Feal algorithm
- Blowfish
- Serpent

References:

Cryptography and Network Security Principles And Practice Fifth Edition William Stallings

7. Multimedia Security – 2nd course

- Basic introduction to encryption and steganography, digital signatures, authentication, IP security, digital watermarking, covert communications, security issues related to multimedia protocols, hacking, and jamming.
- Introduction to Digital Right Management Products & Laws
- Introduction to DRM Products
- Introduction to DRM Laws
- Fingerprinting & Digital Forensics
- Fingerprinting
- Non-Intrusive Digital Forensics
- Cryptography & Multimedia Encryption
- Introduction to Cryptography
- Multimedia Encryption
- Privacy-Preserving Data Mining
- Privacy-Preserving Clustering
- Data Sanitization & Privacy-Preserving Surveillance
- Data Sanitization
- Privacy-Preserving Surveillance

References:

1. Static web programming 1st course

- Static Web Programming
- Web Based Application, Introduction
- The world wide web
- The internet and web
- The history and growth of the web
- internet service provider
- Http
- The purpose of the web
- web application
- The web concepts Hypertext, web page, web site, web page address
 - Internet TCP/IP , client/server, URL , Web Based Application, web browsing, The classifying the web sites, environment, the general approach, range of complexity, web application ,web page, web site , Classifying the Web Sites
 - HTML basic tags (head, body, b ,p, I, u sup, sub)
 - HTML insert image and link to pages (bgcolor, other attribute) image maps , list tags , tables tags , form tags , frameset.
 - Introduction to CSS cascading style sheet
 - External Stylesheet & Internal Stylesheet
 - JavaScript Introduction , Put a JavaScript into an HTML page , JavaScript
 - Arithmetics
 - Logical Operators
 - Conditional Statement
 - JavaScript Functions
 - JavaScript Popup Boxes
 - Array, Loops JavaScript
 - JavaScript get Element By Id

References:

- 1- Web Based Application.
- 2- Web Programming with ASP.

2. Operating system 1 1st course

- Operating Systems Definition
 - Computer-System Architecture
 - Single-Processor Systems
 - Multiprocessor Systems
 - Clustered Systems
- Operating-System Structure
 - Operating-System Operations
 - Process Management
 - Memory Management
 - Storage Management
 - Protection and Security
- Operating-System Services
 - User and Operating-System Interface
 - Command Interpreters

- Graphical User Interfaces
- System Calls
- Types of System Calls
- Process Control
- File Management
- Device Management
- Information Maintenance
- Communication
- Protection
- System Programs
- Process Concept
 - The Process
 - Process State
 - Process Control Block
 - Threads
 - Process Scheduling
 - Scheduling Queues
 - Schedulers
 - Context Switch
- CPU Scheduling
 - Basic Concepts
 - CPU-I/O Burst Cycle
 - CPU Scheduler
 - Preemptive Scheduling
 - Dispatcher
 - Scheduling Criteria
 - Scheduling Algorithms

References

1. “Operating System Concepts” by Silberschatz, Galvin and Gagne, 2010.

3. Cloud Computing Security 1st course

1. Fundamentals of Cloud Computing and Architectural Characteristics
 - Understand what is Cloud computing
 - Architectural and Technological Influences of Cloud Computing
 - Understand the Cloud deployment models a. Public, Private, Community and Hybrid models
 - Scope of Control a. Software as a Service (SaaS) b. Platform as a Service (PaaS) c. Infrastructure as a Service (IaaS)
2. INFRASTRUCTURE SECURITY
 - Infrastructure Security: The Network Level
 - Infrastructure Security: The Host Level
 - Infrastructure Security: The Application Level
 - Understand the access control requirements for Cloud infrastructure
3. Secure Isolation of Physical & Logical Infrastructure

Secure Isolation Strategies

 - Multitenancy, Virtualization strategies, Virtualization Security ,Platform-to-Virtualization & Virtualization-to-Cloud

- Inter-tenant network segmentation strategies
 - Storage isolation strategies
4. Security visualization for cloud computing
- security visualization and data security
 - A security visualization standardization model
 - Security visualization intelligence framework
 - Security visualization intelligence model.
- 5 . DATA SECURITY AND STORAGE
- Understand the Cloud based Information Life Cycle
 - Aspects of Data Security
 - Data Security Mitigation
 - Provider Data and Its Security
6. SECURITY MANAGEMENT IN THE CLOUD
- Security Management Standards
 - Security Management in the Cloud
 - Availability Management
 - SaaS Availability Management
 - PaaS Availability Management
 - IaaS Availability Management
 - Access Control
 - Security Vulnerability, Patch, and Configuration Management
7. PRIVACY
- What Is Privacy?
 - What Is the Data Life Cycle?
 - What Are the Key Privacy Concerns in the Cloud?
 - Who Is Responsible for Protecting Privacy?
 - Changes to Privacy Risk Management and Compliance in Relation to
 - Cloud Computing

References

1. T. Mather, S.Kumaraswamy, and S. Latif, “Cloud Security and Privacy”,1 st edition, Copyright © 2009 ,Published by O’Reilly Media,Inc., USA.
2. Securing The Cloud: Cloud Computing Security Techniques and Tactics by Vic (J.R.) Winkler (Syngress/Elsevier),2011.
3. Vimal Kumar, Sivadon Chaisiri and Ryan Ko,” Data Security in Cloud Computing”,1 st edition, Copyright © The Institution of Engineering and Technology,London,UK,2017.

4. Information Hiding & Watermarking – 1ST course(update)

Part I

- Introduction to Information Hiding
- Main Sub-disciplines of Information Hiding
- A Brief History of Information Hiding
- Linguistic Steganography in Ancient time
- Copyright Enforcement
- Wisdom from Cryptography
- Some Applications of Information Hiding

- **Principles of Steganography**
- Frameworks for Secret Communication
 - Pure Steganography
 - Secret Key Steganography
 - Public Key Steganography
- **Information Hiding in Noisy Data & A Survey of Steganographic Techniques**
 - Substitution Systems
 - Least Significant Bit Substitution
 - Pseudorandom Permutations
 - Image Downgrading and Covert Channels
 - Palette-Based Images
 - Information Hiding in Binary Images
 - Unused or Reserved Space in Computer Systems
 - Transform Domain Techniques
 - Steganography in the DCT Domain
 - Spread Spectrum and Information Hiding
 - Statistical Steganography
 - Distortion Techniques
 - Cover Generation Techniques
- Active and Malicious Attackers
- Information Hiding in Written Text

Part II

- **Watermarking and Copyright Protection**
- Watermarking Terminology
- Basic Watermarking Principles
- Watermarking Applications
 - Watermarking for Copyright Protection
 - Fingerprinting for Traitor Tracking
 - Watermarking for Copy Protection
 - Watermarking for Image Authentication
- Requirements and Algorithmic Design Issues
 - Imperceptibility
 - Robustness
- Evaluation and Benchmarking of Watermarking Systems

References

- [1] Stefan Katzenbeisser, and Fabien A. P. Petitcolas, “ Information Hiding Techniques for Steganography and Digital Watermarking” , Artech House computing library, 2000.
- [2] Frank Y. Shih “Digital Watermarking and Steganography: Fundamentals and Techniques”, Taylor & Francis Group, LLC CRC Press is an imprint of Taylor & Francis Group, 2017

5. Advance Cryptography – 1st course

- Modular Arithmetic , Groups, Rings, and Fields, Finite Fields of the Form $GF(p)$, Polynomial Arithmetic , Finite Fields of the form $GF(2^n)$

- The Origins AES, AES Structure, AES Round Functions, AES Key Expansion, An AES Example, AES Implementation.
- Electronic Codebook Mode, Cipher Block Chaining Mode , Cipher Feedback Mode .
- Blowfish Block cipher Algorithm
- Two Fish Algorithm
- Elliptic curve, Elliptic curve Arithmetic (Elliptic curve over finite fields, Elliptic curve discrete logarithm problem, Elliptic curve factorization algorithm, Menezes-Vanstone Elliptic curve, ElGamal, Massey-Omura,

References:

- 1- Cryptograph and Network Security Principles and Practices, Four Edition By William Stallings, 2011.
- 2- Advances in Elliptic curve Cryptography, Edited by Ian F. Blake University of Toronto Gadiel Seroussi Hewlett-Packard Laboratories Nigel, University of Bristol, Cambridge University ,Press 2005

6. Intelligent Systems 1st Course

Rule Base Expert System (Design and Architecture), Classification system: Back word chaining, For word chaining, Natural language processing (Formal method), Natural language processing (InFormal method),Systems Designs under uncertainty, Probability method, Systems that depends (Explain) their actions, How facility, Why facility, Expert system Shell, Text Mining Principals.

References:

1. Daniel H. Marcellus, Expert Systems Programming in Turbo Prolog, Prentice Hall (New Jersey) 1992.
2. George F. Luger, Artificial Intelligence (structures and strategies for complex problem solving), Pearson Education Asia (Singapore), 2002.

7. Project

المرحلة الرابعة / الكورس الثاني

1. Dynamic Web Programming

- JavaScript Functions, Lifetime of JavaScript Variables, Event Handler,
- Array, string and methods ,Insert Special Characters, Create New object
- Method of object set and get date, JavaScript Math Object
- Search Function Regular Expression , Form Validation ,
- JavaScript getElementById
- ASP Principles, IIS: internet information server
- ASP Objects, Response Object, write , clear, end, redirect, Request Object, get and
- post methods form and Queerstring, Cookies
- Active server pages Create & retrieve cookies, ASP-File System Object
- File system object copyfile, copyfolder, createtextfile, deletetextfile,deletefolder,
- ADO , SQL, Connection asp with database, objects Insert from asp to db
- Update ,delete Application e-mail

References:

- 1- Web Based Application.
- 2- Web Programming with ASP.
- 3- Multimedia Web Programming (Grassroots) Paperback , by Adrian Moore,2005.

2. Operating system 2nd course

- Deadlock
 - System Model
 - Necessary Conditions
 - Resource-Allocation Graph
 - Methods for Handling Deadlocks
 - Deadlock Prevention
 - Deadlock Avoidance
 - Safe State
 - Resource-Allocation-Graph Algorithm
 - Banker's Algorithm
 - Safety Algorithm
 - Resource-Request Algorithm
 - Dead Lock Detection
 - Detection-Algorithm Usage
 - Recovery from Deadlock
- Mass-Storage Structure
 - Overview of Mass-Storage Structure
 - Magnetic Disks
 - Disk Scheduling
 - FCFS Scheduling
 - SSTF Scheduling
 - SCAN Scheduling
 - C-SCAN Scheduling
 - LOOK Scheduling
- Virtual Memory
 - Demand Paging
 - Page Replacement

- Basic Page Replacement
- FIFO Page Replacement
- Optimal Page Replacement
- LRU Page Replacement

References

1. “Operating System Concepts” by Silberschatz, Galvin and Gagne, 2010.

3. Crypt Analysis – 2nd course

Introduction (definition of Cryptanalysis and Cryptanalyst, Requirements of Cryptosystems), Type of Attacks on Cryptosystems, Cryptanalysis of the traditional systems: (Transposition cryptanalysis, columnar transposition, Double transposition). substitution cryptanalysis, (additive, multiplication, affine, keyword), Polyalphabetic analysis: (Vigenere method, computing key length, Kasiski test, Shift itself, Percentage of coincidence, complete examples.), Statistical cryptanalysis: (unilateral frequency distribution, Letter frequency in cryptogram, roughness, Coincidence tests, index of coincidence, Cryptanalysis for the affine using statistical cryptanalysis), Stream cipher cryptanalysis (introduction of stream cipher, LFSR, primitive polynomials, Matrix approach to analyzing stream cipher, examples, solve problems, Massey algorithm, examples), DES cryptanalysis, RSA cryptanalysis.

References:

1- Applied cryptanalysis' /Breaking Ciphers in the Real World/2007 PDF

4. Authentication and Access Control- 2nd course

- 1- Define the authentication, authentication goals, Authentication requirements; human authentication, machine authentication, authentication technologies, Remote User Authentication Principles, Remote User Authentication Using Symmetric Encryption
- 2- Define Access control, Access control required tools, Identification, Authentication, Authorization, Fingerprints, Retina scan, Iris scan, Voice print, Facial scan process, Biometric performance, Types of Access control, Administrative control, Technical control, Physical control, Categories of access control
- 3- Access Control Matrix, ACLs and Capabilities, Confused Deputy, Multilevel Security Models, Bell-LaPadula, Biba's Model, Multilateral Security, Covert Channel, Inference Control, PTCHA

References

- 1- Cryptography and Network Security Principles and Practice Fifth Edition William Stallings
- 2- https://www.chipsystems.in/download_syllabus.php?sbs=QURBQIQucGRm
- 3- INFORMATION SECURITY PRINCIPLES AND PRACTICE, Mark Stamp, San Jose State University, 2006

5. Cyber Security- 2nd course (update)

Unit 1: Introduction to Cyber Security

Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats: - Cyber Warfare-Cyber Crime-Cyber Terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.

Unit 2: Cyber Security Vulnerabilities and Cyber Security Safeguards

Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, social engineering, Firewalls, Response, Scanning, Security policy, Threat Management.

Unit 3: Cyber security architecture and operations:

physical and process controls that can be implemented across an organisation to reduce information and systems risk, identify and mitigate vulnerability, and ensure organisational compliance. Service continuity and reliability, Security architecture, Process and Technology Control, Defence in depth, Operational fundamentals of technical controls

Testing and monitoring, Usability, awareness and behaviour

Unit 4: Cybersecurity management:

Understanding the personal, organisational and legal/regulatory context in which information systems could be used, the risks of such use and the constraints (such as time, finance and people) that may affect how cybersecurity is implemented.

Unit 5: Secure systems and products

Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.

Unit 6: intrusion Detection systems

- Intrusion detection system types

Network intrusion detection system

Network node intrusion detection system

Host intrusion detection system

Protocol based intrusion detection system

- Methods of intrusion detection system

Unit 7 : Cyberspace and the Law:

Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards

References:

Cyber-security-essentials, James graham, Ryan Olson, Richard Howard, 2010

6. Soft Computing – 2nd course

- Neural Networks: Introduction – Learning Types – ANN properties – Supervised Learning Neural Networks – Perceptrons – Back propagation Multilayer Perceptrons – Unsupervised Learning Neural Networks – Hopfield – BAM – Competitive Learning Networks – Kohonen Self – Organizing Networks.
- Genetic Algorithm:

- Difference between Traditional Algorithms and GA, The basic operators, Schema theorem, convergence analysis, stochastic models, applications in search and optimization. Encoding , Fitness Function, Reproduction, Cross Over, Mutation, Convergence Theory; Applications – 4-colors mapping problem – Travelling Salesman Problem.

References:

- 1- Daniel H. Marcellus, Expert Systems Programming in Turbo Prolog, Prentice Hall (New Jersey) 1992.
- 2- George F. Luger, Artificial Intelligence (structures and strategies for complex problem solving), Pearson Education Asia (Singapore), 2002.

7. Project

Description for Research Project

Research project is an study proposed by teacher (supervisor) and developed by student (fourth class only), this study aim to train the student on it is specialization of scientific (the scientific branch in computer sciences).

Time for Research Project

The Student given full academic year for accomplishes his study.

Exam for Research Project

Research project will be evaluated by a supervisor and Committee of Experts.

Format for Research Projects

Research projects are written up in standardized format. Be formal & objective in English language, & cite all sources. The format includes the following sections:

Title

Title would normally include the major variables of student study. For example: “A protection system for an Internet site”

Abstract

Begin with a brief Abstract of the study, which summarizes the entire study into one paragraph. The reader should be able to tell from Abstract what theory and hypothesis were, who you studied and how, what your findings were, and what they meant for the theory.

Introduction

The introduction includes a brief (~2-3 page) review of current theory & research in the area of your topic. In presenting this material, paraphrase it into your own words, but always cite the source of the information. Referencing must be complete & correct, or you are plagiarizing, which is a serious academic offence. End with an introduction to your study, including your hypothesis.

Method

3. Materials/Instruments , Describe any instruments employed to measure the variables of your study. (e.g. questionnaires, tests, etc.)

4. Procedure , The Procedure section reviews exactly how you did your study, & should include enough detail that anyone could repeat your procedure. Include your methodology (e.g. whether you did an experiment, or observation, etc.); a review of how you carried out the study; & any data analysis that you did.

Results

Include your results, summarized & presented in a way that is easy to follow & to understand. If possible, these results should be presented both in a table (which would

include descriptive & inferential statistics) & in a written description of the results. The results section should not include conclusions or interpretations; these would be in the Discussion section.

Discussion

Use the discussion to relate your results to the theory you described in the introduction. The "why" of your results are discussed here, & what they mean in terms of theory & research. Add a discussion of the limitations of your study.

References

All references in the introduction are included in the reference section at the end of the research report, in alphabetical order.

Appendix

Any information that is relevant to the study, but not needed within the body of the paper, should be included at the end of the report. These appendices would include further details of the research instructions, materials, results, psychological measures, etc., if needed. Your instructor may also wish you to attach the raw data of your project.

8. English Language 4 – 2nd course

- The tense system (simple, cont, perfect, active and passive voice)
- Present perfect simple and continuous, Hot verbs
- Narrative tenses (Past simple, past continuous, past perfect, active and passive voice)
- questions and negative, saying the opposite, prefixes and antonyms in context.
- future form, expression of quantity, words with variable stress
- modules and related verbs
- relative clauses, adverb collocation

References

1. New Headway plus 4th edition intermediate student book, Liz and John Soars.
2. New Headway plus 4th edition intermediate work book, Liz and John Soars



المناهج الدراسية لفرع ادارة
الشبكات

للعام الدراسي 2023-2024

Second Year – First Semester					
Code	Title	Hours / Week			
		Lect.	Lab.	Disc.	Units
CSCL2112	Object Oriented Programming I	2	2	1	3
CSCL2114	Data Structures	2	2	1	3
CSCL2116	Mathematics III	2	-	1	2
CSCL2118	Database Foundation	2	2	1	3
CSCL2120	Human Rights	2	-	-	1
CSCL2122	English Language II	2	-	-	1
CSCN2104	Digital Signal Processing	2	-	1	2
Totals		14	6	5	15

Second Year – Second Semester					
Code	Title	Hours / Week			
		Lect.	Lab.	Disc.	Units
CSCL2213	Object oriented programming II	2	2	1	3
CSCL2215	Sorting and Searching Algorithms	2	2	1	3
CSCL2217	Numerical Analysis	2	2	1	3
CSCL2219	DataBase Design	2	2	1	3
CSCL2221	Democracy	2	-	-	1
CSCN2205	Communications	2	-	-	2
CSCN2206	Network Protocols	2	-	-	2
Totals		14	8	4	17

Third Year – First Semester					
Subject Code	Subject in English	Number of Hours/ Week			
		Theory	Lab	Tutorial	Units
CSC21	Microprocessor	2	2	1	3
CSC23	Computation Theory	2	-	1	2
CSC25	Operations Researches	2	-	-	2
CSC27	Knowledge Representation	2	2	-	3
CSC31	Data Security I	2	2	1	3
CSN07	Network Switching and Routing I	2	2	1	3
CSN09	Networks Programming I	2	2	1	3
CSC53	English Language III	2	-	-	1
		14	10	5	20

Third Year – Second Semester					
Subject Code	Subject in English	Number of Hours / Week			
		Theory	Lab	Tutorial	Units
CSC22	Computer Architecture	2	2	1	3
CSC24	Compiler Design	2	2	1	3
CSC26	Optimization	2	-	-	2
CSC28	Intelligent Searching Techniques	2	2	-	3
CSC35	Distributed Database I	2	2	1	3
CSN08	Network Switching and Routing II	2	2	1	3
CSN10	Networks Programming II	2	2	1	3
		14	12	5	20

Total No. of Unit for first Course: (20)Units

Total No. of Unit for Second Course: (20)Units

Total No. of Unit for Year: (40) Units

Total No. of Unit for Specialist Courses: (15)Units

Fourth Year – First Semester					
Code	Title	Hours / Week			
		Lect.	Lab.	Disc.	Units
CSCL4134	Static Web Programming	2	2	1	3
CSCL4142	English Language III	2	-	-	2
CSCN4113	Multimedia 1	2	-	1	3
CSCN4115	Operating system I	2	2	1	3
CSCN4117	Network Management I	2	2	-	3
CSCN4119	Network Security I	2	2	1	3
CSCN4121	Wireless Foundations	2	2	1	3
CSCL444	Project	2	2	-	3
Totals					

Fourth Year – Second Semester					
Code	Title	Hours / Week			
		Lect.	Lab.	Disc.	Units
CSCL4235	Dynamic Web Programming	2	2	1	3
CSCN4214	Multimedia II	2	2	1	3
CSCN4216	Operating system II	2	2	1	3
CSCN4218	Network Management II	2	2	-	3
CSCN4220	Network Security II	2	2	1	3
CSCN4222	Wireless Techniques	2	2	1	3
CSCL444	Project	2	2	-	3
Totals					

Second Year – First Semester					
Code	Title	Hours / Week			
		Lect.	Lab.	Disc.	Units
CSCL2112	Object Oriented Programming I	2	2	1	3
CSCL2114	Data Structures	2	2	1	3
CSCL2116	Mathematics III	2	-	1	2
CSCL2118	Database Foundation	2	2	1	3
CSCL2120	Human Rights	2	-	-	1
CSCL2122	English Language II	2	-	-	1
CSCN2104	Digital Signal Processing	2	-	1	2
Totals		14	6	5	15

Second Year – Second Semester					
Code	Title	Hours / Week			
		Lect.	Lab.	Disc.	Units
CSCL2213	Object Oriented programming II	2	2	1	3
CSCL2215	Sorting and Searching Algorithms	2	2	1	3
CSCL2217	Numerical Analysis	2	2	1	3
CSCL2219	Database Design	2	2	1	3
CSCL2221	Democracy	2	-	-	1
CSCN2205	Communications	2	-	-	2
CSCN2206	Network Protocols	2	-	-	2
Totals		14	8	4	17

Second Year – First Semester

1. Object Oriented Programming I

- Overview for functions and parameter transmission
- Function overloading
- Introduction to OOP and its main features
- Classes in OOP
 - Defining a Simple Class with Inline Member Functions
 - Constructors and destructors functions
 - Friends functions and friend class
 - Constant Members and Static Members
 - Default Arguments and Implicit Member Argument
 - Pointer to class object
 - Array to class object
 - Pointer with array to class object

References:

1. Joyce Farrell, "Object-Oriented Programming Using C++" , Fourth Edition, Course Technology, 2009.
2. Bjarne Stroustrup, "Programming Principles and Practice Using C++", Second Edition, Addison-Wesley, 2014.

2. Data Structures

- Introduction to Data Structures
- Types of data structure
- Memory representation for 1D and 2D arrays
- Linear list and Linear list types
- Stack
 - Stack Operations
 - Applications of stack
- Queue
 - Queue Operations
 - Applications of queue
- Circular Queue
 - CQueue Operations
 - Applications of CQueue
- Linked List
 - Linked-Stack
 - Linked-Queue
 - Linked-CQueue
- Recursion

References

1. Data structures and Algorithms with Object- Oriented design Patterns in C++ by: Bruno R. Preiss, B.A.Sc., M.A.Sc.Ph.D., P.Eng. Associate Professor, Department of electronic and computer engineering, university of waterloo.
2. Data Structures and algorithm analysis in C, By: Mark Allen Weiss.
3. Data Structures and algorithms in Java PDF file.
4. Data Structures using C and C++, Yedidyah language, Moshe J. augenstein, Aaeon M. Tenenbaum, Brooklyn College.

3. Mathematics III

- Partial differentiation
 - Partial differentiation for first and higher order of derivative
 - Chain rule and directional derivative
 - First order differential equations
 - Solution of differential equation by direct integration
 - Separating the variables and homogeneous equation
- Second and higher order differential equations
 - Linear second order differential equation with constant
 - Variation method
- Laplace transform for standard important function
 - Multiplication by t^n , division by t
 - Inverse Laplace transform of derivatives
- Formatting of Partial differential equation
 - Types of partial differential equations
- Fourier series and periodic functions
 - Fourier series for odd and even function
 - Half range Fourier sin and cosine series
- Change of interval

References:

1. Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesley, 1999.

4. Database Foundation *

- Centralized database system
 - Introduction and the purpose of database
 - Comparing between a file processing system and DBMS
- Entity relationship model
 - Entities and entity sets
 - Relationships and relationship set
 - Attributes and mapping
 - Constraints and keys
- Relational model
 - Data representation in relational model (Tables, Records, and keys)
- Instant and schema

- Weak entity in ER model
- ER model and relational model examples
- Indexing
 - Primary indexing
 - Secondary indexing
 - Index update
 - Hash index

References

1. Database system concepts
2. Database design , application and development

5. Human Rights

- مفهوم الحقوق (تعريف الحقوق-خصائص الحقوق).
- حقوق الانسان في الشرائع السماوية(الديانتين المسيحية واليهودية- الدين الاسلامي).
- مصادر حقوق الانسان(المصادر الدولية- المصادر الوطنية).
- ضمانات حقوق الانسان(الضمانات على الصعيد الداخلي- الضمانات على الصعيد الدولي).
- التقدم التكنولوجي واثره على الحقوق والحريات(الاحزاب السياسية- حماية الملكية الفكرية).

المصادر:-

1. حقوق الإنسان والطفل والديمقراطية د.ماهر صالح علاوي الجبوري،د. رعد ناجي الجدة،د رياض عزيز هادي، د.كامل عبد العنكود،د.علي عبد الرزاق محمد، د.حسان محمد شفيق، دار ابن الأثير للطباعة والنشر، 2009 .

6. English Language II

- Unit 1 :Getting to know you
- Unit 2: The way we live
- Unit 3: It all went wrong, past tenses, past simple
- Unit 4: Let's go shopping, quantity
- Test
- Unit 5: Verb patterns 1
- Unit 6:Comparative and superlative adjectives
- Unit 7:Present perfect and past simple, for and since,
- Tense revision
- Unit 8: Have to, must, should
- Unit 9:Time and conditional clauses
- Unit 10:Verb patterns 2
- Unit 11:Passives
- Unit 12:Sound conditional
- Unit 13:Present perfect continuous

Reference:

1. New Headway plus for Pre-Intermediate Student's Book by John and Liz Soars.
2. New Headway plus for Pre-Intermediate Workbook by John and Liz Soars.
3. English for computer users By Santiag R. Esteras, Fourth Edition, Cambridge University Press, 2008.
4. Grammar in Use by Raymond Murphy, Third Edition, Cambridge University Press, 2004.
5. English Grammar and Composition By Wren and Martin, Revised by N.O.PrasadaRao,S.Chand,, Company Ltd., New Delhi, 2007.

7. Digital Signal Processing

- Introduction to DSP: D/A, D/A, sampling rate
- Signal types, operations and functions
- DSP System properties: LITS
- Linear Convolution: look-up table method and graphical method
- Linear Convolution: polynomial method and by Rule applying
- Circular Convolution: by rule applying
- Circular Convolution: by graphical method
- Introduction to Fourier Series and Derivations
- 4_FFT & 8_FFT
- 16_FFT &32_FFT
- IFFT
- Deconvolution: Cartona method, and by rule applying
- Deconvolution: polynomial method
- Haar Wavelet Transform
- Haar Invers Wavelet Transform

References

1. Digital Signal Processing, A practical Approach.Second edition, Emmanuel Ifeachor, Barrie W. Jervis, 2013

Second Year – Second Semester

1. Object Oriented Programming II

- Operators overloading
 - Unary Operators
 - Arithmetic Operators
 - Logical Operators
- Inheritance and Derived Classes
 - Single inheritance and Multiple inheritances
 - Virtual Functions and Pure virtual functions
- Template
 - Function Template Definition
 - Function Template Instantiation
 - Class Template Definition
 - Class Template Instantiation
- Polymorphism
 - Polymorphism of variables
 - Polymorphism of functions
 - polymorphism of objects

References

1. Joyce Farrell, "Object-Oriented Programming Using C++" , Fourth Edition, Course Technology, 2009.
2. Bjarne Stroustrup, “Programming Principles and Practice , Using C++”, Second Edition, Addison-Wesley, 2014

2. Sorting & Searching Algorithms

- Sorting Algorithm
 - Insertion Sort
 - Selection Sort
 - Bubble Sort
 - Heap Sort
 - Quick Sort
 - Merge Sort
- Searching algorithm
 - Sequential Search
 - Binary Search
- Trees
 - Types of Tree
 - Binary tree
 - Binary tree scan
 - Represent Regulars expression using trees
 - Binary Search Tree

References

1. Data structures and Algorithms with Object- Oriented design Patterns in C++ by: Bruno R. Preiss, B.A.Sc., M.A.Sc.Ph.D., P.Eng. Associate Professor, Department of electronic and computer engineering, university of waterloo.
2. Data Structures and algorithm analysis in C, By: Mark Allen Weiss.
3. Data Structures and algorithms in Java PDF file.
4. Data Structures using C and C++, Yedidyah language, Moshe J. augenstein, Aaeon M. Tenenbaum, Brooklyn College.

3. Numerical Analysis

- Numerical analysis and solving sets of equation
- Elimination and iterative methods
- Interpolating polynomials
- Lagrange polynomial
- Solving non-linear equation
- Numerical differentiation and numerical integration
- Numerical solution of ordinary differential equations
- Curve-fitting and approximations.
- The solution of integral equation, trapezoidal method
- Simpsons method

References

Numerical Methods Using Matlab, Prentice Hall.

4. Database Design

- Database Administrator and database design process
- Data base cardinality
- Normalization
- System architecture
- Transaction
- Database security
 - Access control
 - Encryption
- Fundamental of relational algebra:
- Query processing

References

1. To design a database having high efficiency in storing, updating and retrieving of the data.
2. Provide ways for securing the data base

5. Democracy

- مفهوم الديمقراطية (تعريف الديمقراطية- مزايا الديمقراطية).
- اشكال الديمقراطية (الديمقراطية المباشرة- الديمقراطية شبه المباشرة- الديمقراطية النيابية- المجلس النيابي).
- الية النظام النيابي- الانتخاب- (مفهوم الانتخاب- هيئة الناخبين- تنظيم عملية الانتخاب- نظم الانتخاب).

المصادر:-

1. محاضرات في الديمقراطية- د فيصل شطناوي
2. لاتجار بالبشر في القانون واحكام الشريعة الاسلامية - بحث مقدم من قبل م.م محمد احمد عيسى /جامعة بغداد – كلية القانون/مجلة رسالة الحقوق- السنة الرابعة- العدد الثاني -2012.

6. Communications

- Introduction
 - Data and signals
 - Analog and digital signals
 - Time and frequency domain
 - Composite signals
 - Bandwidth: bit rate, bit length, Baseband and broadband transmission
 - Attenuation, distortion, Noise, Types of noise, White Noise, Addition of Noise due to several sources
 - Signal to Noise Ratio
 - Shannon capacity, throughput, delay, Jitter, Bandwidth delay product.
- Data communication concepts
 - Data transmission
 - Parallel and serial transmission
 - Synchronous, and Asynchronous transmission
 - Modem definition
- Communication media
 - Wired Communication
 - Wireless Communication
- Digital Modulation And Multiplexing
 - Baseband Transmission
 - Passband Transmission
 - Frequency Division Multiplexing
 - Time Division Multiplexing
 - Code Division Multiplexing
- Switching techniques- Circuit , packet and hybrid switching
- Communication Error
 - Types of error
 - single bit error
 - burst error
 - Error detection
 - Vertical redundancy check
 - cyclic redundancy check
 - Error correction.

References

1. Behrouz A. Forouzan, "Data Communications and Networking", McGraw Hill; 5th edition 2012.
2. Andrew S. Tanenbaum, "Computer Networks", Pearson, 5th Edition 2011.

7. Networking Protocols

- Physical Layer
 - EIA/TIA-232
 - EIA/TIA-449
 - ITU-T-V-Series
 - DSL
 - IEEE 802.3
 - IEEE 802.11
 - IEEE 802.15
 - IEEE 802.16
 - Bluetooth
 - RS-232
- Network Layer
 - IP (v4 ,and v6)
 - ARP
 - ICMP
 - IPSec
 - IPX (Internetwork Packet Exchange)
- Transport layer
 - TCP (Transmission Control Protocol)
 - UDP (User Datagram Protocol)
 - SPX (Sequenced Packet Exchange)
- Application Layer
 - NNTP (Network News Transfer Protocol)
 - SSI
 - DNS (Domain Name System)
 - FTP (File Transfer Protocol)
 - HTTP
 - NFS (Network File System)
 - NTP (Network Time Protocol)
 - SMTP (Simple Mail Transfer Protocol)
 - SNMP (Simple Network Management Protocol)
 - Telnet
 - DHCP (Dynamic Host Configuration Protocol).

References

1. "Network Protocols Handbook", 2nd Edition, Javvin Technologies Inc,2005

Third Year – First Semester					
Subject Code	Subject in English	Number of Hours/ Week			
		Theory	Lab	Tutorial	Units
CSC21	Microprocessor	2	2	1	3
CSC23	Computation Theory	2	-	1	2
CSC25	Operations Researches	2	-	-	2
CSC27	Knowledge Representation	2	2	-	3
CSC31	Data Security I	2	2	1	3
CSN07	Network Switching and Routing I	2	2	1	3
CSN09	Networks Programming I	2	2	1	3
CSC53	English Language III	2	-	-	1
		14	10	5	20

Third Year – Second Semester					
Subject Code	Subject in English	Number of Hours / Week			
		Theory	Lab	Tutorial	Units
CSC22	Computer Architecture	2	2	1	3
CSC24	Compiler Design	2	2	1	3
CSC26	Optimization	2	-	-	2
CSC28	Intelligent Searching Techniques	2	2	-	3
CSC35	Distributed Database I	2	2	1	3
CSN08	Network Switching and Routing II	2	2	1	3
CSN10	Networks Programming II	2	2	1	3
		14	12	5	20

Total No. of Unit for first Course: (20)Units

Total No. of Unit for Second Course: (20)Units

Total No. of Unit for Year: (40) Units

Total No. of Unit for Specialist Courses: (15)Units

Third Year – First Semester

1. Micro-processors

- Introduction to Microprocessor and Microcomputer system.
 - Microprocessor Architecture and Register Set.
 - System Buses
 - Memory types and physical addressing.
 - I/O devices
- Instruction Set and Format
- Addressing Modes
- Introduction to Assembly Programming Language.
 - Arithmetic and logical Instructions (Shift and Rotate).
 - Program Control (interrupt and subroutine call).

References:

1. Abel P., "IBM PC Assembly Language and Programming", 4th Edition, Prentice Hall, 1998.
2. Thorne M., "Computer Organization and Assembly Language Programming", 2nd Edition, Benjamin/Cummings, 1990.

2. Computation Theory:

- Regular Expression,
- Finite Automata, DFA and NFA, Equivalence of NFA and DFA,
- Kleen theorem,
- Two way finite automata with output (mealy machine, moor machine),
The equivalence of mealy and moor machine,
- Introduction to Crammers, Phrase Structure Grammar, Context sensitive Grammar, Context Free grammar,
- Chomsky Normal Form,
- Tree, leftmost and rightmost derivations,
- Regular grammar, Left linear grammar, Right linear grammar, Push down automata, Top down –bottom up derivation,
- Turing machine.

References:

1. H.R.Lewis And G.H Papadimitiou,"Elements Of The Theory Of Computation", Prentig-Hall, 1981.
2. R.W.Floyd And R.Beigel,"The Languae Of Machine:An Introduction To Computability And Formal Languages"Computer Science Press, Network, 1994.
3. M.Sipser."Introduction To The Theory Of Computation" ,Boston Pws Pub ,1996.

3. Operation research

- An introduction to linear programming
- Linear programming model formulation.
- Graphical method.
- Simplex method.
- Artificial variables techniques (big – M and II-Phases).
- Network analysis.
- Game theory.
- Transportation models.
- Queuing theory/

References:

1. Operation Research: An Introduction, Hamdy A. Taha.
2. بحوث العمليات و تطبيقاتها، أ.د. هلال هادي و آخرون 1990

4. Knowledge Representation

- Introduction to Programming in Logic
- Prolog Language Structure
- Prolog Language Components
- Facts, Simple Rules
- Built in Functions in Prolog Language
- Recursion in Prolog (Tail Recursion)
 - Non Tail Recursion
 - Fail Structure, List Processing, String Processing
- Database Structure and Properties
- Files in Prolog and Applications with Database
- Introduction to Artificial Intelligence, Knowledge Representation, Logical Representation (propositional calculus & predicate logic)
- non-logical Representation (production rules, semantic net & frames)
- Problem State Space Characteristics
- Problem Solving,

References:

1. Elian Rich, Artificial Intelligence, Prentice Hall 1991.

5. Data Security I

- Introduction to Data security,
- Requirements for computer protection
- Security mechanisms
 - Authentication
 - Chain of Authority
 - Access control
 - Permissions-based access control
- Understanding hacking
 - Vectors that hackers exploit
 - Direct intrusion

- Dial –up
- Hacking techniques
- Firewall
 - Definition, concepts and conditions
- The components of cryptographics system
 - Encryption algorithms
 - Traditional ciphers
 - Homophonic substitution cipher
 - Polygram ciphers
- Viruses
 - Macro
 - Scripting hosts
 - Understanding virus propagation
 - Worm
 - Common types of virus attacks
 - Boot sector viruses
 - Executable viruses
 - Macro viruses
 - Understanding worms and Trojan horses

References:

1. Managing Cisco network security: building rock-solid networks 2000
2. Cryptography and Network Security, William Stallings, 2003

6. Network Switching and Routing I

- Network Routing Protocols:
 - Introduction to Routing Protocols
 - IP Routing
 - Routing Basics
 - The IP Routing Process
 - Configuring IP Routing
 - Static and Dynamic routing
 - Flooding
 - Distance vector routing
 - Link-state shortest-path-first routing
 - Dijkstra Algorithm.
- Tunneling and encapsulation
- Unicast, Multicast and Broadcast routing
- Routing in the Internet
- ARP and RARP
- DHCP
- Interior And Exterior Routing Protocols,
 - RIP
 - OSPF
 - BGP
 - Multicast Addressing and routing

- IGMP, IP Tunnelling, MBONE, PIM.
- **IPv6**
 - FROM IPv4 TO IPv6 Address Architecture
 - The IPv6 Header Format. ICMP v6.
 - Address Resolution.

REFERENCES:

1. Fred Halsall, “Computer Networking and the Internet”, Fifth edition
2. Note: IN LAB Intermediate Routing Protocols + Command-Line Interface Configuration Of Switches, (LAB WORK)
3. CCNA Routing And Switching STUDY GUIDE
4. Deepankar Medhi, Karthikeyan Ramasamy, ”Network Routing Algorithms, Protocols, and Architectures”,
5. Olivier Bonaventure, ” Computer Networking : Principles, Protocols and Practice”,2015

7. Network Programming

- Introduction and overview of most C Sharp classes used in network environments
- Elementary TCP Sockets
 - Introduction to Sockets and Socket Programming
 - Socket address Structures
 - Byte ordering functions
 - Address conversion functions
 - Elementary TCP Sockets (socket, connect, bind, listen, accept, read, write, close functions)
 - Iterative server
- Application Development
 - TCP Echo Server, TCP Echo Client
 - Server with multiple clients
 - Boundary conditions(Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown)
 - I/O multiplexing, I/O Models
 - Select function, Shutdown function
 - TCP echo Server (with multiplexing), Poll function
 - TCP echo Client (with Multiplexing)

References

1. E.Rusty, “Java Network Programming”, O’REILLY, 2014
2. W. Richard Stevens, “Advanced Programming in the UNIX Environment”, Addison Wesley, 1999.
3. R.Blum, J.Fugazzotto,“C# Network Programming”, SYBEX, 2003.

8. English Language III

- Unit one: It's a wonderful world -Auxiliary verbs , present, past, present perfect
- Unit two: Get happy, present tenses
- Unit three: Telling tales , -past tenses
- Unit four: doing the right thing , Model verbs
- Unit five: On the move, Future forms
- Unit six: I just love it , Questions with like, Skills development
- Unit Seven: the world of work ,Present perfect
- Unit eight: Just imagine ,conditionals
- Unit nine: getting on together, Modal verbs
- Unit ten: Obsessions, Present perfect continuous
- Unit eleven: tell me about it , Indirect questions
- Unit twelve: life's great events, Reported speech

References:

1. New Headway plus 4th edition intermediate student book, Liz and John Soars.
2. New Headway plus 4th edition intermediate work book, Liz and John Soars.

Third Year – Second Semester

1. Computer Architecture

- Introduction to Computer Organization
 - RISC and CISC
 - I/O Organization and Peripheral Control Strategies.
 - I/O Interfaces and Programming
 - Asynchronous data transfer
- Memory Management.
 - Memory types and Hierarchy
 - Main Memory address map.
 - Associative Memory and Content Addressable Memories.
- Parallel Processing
 - Pipeline (general consideration).
 - Arithmetic Pipeline.
 - Instruction Pipeline.
 - Difficulties and Solutions in Instruction Pipeline.
 - Vector processing and Array Processing.

References:

1. M.M Mano "Computer System Architecture " third Edition, Prentice Hall, 1993.
2. David A. patterson And John L.Hennessy, "Computer Organization And Design " Morgan Kaufmann, 1998.

2. Compilers:

- Introduction to Compiler,
- Lexical analysis,
- Syntax of Analysis,
- Problems of Compiler,
- First and Follow,
- Top down Parsing, Predictive Parsing Method, LL(1),
- Bottom up Parsing, Operation Precedence Parser, Simple Left to Right Parser, Canonical LR Parser,
- Semantic Analysis,
- Intermediate Code Generation,
- Code Optimization,
- Code Generation.

References:

1. Principles of Compiler Design, Alfred V. Aho, Jeffrey D. Ulman 2003.

3. Optimization

- Duality and dual simplex method.
- Post-Optimality and sensitivity analysis.
- Integer programming.
- Dynamic programming.
- Advanced network analysis.
- Assignment methods.
- Scheduling techniques.
- Optimality techniques (Artificial intelligence techniques).
- Decision tree and Spanning tree.

References:

1. Operation Research: An Introduction, Hamdy A. Taha.
2. بحوث العمليات وتطبيقاتها . د هلال هادي واخرون 1990

4. Intelligent Searching Techniques

- Search Technique
- Blind search (depth & breadth)
- Heuristic Search (hill climbing, best first search,
- A algorithm, A* algorithm minmax and alpha-beta)
- The 8_Puzzle Problem,
- Tic tac toe problem, tour of Hanoi
- Control Strategy (Forward Chaining, Backward Chaining)
- Hybrid Method (Rule Cycle)
- expert system fundamentals.

References:

1. Elian Rich, Artificial Intelligence, Prentice Hall 1991.

5. Distributed Databases I

- Structure of Distributed Database
 - Trade-offs in Distributed Database
 - Advantages of data distribution
 - Data sharing and distributed control
 - Speeding up query processing,
- Design of distributed database
 - Data Replication, Reliability, and Availability
 - Increased parallelism
 - Increased overhead on update
- Data fragmentation
 - Horizontal fragmentation
 - vertical fragmentation
 - Mixed fragmentation
- Transparency and Autonomy
- Naming of data items
- Fragmentation of data items
- Location fragments and replicas
- Recovery in Distributed systems
- Robustness
- Commit protocols
- Concurrency controls
- Time stamping
- Deadlock Handling

References:

1. Hersry K. Korth, "Database System Concepts", 1991.
2. Kroenke, "Database Concept", 2005.

6. Switching and Routing in Network II

- **Quality of Service (QoS)**
 - Quality of Service Criteria
 - Quality of Service operations
- **Ethernet switching**
- **Introduction to Virtual LANs (VLANs)**
 - Problem: Big Broadcast Domains
 - VLAN, The Effect of VLANs ,VLAN Ports
 - Types of VLANs
 - VLANs between Switches
 - Trunk, Trunking Protocol Standards
 - Multiswitch VLANs Using Trunking
- **Bridging And LAN Switching: Cisco Improvements**
 - Port Fast , Uplink Fast And Backbone Fast
- **Spanning Tree protocol (STP)**
 - Looping problems and the need for STP

- How Spanning Tree Works
- The Rapid Spanning Tree Protocol (RSTP)

REFERENCES:

1. Fred Halsall, “Computer Networking and the Internet”, Fifth edition
2. Note: IN LAB Intermediate Routing Protocols + Command-Line Interface Configuration Of Switches, (LAB WORK)
3. CCNA Routing And Switching STUDY GUIDE
4. Deepankar Medhi, Karthikeyan Ramasamy, ”Network Routing Algorithms, Protocols, and Architectures”,
5. Olivier Bonaventure, ” Computer Networking : Principles, Protocols and Practice”,2015

7. Network Programming II

- Socket Options, Elementary UDP Sockets
 - Generic socket options.
 - Getsocket and Setsocket functions.
 - IP socket options.
 - ICMP socket options.
 - TCP socket options.
 - Elementary UDP sockets.
 - UDP echo Server, UDP echo Client.
 - Multiplexing TCP and UDP sockets.
 - Domain name system
 - Get host by name function, IPv6 support in DNS, Gethostbyadr function and Getservbyname and getservbyport functions.
- Advances Socket programming
 - IPv4 and IPv6 interoperability.
 - Threaded servers.
 - Thread creation and termination.
 - TCP echo server using threads.
 - Condition variables.
 - Raw sockets ,Raw socket creation ,Raw socket output and Raw socket input.
 - Ping program.
 - Trace route program.
 - Network statistical information program
 - Network properties program
 - IP information program

References

1. E.Rusty, “Java Network Programming”, O’REILLY, 2014
2. W. Richard Stevens, “Advanced Programming in the UNIX Environment”, Addison Wesley, 1999.
3. R.Blum, J.Fugazzotto, “C# Network Programming”, SYBEX, 2003

Fourth Year – First Semester					
Code	Title	Hours / Week			
		Lect.	Lab.	Disc.	Units
CSCL4134	Static Web Programming	2	2	1	3
CSCL4142	English Language III	2	-	-	2
CSCN4113	Multimedia 1	2	-	1	3
CSCN4115	Operating system I	2	2	1	3
CSCN4117	Network Management I	2	2	-	3
CSCN4119	Network Security I	2	2	1	3
CSCN4121	Wireless Foundations	2	2	1	3
CSCL444	Project	2	2	-	3
Totals					

Fourth Year – Second Semester					
Code	Title	Hours / Week			
		Lect.	Lab.	Disc.	Units
CSCL4235	Dynamic Web Programming	2	2	1	3
CSCN4214	Multimedia II	2	2	1	3
CSCN4216	Operating system II	2	2	1	3
CSCN4218	Network Management II	2	2	-	3
CSCN4220	Network Security II	2	2	1	3
CSCN4222	Wireless Techniques	2	2	1	3
CSCL444	Project	2	2	-	3
Totals					

1. Static Web Programming

- Web Based Application, Introduction
 - The world wide web
 - The internet and web
 - The history and growth of the web
 - internet service provider
 - Http
 - The purpose of the web
 - web application
 - The web concepts Hypertext, web page, web site, web page address
- Internet TCP/IP , client/server, URL , Web Based Application, web browsing, The classifying the web sites, environment, the general approach, range of complexity, web application ,web page, web site , Classifying the Web Sites
- HTML basic tags (head, body, b ,p, I, u sup, sub)
- HTML insert image and link to pages (bgcolor, other attribute) image maps , list tags , tables tags , form tags , frameset,
- Introduction to CSS cascading style sheet
- External Stylesheet & Internal Stylesheet
- JavaScript Introduction , Put a JavaScript into an HTML page , JavaScript Arithmetics
- Logical Operators
- Conditional Statement
- JavaScript Functions
- JavaScript Popup Boxes
- Array, Loops JavaScript
- JavaScript getElementById

References

1. Web Based Application.
2. Web development and design
3. Java script step by step

2. English Language III

- The tense system (simple ,cont,perfect, active and passive voice)
- Present perfect simple and continuous ,Hot verbs
- Narrative tenses(Past simple ,past continuous , past perfect ,active and passive voice)
- questions and negative, saying the opposite, prefixes and antonyms in context.
- future form , expression of quantity ,words with variable stress
- modules and related verbs

- relative clauses, adverb collocation

References

1. New Headway plus 4th edition intermediate student book, Liz and John Soars.
2. New Headway plus 4th edition intermediate work book, Liz and John Soars.

3. Multimedia 1*

- Introduction to multimedia
- Current Multimedia Projects
- Present Multimedia applications
- Image Basic concept
- Image digitization
- quantization
- Arithmetic operation on image
- Logical operation on an image
- Image histogram
- Histogram modification and Histogram equalization

References

4. Operating system I

- Operating Systems Definition
 - Computer-System Architecture
 - Single-Processor Systems
 - Multiprocessor Systems
 - Clustered Systems
- Operating-System Structure
 - Operating-System Operations
 - Process Management
 - Memory Management
 - Storage Management
 - Protection and Security
 - Operating-System Services
 - User and Operating-System Interface
 - Command Interpreters
 - Graphical User Interfaces
 - System Calls
 - Types of System Calls
 - Process Control
 - File Management
 - Device Management
 - Information Maintenance
 - Communication
 - Protection
 - System Programs
- Process Concept
 - The Process
 - Process State

- Process Control Block
 - Threads
 - Process Scheduling
 - Scheduling Queues
 - Schedulers
 - Context Switch
- CPU Scheduling
 - Basic Concepts
 - CPU-I/O Burst Cycle
 - CPU Scheduler
 - Preemptive Scheduling
 - Dispatcher
 - Scheduling Criteria
 - Scheduling Algorithms
 - First-Come, First-Served Scheduling
 - Shortest-Job-First Scheduling
 - Priority Scheduling
 - Round-Robin Scheduling
 - Multilevel Queue Scheduling
 - Multilevel Feedback Queue Scheduling
 - Process Synchronization
 - Background
 - The Critical-Section Problem
 - Peterson's Solution
 - Synchronization Hardware
 - Semaphores
 - Classic Problems of Synchronization
 - The Bounded-Buffer Problem
 - The Readers-Writers Problem
 - The Dining-Philosophers Problem

References

1. ABRAHAM SILBERSCHATZ, PETER BAER GALVINGREG GAGNE, "Operating System Concepts", JOHN WILEY & SONS, 2005.

5. Network Management I

- Data Link Control
 - FRAMING
 - Fixed-Size Framing
 - Variable-Size Framing
- FLOW AND ERROR CONTROL
 - Flow Control
 - Error Control
- PROTOCOLS

- NOISELESS CHANNELS
 - Simplest Protocol
 - Stop-and-Wait Protocol
- NOISY CHANNELS
 - Stop-and-Wait Automatic Repeat Request
 - Go-Back-N Automatic Repeat Request
 - Selective Repeat Automatic Repeat Request
 - Piggybacking
- HDLC
 - Configurations and Transfer Modes
 - Frames
 - Control Field

References:

1. “Data communication and networking”, Behrouz A. Forouzan,
2. “Administration CISCO QoS in IP Networks”
3. “Network Management Fundamentals”, Alexander Clemm, Ph.D. , 2007
Cisco Systems, Inc.

6. Network Security I

- Introduction to Network Security
 - Definition of security
 - Introductions to network
 - Security Attacks.
- Network Security Factors
 - Message Confidentiality
 - Message Integrity
 - Message Authentication
- Message Confidentiality
 - Confidentiality with Symmetric-Key Cryptography
 - Confidentiality with Asymmetric-Key Cryptography
- Message Integrity
 - Message and Message Digest
 - Hash Function Criteria
 - Hash Algorithms: SHA-1
 - Biometric parameters
- Message Authentication
 - Message Authentication Code (MAC)
 - Digital Signature
 - End-Point Authentication
 - Passwords & Challenge-Response

References:

1. Computer Networking-A Top Down Approach-Kurose Ross – eighth Edition-2016

7. Wireless Foundation

➤ WIRELESS LAN

- Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum.
- IEEE802.11: System architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, security.
- IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX.

➤ MOBILE NETWORK LAYER

- Introduction – Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation.
- IPV6-Network layer in the internet.
- Mobile IP session initiation protocol
- mobile ad-hoc network: Routing, Destination Sequence distance vector, Dynamic source routing
- MOBILE TRANSPORT LAYER
TCP enhancements for wireless protocols
- Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility.

References

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012.(Unit I,II,III)
2. Vijay Garg , "Wireless Communications and networking", First Edition, Elsevier 2007.(Unit IV,V)
3. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, "3G Evolution HSPA and LTE for Mobile Broadband", Second Edition, Academic Press, 2008.
4. Anurag Kumar, D.Manjunath, Joy kuri, "Wireless Networking", First Edition, Elsevier 2011.
5. Simon Haykin , Michael Moher, David Koilpillai, "Modern Wireless Communications", First Edition, Pearson Education 2013

8. Project

Fourth Year – Second Semester

1. Dynamic Web Programming

- JavaScript Functions, Lifetime of JavaScript Variables, Event Handler,,
- Array, string and methods ,Insert Special Characters, Create New object
- Method of object set and get date, JavaScript Math Object
- Search Function Regular Expression , Form Validation ,
- JavaScript getElementById
- ASP Principles, IIS: internet information server
- ASP Objects, Response Object, write , clear, end, redirect, Request Object, get and post methods form and Queerstring, Cookies
- Active server pages Create & retrieve cookies, ASP-File System Object
- File system object copyfile, copyfolder, createtextfile, deletefile, deletefolder,
- ADO , SQL, Connection asp with database, objects Insert from asp to db Update ,delete Application e-mail

References

1. Web development and design
2. Java script step by step

2. Multimedia II

- Introduction to computer graphics
- Lines drawing algorithms
- Circle drawing algorithms
- 2D transform : translation, scaling
- 2D transform : Rotation, reflection, shearing
- Video basic concepts
- Color models in video
- Digitizing Video
- Video compression
- Audio Basic Concept
- Digitization Audio
- Quantization and transmission of Audio
- Audio Compression
- Streaming stored Audio/Video
- Streaming Live Audio/Video

References

3. Operating system II

➤ DeadLock

- System Model
- Necessary Conditions
- Resource-Allocation Graph
- Methods for Handling Deadlocks
- Deadlock Prevention
- Deadlock Avoidance
- Safe State
- Resource-Allocation-Graph Algorithm
- Banker's Algorithm
- Safety Algorithm
- Resource-Request Algorithm
- Dead Lock Detection
- Detection-Algorithm Usage
- Recovery from Deadlock

➤ Main Memory

- Basic Hardware
- Address Binding
- Logical Versus Physical Address Space
- Dynamic Loading
- Dynamic Linking and Shared Libraries
- Swapping
- Contiguous Memory Allocation
- Memory Protection
- Memory Allocation
- Fragmentation
- Segmentation
- Segmentation Hardware
- Paging
- Protection
- Shared Pages

➤ Mass-Storage Structure

- Overview of Mass-Storage Structure
- Magnetic Disks
- Disk Scheduling
- FCFS Scheduling
- SSTF Scheduling
- SCAN Scheduling
- C-SCAN Scheduling
- LOOK Scheduling

➤ Virtual Memory

- Demand Paging
- Page Replacement
- Basic Page Replacement
- FIFO Page Replacement
- Optimal Page Replacement

- LRU Page Replacement

References

1. ABRAHAM SILBERSCHATZ, PETER BAER GALVINGREG GAGNE, “Operating System Concepts”, JOHN WILEY & SONS, 2005.

4. Network Management II

- Congestion Control and Quality
- Data Traffic
 - Traffic Descriptor
 - Traffic Profiles
- CONGESTION
 - Network Performance
- CONGESTION CONTROL
 - Open-Loop Congestion Control
 - Closed-Loop Congestion Control
- IWO EXAMPLES
 - Congestion Control in TCP
 - Congestion Control in Frame Relay
- QUALITY OF SERVICE
 - Flow Characteristics
 - Flow Classes
- TECHNIQUES TO IMPROVE QoS
 - Scheduling
 - Traffic Shaping
 - Resource Reservation
 - Admission Control
- INTEGRATED SERVICES
 - Signaling
 - Flow Specification
 - Admission
 - Service Classes
 - RSVP
 - Problems with Integrated Services
- DIFFERENTIATED SERVICES
 - DS Field
- QoS IN SWITCHED NETWORKS
 - QoS in Frame Relay
 - QoS in ATM

References:

1. “Data communication and networking”, Behrouz A. Forouzan,
2. “Administration CISCO QoS in IP Networks”
3. “Network Management Fundamentals”, Alexander Clemm, Ph.D. , 2007 Cisco Systems, Inc.

5. Network Security II

- Application layer security
 - Secure E-Mail
 - PGP scheme
- TCP layer Security
 - Securing TCP Connections
 - Securing Socket Layer (SSL)
- Network Layer Security
 - IPsec and Virtual Private Networks
 - The AH and ESP Protocols
 - IKE: Key Management in IPsec
- Securing Wireless LANs
 - Firewalls
 - Intrusion Detection Systems

References:

1. Computer Networking-A Top Down Approach-Kurose Ross – eighth Edition-2016

6. Wireless Techniques

- Continue with (MOBILE TRANSPORT LAYER)
 - Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP
 - TCP over 3G wireless networks.
- WIRELESS WIDE AREA NETWORK
 - Overview of UTMS Terrestrial Radio access network
 - UMTS Core network Architecture: 3G-MSC, 3G-SGSN, 3G-GGSN, SMS-GMSC/SMS-IWMSC, Firewall, DNS/DHCP-High speed Downlink packet access (HSDPA)
- LTE network architecture and protocol.
- 4G NETWORKS
 - Introduction
 - 4G vision – 4G features and challenges – Applications of 4G – 4G Technologies: Multicarrier Modulation, Smart antenna techniques, OFDM-MIMO systems, Adaptive Modulation and coding with time slot scheduler, Cognitive Radio.

References

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012.(Unit I,II,III)
2. Vijay Garg , "Wireless Communications and networking", First Edition, Elsevier 2007.(Unit IV,V)

3. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, “3G Evolution HSPA and LTE for Mobile Broadband”, Second Edition, Academic Press, 2008.
4. Anurag Kumar, D.Manjunath, Joy kuri, “Wireless Networking”, First Edition, Elsevier 2011.
5. Simon Haykin , Michael Moher, David Koilpillai, “Modern Wireless Communications”, First Edition, Pearson Education 2013

7. Project



المناهج الدراسية لفرع الوسائط
المتعددة
للعام الدراسي 2023-2024

First Year – First Semester

Code	Title	العنوان	Hours/ Week							
			Lect.	Lab.	Tut.	Exam	SSW L	USSW L	SWL	ESTC
PRFU111	Programming Fundamental	اساسيات البرمجة	4	2	1	5	110	90	200	8.00
MATH112	Mathematics	الرياضيات	4	0	2	3	93	57	150	6.00
STPR113	Statistics and Probability	الاحصاء والاحتمالات	4	0	2	3	93	57	150	6.00
COOR114	Computer Organization	تركيب الحاسوب	2	0	2	3	63	37	100	4.00
INTH115	Information Theory	نظرية المعلومات	2	0	2	3	63	37	100	4.00
WORK106	Workshop	المعامل	0	3	0	2	47	3	50	2.00
Totals			16	5	9	19	469	281	750	30

First Year – Second Semester

Code	Title	العنوان	Hours/ Week							
			Lect.	Lab.	Tut.	Exam	SSW L	USSW L	SWL	ESTC
STPR121	Structured Programming	البرمجة المهيكلة	4	2	1	5	110	90	200	8.00
DIST122	Discrete Structures	الهياكل المتقطعة	3	0	1	3	63	62	125	5.00
LODE123	Logic Design	التصميم المنطقي	3	2	1	5	95	55	150	6.00
COTE124	Coding Techniques	تقنيات الترميز	2	0	2	3	63	37	100	4.00
PRDM125	Principles of Digital Media	مبادئ الوسائط الرقمية	2	2	1	5	80	45	125	5.00
WORK106	Workshop	المعامل	0	3	0	2	47	3	50	2.00
Totals			14	9	6	23	458	292	750	30

Semester	Minor		Major	
	Hours	Units	Hours	Units
1'st	9	13	2	2
2'nd	11	14	4	5
Totals	20	27	6	7

Second Year – First Semester					
Code	Title	Hours/ Week			Units
		Lect.	Lab.	Disc.	
CSC L211 2	Object Oriented Programming I	2	2	1	3
CSC L211 4	Data Structures	2	2	1	3
CSC L211 6	Mathematics III	2	2	1	3
CSC L211 8	Database Foundation	2	2	1	3
CSC L212 0	Human Rights and democracy	1	-	-	1
CSM M21 04	Information Theory	2	-	-	2
Totals		11	8	4	15

Second Year – Second Semester

Code	Title	Hours/ Week			Units
		Lect.	Lab.	Disc.	
CSC L2213	Object oriented programming II	2	2	1	3
CSC L2215	Sorting and Searching Algorithms	2	2	1	3
CSC L2217	Numerical Analysis	2	2	1	3
CSC L2219	Data Base Design	2	2	1	3
CSC L2221	جرائم حزب البعث البائد	1	-	-	1
CSC L2122	English Language II	2	-	-	1
CSM M2205	Software Engineering II	2	2	1	3
CSM M2206	Coding Techniques	2	-	-	2
Totals		15	10	5	19

Third Year – First Semester					
Code	Title	Hours/ Week			
		Lect.	Lab.	Disc.	Units
CSCL3123	Microprocessor	2	2	1	3
CSCL3125	Computation Theory	2	-	1	2
CSCL3131	Image processing I	2	2	1	3
CSCL3133	English Language III	2	-	-	1
CSMM3107	Intelligent Search Methods	2	2	-	3
CSMM3108	2D Computer Graphics	2	2	1	3
CSMM3109	Digital Signal Processing	2	-	1	2
CSMM3110	Animation	2	-	-	2
Totals		16	8	5	19

Third Year – Second Semester					
Code	Title	Hours/ Week			
		Lect.	Lab.	Disc.	Units
CSCL3224	Computer Architecture	2	2	1	3
CSCL3226	Compiler Design	2	2	1	3
CSCL3232	Image processing II	2	2	1	3
CSMM3211	3D Modelling and Rendering	2	2	-	3
CSMM3212	Geographic Information System	2	-	1	2
CSMM3213	Digital Audio	2	-	-	2
CSMM3214	Adaptive systems	2	2	-	3
Totals		14	10	4	19

Semester	Minor	Major
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	Hours	Units	Hours	Units
1 st	8	9	8	10
2 nd	6	9	10	10
Totals	14	18	18	20

Fourth Year – First Semester					
Code	Title	Hours/ Week			
		Lect.	Lab.	Disc.	Units
CSCL4134	Static Web Programming	2	2	1	3
CSCL4136	Operating System I	2	2	1	3
CSMM411 5	Multimedia Security I	2	2	1	3
CSMM411 7	Computer Network	2	2	1	3
CSMM411 8	Data Compression	2	2	1	3
CSMM411 9	Digital Video	2	-	-	2
Totals		12	10	5	17

Fourth Year – Second Semester					
Code	Title	Hours/ Week			
		Lect.	Lab.	Disc.	Units
CSCL4235	Dynamic Web Programming	2	2	1	3
CSCL4237	Operating System II	2	2	1	3
CSCL4142	English Language IIII	2	-	-	1
CSMM421 6	Multimedia Security II	2	2	1	3
CSMM422 0	Multimedia Communication Network	2	2	1	3
CSMM422 1	Multimedia Data Compression	2	2	1	3
CSMM422 2	Pattern Recognition	2	-	-	2
CSCL444	Project	2	2	-	6
Totals		16	12	5	24

First year / 1'st Semester

1. Structured Programming I (with C++ Programming Language)

- Introduction, Structured Programming Principles.
- Algorithm, Algorithm properties, Examples.
- Flowcharts, Flowchart Figure, Examples.
- C++ Language Basics
- Getting started with C++
 - Character set and Identifiers
 - Variables and Variables Declaration
 - Constants Types
 - Arithmetic Operations
 - Assignment Operators
 - Relational Operations
 - Logical Operations
 - Bitwise Operations
- The compiler directives (define and include).
- Unary Minus, Increment and /decrement Operators.
- Selection Statements
 - The Single If Statement Structure, The If/else Statement Structure, Nested If and If/else Statements
 - The Switch Selection Statement and Conditional Statement.
 - Break and Continue Control Statements
- Iteration Statements
 - While Repetition Structure
 - Do/While Statement.
 - For Statement and Nested Loops

References:

- 1- Mastering C++, Amman-Jordan, AL-Shorok, 2002.
- 2- Programming with C++ , D. Ravichandran.
- 3- OqeiliSalch, prof. Department of IT-AL-Balqa Applied University.

2. Mathematics I

- ☐ Mathematical background
- ☐ Matrix
 - Types of matrix
 - Matrix addition, subtraction, and multiplication
 - Determinant, transpose, symmetric of matrix and rank of matrix
 - Inverse of matrix, absolute value, and polynomials
 - Grammar rule for solving system of equation.
- ☐ Functions
 - Function Definition
 - Domain and range of functions
 - Graphing of function
- ☐ Limits
 - Definition of limits
 - Theorems of limits
 - Type of limits
 - One side and two sides limits
 - Limits as infinity
 - Sandwich theorem and continues functions
- ☐ Derivation
 - Mathematical definition of derivation, rule of derivation
 - Derivation of trigonometric, inverse trigonometric, logarithm, exponential
hyperbolic, inverse of hyperbolic function.
 - Implicit derivation, chain rule, higher derivation
- ☐ **References:**
- ☐ 1- Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesley, 1999.

3. Discrete Structures I

- ☐ Set theory
 - Sets and subsets
 - How to specify sets, Operations on sets
 - Algebra of sets and its proves
 - Power set, Classes of sets, Cardinality
 - Sets of numbers, Finite sets and counting principle
- ☐ Mathematical induction
- ☐ Relations
 - Computer representation of relations and Digraph

- Manipulation of relations, Properties of relations
- Composition of relations
- ☐ Functions
 - Type of function (one-to-one & invertible function)
 - Geometrical characterization of functions

References:

1. Discrete mathematics by Seymour Lipchitz
2. Discrete mathematical structures for computer science by Bernard Kolman and Robert C. Busby.

4. Computer Organization

- ☐ Introduction to computer architecture
- ☐ Computer definition, History of computer
- ☐ Application with computer system
- ☐ Computer classification [analoge, digital, hybrid]
- ☐ Main parts of a personal computer
- ☐ Hardware: the structure of computer system
 - Input units, Output units
 - Central processing units [CPU] , CPU components [ALU,RS,CU], CPU operations
 - Main memory, Primary storage, Type of main memory [RAM,ROM]
 - Instruction format with memory
 - Secondary storage , Type of secondary storage
- ☐ Software Programs and application programs and utilities
- ☐ System software and operating system and utilities
- ☐ Application packages.
- ☐ Number system
 - Decimal.
 - Binary.
 - Octal.
 - Hexadecimal.
- ☐ Addition and subtraction
 - binary
 - octal
 - Hexadecimal.

References:

1. Computer System Architecture, M. Morris Mano, Third Edition, 1993.

5. Introduction to Statistics

- Basic concepts
 - Statistics
 - branches of statistics
 - population
 - sample
 - discrete variable
 - continuous variable
- Data Organization
 - frequency distribution table
 - histogram
 - polygon
 - Ogive
 - Pareto charts
 - Pie graph
- Data description measurements
 - measurement of central tendency
 - measurements of variation
- Counting techniques
 - Factorial
 - Permutations
 - combinations

References:

1. Statistics: theories and applications, Joseph Inungo, 2006.
2. Introductory Statistics , Ronald J. Wonnacott

3. الأحصاء د. محمود حسن المشهداني

6. English Language I

☐ Writing and Reading

- Parts of Speech (Noun, verb, adjective, adverb, etc)
- Structure and kinds of sentence
- Tenses in English
- Active and passive voice
- Prepositions of time and place
- How to write and understand simple paragraphs on arrange of topics within the field of the study and interest or experience

- Develop the extensive intensive reading skills by taking different passage
- Write your CV in summary form
- Expose to important technical vocabulary and Idioms
- Write scientific papers and well-structured and

☐ **Project Implementation**

- Choose a topic and apply the items of scientific writing.
- Make presentation by applying the rules of the four skills of the language.

References :

1. English for computer users By SantiagR.Esteras, Fourth Edition, Cambridge University Press, 2008.
2. English Grammar In Use By Raymond Murphy, Third Edition, Cambridge University Press, 2004.

English Grammar and Composition By Wren and Martin, Revised by N.O.PrasadaRao,S.Chand,, Company Ltd., New Delhi, 2007.

7. **Principles of Digital media- 1'st course**

- ☐ Introduction to multimedia.
- ☐ Multimedia and hypermedia.
- ☐ Multimedia authoring and tools.
- ☐ Introduction to text.
- ☐ Basics of computer graphics.
- ☐ Introduction to digital image.
- ☐ Basics of digital audio.
- ☐ Fundamental concepts in digital video.
- ☐ Multimedia compression techniques.

References

- 1) Ze-Nian Li and Mark S Drew," **Fundamentals of Multimedia**", Prentice Hall,2004.

- 2) Gaurav Bhatngar, Shikha Mehta and SugataMitra , ”**Introduction to Multimedia Systems**” ,Academic Press,2002.
- 3) Tay Vaughan” **Multimedia: Making it work**”, Eighth Edition, The McGraw-Hill companies,2010.

First Year/2'nd Semester

1. Structured Programming II (with C++ Programming Language)

- ☐ Functions
 - Defining a function
 - Return statement
 - Types of functions
 - Actual and formal arguments
 - Local and global variables
 - Parameters passing
 - Recursive functions.
- ☐ Arrays
 - One dimensional array (declaration, initialization, Accessing)
 - Two dimensional array (declaration, initialization, Accessing).
- ☐ String manipulation
- ☐ Structures
 - Type of Structure declaration
 - Array of Structures
 - structure within structure
 - functions and structures
- ☐ Pointers
 - pointers declaration
 - pointers and functions parameters passing
 - pointers and arrays

- arrays of pointers
- pointers to pointers

References:

- 1-Mastering C++, Amman-Jordan, AL-Shorok, 2002.
- 2- Programming with C++ , D. Ravichandran.
- 3- OqeiliSalch, prof. Department of IT-AL-Balqa Applied University.

2. Mathematics II

☐ Derivation

- L'hopital rule
- Application of derivation, velocity and acceleration

☐ Series

☐ Integration

- Indefinite integral
- Rules of integral
- Method of integration
- Multiple integral
- Definite integral
- Application of integral area under the curve
- Area between two curves

References:

- 1- Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesley, 1999.

3. Discrete Structures II

☐ Logic and propositions

- Basic logical operation, Equivalency
- Tautology and Contradiction
- Conditional and biconditional statements
- Argument with examples

☐ Graphs

- Definition, Graphs. Sub graph, and multigraphs
- Degree of graph, Connectivity, Special graph
- Walk & length of walk, Trail, path, cycle
- The bridges of Konigsberg
- Traversable multigraphs, Labeled graphs
- Minimal path, Minimum spanning tree
- Matrices and graph
- Trees, rooted tree, ordered rooted tree
- polish notation, with examples

- ☐ Finite state machines
 - Finite automata
 - Optimistic approach to construct FSM
 - Deterministic Finite state automata

References:

1. Discrete mathematics by Seymour Lipchitz
2. Discrete mathematical structures for computer science by Bernard Kolman and Robert C. Busby.

4. Logic Design

- ☐ Logic gates (AND, OR, NOT)
- ☐ Class of Digital circuit
 - Diode-transistor logic (DTL)
 - Transistor – to –transistor logic
 - Emitter –Coupled logic
 - CMOS
- ☐ Boolean algebra and simplification and demerger's.
- ☐ K-map.
- ☐ Combinational universal NAND and NOR logic.
- ☐ Half-adder, full-adder, 4- bit parallel adder, and Subtract adder.
- ☐ Decoder, encoder, multiplexer, and demultiplexer.
- ☐ Sequential logic circuits and Flip-flop, SR, D, and JK flip-flop.
- ☐ Shift register 3-bit and 4- bit.
- ☐ Binary counter 3-bit and 4- bit.
- ☐ State diagram FSA, ROM and RAM.

References:

1. Computer System Architecture M.Morris Mano
2. Digital fundamentals by Floyd, 2009
3. Fundamental of digital logic and Microcomputer design, fifth addition.

5. Probability Theory

- ☐ Probability theory
 - basic concepts
 - sample space
 - events
 - rules of probability
 - Venn Diagram
 - tree diagram
 - Discrete probability distributions

- Mean
- Variance
- Expectation
- Binomial distribution
- Multinomial distribution
- Poisson distribution
- Hypergeometric distribution
- Continuous Distributions
 - Normal distribution
 - Exponential distribution
- Hypothesis Testing
 - statistical hypothesis
 - test under normal curve
- Chi- square distribution and test of independency
- Correlation and Regression
 - scatter Plots
 - correlation coefficient
 - Line of best fit

References:

1. Probability and statistics, theory and applications, Gunnar Blom
2. Probability and statistics for engineers, Richard L. Scheaffer

6. Multimedia Technology - 2'nd course

☐ **Introduction to Multimedia**

- Define what is multimedia.
- Discuss the effects of multimedia in your daily life.
- Identify five multimedia components.
- Explain why multimedia is so powerful to increase human-computer interaction.
- Examine multimedia applications in several areas.

☐ **Multimedia Hardware and Software**

- Understand analog and digital conversion process
- Discuss the hardware requirement of multimedia system
- Classify multimedia software based on its function

☐ **Text and Graphics**

- Describe how to use text-related element in multimedia design correctly.
- Compare and contrast between bitmap and vector graphic.
- Examine how to find graphics and about editing software.

☐ **Multimedia Project Development**

- Discuss 4 main steps in multimedia project development.
- Discuss 7 Processes of Making Multimedia.
- Create a storyboard for the animation project.

☐ **Web-based Multimedia Applications**

- Describe about the characteristics of web-based system
- Examine the examples of web-based multimedia applications.
- Discuss online issues such as copyrights and cybercrime.

☐ **Multimedia Communications**

- Describe the development in multimedia communication.
- List out five basic type of communication networks.
- Examine technological advancement and challenges in communication.

☐ **Emerging Multimedia Research**

- Identify how multimedia research has contributed to our lives.

☐ **Multimedia Future**

- Identify the future multimedia computing technologies.
- Discuss how we will interact with the future computers.

References:

Multimedia Technologies by Banerji, Tata McGraw-Hill Education, 2010.

7. Software Engineering I

☐ Introduction to SW engineering,

☐ Computer software,

☐ What is software engineering,

☐ The evolving role of software,

☐ Software characteristics,

☐ Software engineering principles,

☐ The Characteristic of software engineer,

☐ Software applications,

☐ Software systems,

☐ Software development, A crisis on the horizon,

☐ The attribute of good software,

☐ Software lifecycle

☐ Software Engineering-A Layered technology,

☐ Software process models,

- The waterfall model,

- The prototype model ,

- The RAD model,

- Evolutionary software process models,
- The incremental model,
- The spiral model
- ☐ Component based development,
- ☐ Introduction to Software process and project metrics,
- ☐ Measures ,
 - Metrics and Indicators,
 - Metrics in the process and project domains,
 - Process metrics,
 - Project metrics,
 - Software measurement,
 - size oriented metrics,
 - function oriented metrics,
 - computing function point,
 - Software Quality Metrics,
 - Defect removal efficiency ,
 - Integration metrics with software process
 - Statistical process control,
 - Metrics for small organization, Establishing a software metrics program,

References

1. Software Engineering by Roger Press Man 2001
2. Introduction to Software Engineering by Shari Lawrence and Joan M. Atlee, 2006
3. Software Engineering, by , Addison Wesley, 1999.

Second Year/1'st Semester

1. Object Oriented Programming I

- ☐ Overview for functions and parameter transmission
- ☐ Introduction of OOP and its main features
- ☐ Classes in OOP
 - Defining a Simple Class with Inline Member Functions
 - Constructors and destructors functions
 - Friends functions
 - Constant Members
 - Static Members
 - Default Arguments and Implicit Member Argument
- ☐ Overloading
 - Function overloading
 - Operators overloading

References:

1. "Mastering C++", Prof. OqeiliSaleh and others, Dar Al-Shorok, Amman-Jordan, 2004.
2. "Object Oriented Programming Language with C++", BjarneStroustrup, Addison-Wesley Publication, 2003.
3. " An Introduction to Object-Oriented Programming with **Java**, Fifth Edition", C.Thomas Wu, 2010.
4. "Simply Java—An Introduction to Java Programming", Charles River ,2006

2.Data Structures

- ☐ Introduction to Data Structures
- ☐ Types of data structure
- ☐ Memory representation for 1D and 2D arrays
- ☐ Linear list and Linear list types
- ☐ Stack
 - Stack Operations
 - Applications of stack
- ☐ Queue
 - Queue Operations
 - Applications of queue
- ☐ Circular Queue
 - CQueue Operations
 - Applications of CQueue
- ☐ Linked List
 - Linked-Stack
 - Linked-Queue
 - Linked-CQueue
- ☐ Recursion

References:

- ☐ Data structures and Algorithms with Object- Oriented design Patterns in C++ by: Bruno R. Preiss, B.A.Sc., M.A.Sc.Ph.D., P.Eng. Associate Professor, Department of electronic and computer engineering, university of waterloo.
- ☐ Data Structures and algorithm analysis in C, By: Mark Allen Weiss.
- ☐ Data Structures and algorithms in Java PDF file.
- ☐ Data Structures using C and C++, Yedidyah language, Moshe J. augenstein, Aaeon M. Tenenbaum, Brooklyn College.

3. Mathematics III

- ☐ Partial differentiation

- Partial differentiation for first and higher order of derivative
- Chain rule and directional derivative
- First order differential equations
- Solution of differential equation by direct integration
- Separating the variables and homogeneous equation
- Second and higher order differential equations
- Linear second order differential equation with constant
- Variation method
- Laplace transform for standard important function
- Multiplication by tn , division by t
- Inverse Laplace transform of derivatives
- Formatting of Partial differential equation
- Types of partial differential equations
- Fourier series and periodic functions
- Fourier series for odd and even function
- Half range Fourier sin and cosine series
- Change of interval

References:

- 1- Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesley, 1999.

4. Database Foundation

- ☐ Centralized database system
- Introduction and the purpose of database
- Comparing between a file processing system and DBMS
- Data Abstraction and file system disadvantage
- Entity relationship model
- Entities and entity sets
- Relationships and relationship set
- Attributes and mapping
- Constraints and keys
- Relational model
- Data representation in relational model (Tables, Records, and keys)
- Tables joining, Instant and schema
- Weak entity in ER model
- ER model and relational model examples
- Indexing
- Primary indexing
- Secondary indexing
- Index update

- Hash index

References:

- 1-Database Management Systems 2nd Edition, by Raghu Ramakrishnan
- 2- Database, design, application development, and administration 2nd edition, 2004.

5. Human Right

- مفهوم الحقوق(تعريف الحقوق-خصائص الحقوق).
- حقوق الانسان في الشرائع السماوية(الديانتين المسيحية واليهودية- الدين الاسلامي).
- مصادر حقوق الانسان(المصادر الدولية- المصادر الوطنية).
- ضمانات حقوق الانسان(الضمانات على الصعيد الداخلي- الضمانات على الصعيد الدولي).
- التقدم التكنولوجي واثره على الحقوق والحريات(الاحزاب السياسية- حماية الملكية الفكرية).

6. Information Theory

- ❑ Principles of probability theory.
- ❑ Introduction to Information theory.
- ❑ Mode of the signal system.
- ❑ Some particular code : ASCII code & Morse Code
- ❑ The Measure of Information.
 - Self information.
 - Average information (entropy) .
- ❑ Maximum Entropy for Discrete Source.
 - Binary source.
 - Ternary source.
- ❑ information rate.
- ❑ Mutual information.
 - Normal noisy channel.
 - Noiseless channel.
 - Total noisy channel.
- ❑ Channel Capacity.
 - Channel Efficiency .
 - Channel Redundancy.
- ❑ Symmetric Channel.
- ❑ Capacity of symmetric channel.
 - Binary Symmetric Channel (BSC) Capacity.
 - Ternary SymmetricChannel Capacity.
- ❑ Cascade channel.

References:

1. Coding and information theory by Richard w. hamming

2. Information Theory and Coding by J. S. Chitode – 2006
3. An introduction to information theory by Fazlollah M. Reza.

Second Year/ 2nd Semester

1. Object Oriented Programming II

- ☐ Template
 - Function Template Definition
 - Function Template Instantiation
 - Class Template Definition
 - Class Template Instantiation
- ☐ Inheritance and Derived Classes
 - Single inheritance and Multiple inheritances
 - Virtual Functions and polymorphism

- ☐ The Visual Programming Development Environment
 - Designing the Application Window
 - Adding Code to the Application
 - Creating the Dialog Box Icon
 - Adding Maximize and Minimize Buttons
- ☐ The Basic Windows Controls
 - The Static Text Control
 - The Edit Box Control
 - The Command Button Control
 - The Check Box Control
 - The Radio Button Control
 - The Drop-Down List Box Control

References:

1. "Mastering C++", Prof. OqeiliSaleh and others, Dar Al-Shorok, Amman-Jordan, 2004.
2. "Object Oriented Programming Language with C++", BjarneStroustrup, Addison-Wesley Publication, 2003.
3. "An Introduction to Object-Oriented Programming with **Java**, Fifth Edition", C.Thomas Wu, 2010.
4. "Simply Java—An Introduction to Java Programming", Charles River ,2006.

2. Sorting and searching Algorithms

- ☐ Sorting Algorithm
 - Insertion Sort
 - Selection Sort
 - Bubble Sort
 - Heap Sort
 - Quick Sort
 - Merge Sort
- ☐ Searching algorithm
 - Sequential Search
 - Binary Search
- ☐ Trees
 - Types of Tree
 - Binary tree
 - Binary tree scan
 - Represent Regulars expression using trees
 - Binary Search Tree

References:

- Data structures and Algorithms with Object- Oriented design Patterns in C++ by: Bruno R. Preiss, B.A.Sc., M.A.Sc.Ph.D., P.Eng. Associate Professor, Department of electronic and computer engineering, university of waterloo.
- Data Structures and algorithm analysis in C, By: Mark Allen Weiss.
- Data Structures and algorithms in Java PDF file.
- Data Structures using C and C++, Yedidyah language, Moshe J. augenstein, Aaeon M. Tenenbaum, Brooklyn College.

3. Numerical Analysis

- Numerical analysis and solving sets of equation
- Elimination and iterative methods
- Interpolating polynomials
- Lagrange polynomial
- Solving non-linear equation
- Numerical differentiation and numerical integration
- Numerical solution of ordinary differential equations
- Curve-fitting and approximations.
- The solution of integral equation, trapezoidal method
- Simpsons method

References:

- 1-Calculus and Analytic Geometry by Thomas.
- 2- Gerald C. F and Wheatley P. O. "Applied Numerical Analysis," Addison Wesley. 1999.

4- Data bases Design

- Database Administrator and database design process
- Data base cardinality
- Normalization
- System architecture
- Transaction
- Database security
 - Access control
 - Encryption
- Fundamental of relational algebra:
- Query processing

References:

1-Database Management Systems 2nd Edition, by Raghu Ramakrishnan
2-Database, design, application development, and administration 2nd edition,
2004.

5. Democracy

- مفهوم الديمقراطية (تعريف الديمقراطية- مزايا الديمقراطية).
- اشكال الديمقراطية (الديمقراطية المباشرة- الديمقراطية شبه المباشرة- الديمقراطية
النيابية- المجلس النيابي).
- الية النظام النيابي- الانتخاب- (مفهوم الانتخاب- هيئة الناخبين- تنظيم عملية
الانتخاب- نظم الانتخاب).

6. Software Engineering II

- ☐ Introduction to Software project planning,
 - Estimation reliability factors,
 - Project planning objective,
- ☐ Software Scope, Estimation of resources,
 - Software project estimation options,
 - Decomposition techniques,
 - Estimation models,
 - The structure of estimation models,
 - The COCOMO Model, The software equation model,
 - Automated estimation tools,
- ☐ introduction to risk analysis and management,
 - reactive versus proactive risk strategies,
 - software risks,
 - risk projection,
 - risk refinement,
- ☐ project scheduling and tracking,
 - basic concepts,
 - scheduling principles,
 - error tracking
- ☐ software quality,
 - quality concepts,
 - Statistical software quality,
- ☐ Software reliability,
- ☐ Software availability,
- ☐ Introduction to analysis concepts and principles,
- ☐ requirement analysis,
- ☐ Software requirement analysis phases,

- ☐ Software requirements elicitation,
 - Facilitated action specification technique,
 - Quality function deployment,
 - Use case, Analysis principles,
- ☐ Analysis principals
 - ☐ Information domain
 - ☐ Modeling
 - ☐ Partitioning
 - ☐ Sw requirement view
- ☐ Software prototyping,
- ☐ Specification principles.

References

- 1-Software Engineering by Roger Press Man 2001
- 2-Introduction to Software Engineering by Shari Lawrence and Joan M. Atlee, 2006
- 3-Software Engineering, by , Addison Wesley, 1999.

7- Coding Techniques

- ☐ Principles of probability theory.
- ☐ Principles of information theory .
- ☐ Introduction to coding techniques.
- ☐ Entropy , Average length of a code.
- ☐ code efficiently , code redundancy.
- ☐ Fixed length coding.
- ☐ Variable length coding.
- ☐ Shannon-Fano coding algorithm.
- ☐ Huffman coding
 - Huffman Binary coding.
 - Huffman Ternary coding.
- ☐ Extension of a source
- ☐ Hamming code.
 - Error detection code.
 - Error correction code.

References:

1. Coding and information theory by Richard w. hamming
2. information theory and Coding by J. S. Chitode – 2006
3. An introduction to information theory byFazlollah M. Reza.

8-English Language II

☐ **Listening and Speaking :-** (by listening to a selected conversations on technical topics)

- How to understand a conversion
- How to avoid silence in conversion
- Focus and study the pronunciation.
- Deal with different situations academic and non academic.
- Express ideas and give detailed accounts of experiences, and describing feelings.
- Engage in extended conversation on most topics
- Give opinions by providing relevant explanations, arguments and comments.
- Give clear, detailed description of subjects within field of study or interest.
- Vocabulary and phrases for making presentations
- Give clearly developed presentations on subjects in the field of study.

☐ **Translation**

- What is the translation , kinds and steps of translation
- Scientific translation nature and steps
- How to use a dictionary and machine translation.

References :

1. English for computer users By SantiagR.Esteras, Fourth Edition, Cambridge University Press, 2008.
2. English Grammar In Use By Raymond Murphy, Third Edition, Cambridge University Press, 2004.
3. English Grammar and Composition By Wren and Martin, Revised by N.O.PrasadaRao,S.Chand,, Company Ltd., New Delhi, 2007.

Third Year/1'st Semester

1- Micro-processors – 1'st course

- ☐ Introduction to Microprocessor and Microcomputer system.
 - Microprocessor Architecture and Register Set.
 - System Buses
 - Memory types and physical addressing.
 - I/O devices
- ☐ Instruction Set and Format
- ☐ Addressing Modes
- ☐ Introduction to Assembly Programming Language.
 - Arithmetic and logical Instructions (Shift and Rotate).
 - Program Control (interrupt and subroutine call).

References:

1. Abel P., "IBM PC Assembly Language and Programming", 4th Edition, Prentice Hall, 1998..
2. Thorne M., "Computer Organization and Assembly Language Programming", 2nd Edition, Benjamin/Cummings, 1990.

2- Computation Theory:

- ☐ Regular Expression,
- ☐ Finite Automata, DFA and NFA, Equivalence of NFA and DFA,
- ☐ Kleen theorem,
- ☐ Two way finite automata with output (mealy machine, moor machine), The equivalence of mealy and moor machine,
- ☐ Introduction to Crammers, Phrase Structure Grammar, Context sensitive Grammar, Context Free grammar,
- ☐ Chomsky Normal Form,
- ☐ Tree, leftmost and rightmost derivations,
- ☐ Regular grammar, Left linear grammar, Right linear grammar, Push down automata, Top down –bottom up derivation,
- ☐ Turing machine.

References:

1. H.R.Lewis And G.H Papadimitiou,"Elements Of The Theory Of Computation", Prentig-Hall, 1981.
2. R.W.Floyd And R.Beigel,"The Languae Of Machine:An Introduction To Computability And Formal Languages"Computer Science Press, Network, 1994.
3. M.Sipser."Introduction To The Theory Of Computation" ,Boston Pws Pub ,1996.

3.Image ProcessingI

- ☐ Computer Imaging: Computer Vision (CV), Image Processing (IP). Image Restoration, Enhancement and Compression.
- ☐ Computer Imaging Systems and Digitization.
- ☐ Image brightness Adaption. Image Representation. Digital Image File Format.

- ☐ Image Quantization: Gray and Spatial Quantization.
- ☐ Image analysis Preprocessing, Data Reduction, Features Analysis.
- ☐ Zoom algorithms, Zero order Hold and First order Hold.
- ☐ Convolution algorithm.
- ☐ Image Algebra: Arithmetic Operations.
- ☐ Image Algebra: Logic Operations. Image Restoration.
- ☐ Noise Removal using Spatial Filters: Mean, Median and difference Filters.
- ☐ Edge /Line Detection. Sobel Operator. Prewitt Operator. Kirch Compass Mask. Robinson Compass Masks. Laplacian Operators.
- ☐ Image smoothing and image sharpening.
- ☐ Introduction to Histogram.
- ☐ Histogram Modification: Shrinking, Stretching and Sliding mapping functions.
- ☐ Histogram Equalization.

References:

- [1] Computer Vision and Image Processing. Scotte E Umbaugh, Ph.D.
- [2] Digital Image Processing .Second Edition
- [3] Rafael C. Gonzalez/University of Tennessee Richard E. Woods Med Data Interactive.

4.English language III

- A world of difference
- The working week
- Good times, badtimes
- Getting it right
- Our changing world
- What matters to me
- Skills development
- IT depends how you look at it
- All things high tech

References:

- 1- New Headway 4th edition intermediate student book, Liz and John Soars.
- 2- New Headway 4th edition intermediate work book, Liz and John Soars

5.Intelligence Search Methods- 1'st course

- ☐ Principles fundamentals of A.I.
- ☐ What means by A.I.
- ☐ Knowledge Representation Methods.
- ☐ Control strategy of Search Methods.
 - Blind Search
 - Heuristic Search
- ☐ Some Metaheuristic Algorithms.
 - What means by Metaheuristic?
 - Local Search.
 - Tabu Search.
 - Simulated Annealing.

- VNS.
- GRASP.

References:

1. A.I. Strategies & Methods, George F. Luger, 2009.

6. 2D Computer Graphics

- Introduction { Computer Graphics, Cathode Ray Tube (CRT) , Generating color on a RGB monitors, Coordinates system, Raster–can display, Frame Buffer, Scan conversion, Applications of computer graphics }
- Vectors {unit vector, measurement associated with vectors, manipulation vectors, negative vectors and subtracting vectors, scaling Vectors, multiplying vectors uses the "dot Product" , direction Cosine , "**Cross Product**" }
- Basic Shapes Drawing (Line, Circle, Ellipse)
- Two Dimension Transformations(Translation, Scaling, Rotation, Reflection, shearing)
- Clipping and Windowing and viewport and polygon

References:

1. Riškus, "Approximation of a Cubic Bézier Curve by Circular Arcs and Vice Versa", Information Technology and Control, 2006.
2. Juhász, "Approximating the helix with rational cubic Bézier curves" Computer-Aided Design, 1995.

7. Digital Signal Processing

- **Signals and systems**
 - Introduction to DSP
 - D/A, A/D and sampling rate
 - Basic types of digital signals
 - Periodic and periodic signal
- **Discrete time system**
 - System properties
 - Block diagram representation of LTIS
 - Step and impulse response of LTIS
 - Convolutions and De-convolution
 - Correlation.
- **Fourier analysis**
 - Discrete time FT and its properties

- Frequency response
- FFT and properties
- Inverse FFT.

☐ **Wavelet Transformation**

- Haar based Wavelet Transform
- Db4 based Wavelet Transform

☐ **Z-transform**

- One side properties
- Inverse z-transform
- poles, zeros location in z-plane and the stability

☐ **Design of digital filter**

- Fundamental structures of digital filters
- Design of FIR filters by windowing
- Design of IIR filter

References:

1. Emmanuel Ifeakor, Barrie W. Jervis, " Digital Signal Processing, A practical Approach" Second edition 2013.

8.Animation

- ☐ Introduction
- ☐ Design for motion
- ☐ Style frames
- ☐ Design boards
- ☐ Developing Concepts
- ☐ Process to outcome
- ☐ The inner eye
- ☐ The outer eye
- ☐ Image making

References

Design for motion fundamentals techniques of motion design, Austin Shaw, copyright Material, 2016.

Third Year/ 2nd Semester

1-Computer Architecture – 2nd course

- ☐ Introduction to Computer Organization
 - RISC and CISC
 - I/O Organization and Peripheral Control Strategies.
 - I/O Interfaces and Programming
 - Asynchronous data transfer
- ☐ Memory Management.
 - Memory types and Hierarchy
 - Main Memory address map.
 - Associative Memory and Content Addressable Memories.
- ☐ Parallel Processing
 - Pipeline (general consideration).
 - Arithmetic Pipeline.
 - Instruction Pipeline.
 - Difficulties and Solutions in Instruction Pipeline.
 - Vector processing and Array Processing.

References:

1. M.M Mano “Computer System Architecture “ third Edition, Prentice Hall, 1993.
2. David A. patterson And John L.Hennessy, ”Computer Organization And Design “ Morgan Kaufmann, 1998.

2- Compiler Design:

- ☐ Introduction to Compiler,
- ☐ Lexical analysis,
- ☐ Syntax of Analysis,
- ☐ Problems of Compiler,
- ☐ First and Follow,
- ☐ Top down Parsing, Predictive Parsing Method, LL(1),
- ☐ Bottom up Parsing, Operation Precedence Parser, Simple Left to Right Parser, Canonical LR Parser,
- ☐ Semantic Analysis,
- ☐ Intermediate Code Generation,
- ☐ Code Optimization,
- ☐ Code Generation.

References: Principles of Compiler Design, Alfred V. Aho, Jeffrey D. Ulman 2003.

3. Image Processing II

- ☐ Feature extraction.
- ☐ Feature analysis.
- ☐ Binary Object features.
- ☐ Histogram Features.
- ☐ Image Segmentation and connectivity.
- ☐ Region Growing and Shrinking Boundary Detection.
- ☐ Morphological operations.
- ☐ Clustering Technique Combined Approach.
- ☐ Discrete Transform. Fourier Transform.
- ☐ Cosine Transform.
- ☐ Wavelet Transform.
- ☐ Compression System Model: Compression Ratio and Entropy.
- ☐ Lossless Compression Methods and Lossy Compression Method.
- ☐ Huffman and Run Length Coding.
- ☐ Fidelity Criteria.

References:

1-Computer Vision and Image Processing.Scotte E Umbaugh, Ph.D.

2- Digital Image Processing .Second Edition

Rafael C. Gonzalez/University of Tennessee Richard E. Woods Med Data Interactive.

4.3D Modeling and Rendering

- ☐ Mathematics for Modeling
 - Vector tools and polar coordinates – Vectors fundamentals– Representations of key geometric objects – Intersection of lines, planes and polygons - clipping algorithms – 2D and 3D Affine transformation – 3D Viewing – 3D rendering pipeline – Camera movements – introduction to OpenGL programming – Geometric transformation and viewing – projection and perspective transformation.
- ☐ Modeling Shapes
 - Introduction – solid modeling – polyhedral – Extruded shapes – tessellation – Mesh approximation of smooth objects – Bezier Curves – B splines – NURBS – Interpolation – Hierarchical and physical modeling – Hidden surface removal algorithms– Curve and surface – Interactive graphics.
- ☐ Shading and Illumination Models
 - Shading models – Flat shading – Smooth shading – Reflections – Diffuse and specular reflection – Adding color – Antialiasing techniques – Dithering techniques – Creating more shades and color – Opengl – specular highlights – Spotlight – Blending – Reflections – Applying colors– Real world lights.

- ☐ Texture and Rendering
 - Procedural and Bitmaps Textures – Texture Mapping or Image – Bump Mapping – Environmental Mapping – Magnification and Minification - Minmapped Textures – Ray Tracing Techniques – Adding Textures on to Curved Surfaces – Tiling – Fractals – Texture Mapping.

References

- 1- F.S. Hill Jr., Stephen Kelly, “Computer Graphics Using OpenGL”, 3rd Edition, Pearson Education /PHI Learning, 2007.
- 2 -Donald Hearn, M. Pauline Baker, “Computer Graphics with OpenGL”, 3rd Edition, Pearson Education, 2012.

5.Geographic Information Systems GIS

- ☐ Introduction to GIS
 - Some fundamental
 - A first function of GIS
 - Spatial data geo in formation
 - Application of GIS
- ☐ The real world and representation of it
 - Modeling
 - Maps
 - Databases
 - Spatial database
- ☐ Geographic information and spatial data types
 - Geographic phenomena
 - Geographic phenomena defined
 - Diffent types of geographic phenomena
 - Geographic field
 - Geographic object
 - Boundaries
- ☐ Computer representations of geographic information
 - Regular tessellations
 - Irregular tessellations
 - Vector representations
 - Topology and spatial relationships
 - Scale and resolution
 - Representation of geographic fields
 - Representation of graphic objects
- ☐ Data Processing systems
 - Hardware and software trends
 - Geographic information systems

- Database management system
- ☐ Data entry and preparation
 - Spatial data input
 - Spatial referencing
 - Data preparation
 - Point data transformation
 - Advance operations on continuous field rasters
- ☐ Spatial data analysis
 - Classification of analytics GIS capabilities
 - Retrieval, classification and measurement.
 - Overlay functions
 - Neighborhood functions
- ☐ Data visualization
 - GIS and Maps
 - The visualization strategies: present or explore
 - The cartographic toolbox
 - How to map
 - Map cosmetics
 - Map output
- ☐ Data quality and meta data
 - Basic concepts and definitions
 - Measures of location error on maps
 - Error propagation in spatial data processing
 - Meta data and data sharing

References:

Principles of geographic information systems, Oho Huismun& Rolf A. de By, ITC, 2009.

6. Digital Audio

- ☐ Introduction to multimedia
- ☐ Multimedia applications and requirements.
- ☐ Basics of digital audio
- ☐ Synthetic sounds
- ☐ Introduction to MIDI (Mutual Instrument Digital interface)
- ☐ Audio signal, Sampling rate, Nyquist theorem
- ☐ Audio modulation (amplitude modulation, frequency modulation)
- ☐ Audio compression
- ☐ Digital rights management

References

1- Digital video and Audio broadcasting technology, Walter Fischer, 2010.

- 2- Digital video and audio Compression, Stephen J. Solari, 1997.
- 3- Fundamental of Digital Audio, new edition, David Patschke, Alan P. Kefauver,2007.

7. Adaptive Systems

- Neural Networks
 - Background
 - The Neuron: Biological and Simulated Neuron.
 - Types of Learning Strategies.
 - Back Propagation, Hopfield, BAM and Kohonen NN.

- Genetic Algorithms (GA)
 - Introduction & historical view.
 - Components of algorithms: Selection methods and Operators.
 - Crossover and Mutation.
 - Parameters of GA.
 - GA and search methods.
 - Genetic Programming and Applications.

- Fuzzy Logic
 - Introduction.
 - Fuzzy sets: Continuous Fuzzy sets, Discrete Fuzzy sets.
 - Logical operators: Fuzzy intersection, Fuzzy implication, Fuzzy union.
 - Compositional rule of inference (continuous & discrete).
 - Fuzzification&Defuzzification.

References

- 1- Fundamentals of Neural Networks: Architecture, Algorithms, and application.
By LaureneFausett.
- 2- A.I. Strategies & Methods, George F. Luger, 2009.
- 3- Neural Networks. Fundamentals, Application, Examples. By Werner Kinnebrock
- 4- Machine Learning, Tom Mitchell, McGraw Hill, 1997.
- 5- Fuzzy system hand book, Byearl Cox, 1999.
- 6- Metaheuristics : from design to implementation, El-GhazaliTalibi, John Wile & Sons, 2009.

Forth Year/ 1'st Semester

1- Static Web Programming

- Web Based Application, Introduction
 - The world wide web
 - The internet and web
 - The history and growth of the web
 - internet service provider
 - Http
 - The purpose of the web
 - web application
 - The web concepts Hypertext, web page, web site, web page address
- Internet TCP/IP , client/server, URL , Web Based Application, web browsing, The classifying the web sites, environment, the general approach, range of complexity, web application ,web page, web site , Classifying the Web Sites
- HTML basic tags (head, body, b ,p, I, u sup, sub)
- HTML insert image and link to pages (bgcolor, other attribute) image maps , list tags , tables tags , form tags , frameset.
- Introduction to CSS cascading style sheet
- External Stylesheet & Internal Stylesheet
- JavaScript Introduction , Put a JavaScript into an HTML page , JavaScript Arithmetics
- Logical Operators
- Conditional Statement
- JavaScript Functions
- JavaScript Popup Boxes
- Array, Loops JavaScript
- JavaScript getElementById

References:

- 1- Web Based Application.
- 2- Web Programming with ASP.

2- Operating system I

- ☐ Operating Systems Definition
 - Computer-System Architecture

- Single-Processor Systems
- Multiprocessor Systems
- Clustered Systems

- ☐ Operating-System Structure
 - Operating-System Operations
 - Process Management
 - Memory Management
 - Storage Management
 - Protection and Security

- ☐ Operating-System Services
 - User and Operating-System Interface
 - Command Interpreters
 - Graphical User Interfaces
 - System Calls
 - Types of System Calls
 - Process Control
 - File Management
 - Device Management
 - Information Maintenance
 - Communication
 - Protection
 - System Programs

- ☐ Process Concept
 - The Process
 - Process State
 - Process Control Block
 - Threads
 - Process Scheduling
 - Scheduling Queues
 - Schedulers
 - Context Switch

- ☐ CPU Scheduling
 - Basic Concepts
 - CPU-I/O Burst Cycle
 - CPU Scheduler
 - Preemptive Scheduling
 - Dispatcher
 - Scheduling Criteria
 - Scheduling Algorithms
 - First-Come, First-Served Scheduling
 - Shortest-Job-First Scheduling
 - Priority Scheduling
 - Round-Robin Scheduling

- Multilevel Queue Scheduling
 - Multilevel Feedback Queue Scheduling
- ☐ Main Memory
- Basic Hardware
 - Address Binding
 - Logical Versus Physical Address Space
 - Dynamic Loading
 - Dynamic Linking and Shared Libraries
 - Swapping
 - Contiguous Memory Allocation
 - Memory Protection
 - Memory Allocation
 - Fragmentation
 - Segmentation
 - Segmentation Hardware
 - Paging
 - Protection
 - Shared Pages
- ☐ Process Synchronization
- Background
 - The Critical-Section Problem
 - Peterson’s Solution
 - Synchronization Hardware
 - Semaphores
 - Semaphore Usage
 - Classic Problems of Synchronization
 - The Bounded-Buffer Problem
 - The Readers–Writers Problem
 - The Dining-Philosophers Problem

References

1. “Operating System Concepts” by Silberschatz, Galvin and Gagne, 2010.

3- English Language IIII

- The tense system (simple ,cont,perfect, active and passive voice)
- Present perfect simple and continuous ,Hot verbs
- Narrative tenses(Past simple ,past continuous , past perfect ,active and passive voice)
- questions and negative, saying the opposite, prefixes and antonyms in context.
- future form , expression of quantity ,words with variable stress

- modules and related verbs
- relative clauses, adverb collocation

References

1. New Headway plus 4th edition intermediate student book, Liz and John Soars.
2. New Headway plus 4th edition intermediate work book, Liz and John Soars.

4- Multimedia Security I

- ☐ Introduction of Data security,
- ☐ Mathematical Background,
 - How Compute the Greater common deviser (GCD) using different methods,
 - Explain the methods to compute the Inv,
 - Explain the methods to find Euler notation and compute inv using Euler notation,
- ☐ Types traditional of ciphers systems,
- ☐ Introduction of transposition cipher systems,
- ☐ fixed pired method,
- ☐ Types of substitution cipher systems types,
- ☐ Mono alphabetic substitution cipher systems (keywords method),
- ☐ Homophonic substitution cipher systems(Beal cipher, Higher order homophonic) ,
- ☐ polyaphabetic substitution cipher systems(Vigener cipher, Beaufort cipher ,Running ker cipher),
- ☐ polygram substitution cipher systems(playfair cipher, hill cipher ,product cipher),
- ☐ Introduction to public key systems (secrecy and authenticity), Knapsack ciphers), Merkel-Hellman knapsacks, simple knapsack algorithm),
- ☐ Trapdoor knapsack algorithm, RSA algorithm (encryption and decryption processes), Public-key digital signature algorithms (RSA), DES algorithm, X-box process in DES algorithm with example,
- ☐ Introduction of Stream ciphers, One time Pad system (vernam system), The requirements of steam cipher,
- ☐ The Basic Five Randomness tests (i.e. frequency test , serial test), Poker test , run test, auto correlation test.
- ☐ Introduction to Information Hiding,

References:

- 1- Embedded Multimedia Security Systems Algorithms and Architectures, Prasant Mohapatra, Springer-Verlag London 2013.
- 2- Cryptography and Network Security, William Stalling , 2003
- 3-** Information Hiding Techniques for Steganography and Digital Watermarking, Stefan Katzenbeisser & Fabien A. P. Petitcolas, , 2000.

5- Computer Network

- ☐ Data Communication,
- ☐ Physical Topology,
- ☐ Basic Network Technology,
- ☐ LAN Devices,
- ☐ Collision and Collision Domains in Shared Layer Environments, Network Devices,
- ☐ Network Layer Addressing,
- ☐ Network Layer Field and Datagram,
- ☐ IP address Class, Subnet NW, Private Addresses,
- ☐ Transmission of Digital Data Interfaces and Modems,
 - Transmission Media, Unguided Media, Satellite
- ☐ Communication, Error Detection and Correction,
- ☐ Data Link Control Multiplexing, De Multiplexing,
- ☐ Data Link Protocols, ARP, FTP, TELNET, DNS, UDP, TCP, NFS and RPC, SMTP, TFTP, HTTP, WAIS, Gopher, SNMP, WWW,
- ☐ Browser Architecture,
- ☐ Methods for Assigning IP Address, Advance ARP, DHCP, Dynamic Addressing,
- ☐ Routable and non Routable Protocols, RIP Features.

References:

- 1- “Computer Networks”, 3rd Edition, A. Tannenbaum, Prentice-Hall, 1996.
- 2-** “Data Communications, Computer Networks and OSI”, 4th Edition, F. Halsall, Addison-Wesley, 1995.

6- Data Compression

- ☐ Introduction to data compression
 - Type of data compression
 - Compression Performance
- ☐ Basic Techniques
 - Run Length Encoding
 - Run Length Text Compression
 - Run Length Image Compression
- ☐ Statistical Methods

- Source Coding Technique
 - Shannon – Fano Method
 - Huffman Method
 - Extension of Code
 - ☐ Prefix Code
 - General Prefix Code
 - The Golomb Code
 - Other Prefix Code
 - Variant of Huffman , MNP5
 - ☐ Dictionary methods
 - Static Dictionary methods
 - Dynamic Dictionary methods
- LZ77 Sliding window
LZ78 Dictionary methods
LZW Dictionary methods
- ☐ Arithmetic Coding

References:

1- Handbook of Data Compression Fifth Edition, Springer-Verlag London Limited 2010.

6.Digital Video

- ☐ Basics of video (types of video signals, component video, composite video, s-video).
- ☐ Analog video (NTSC video, PAL video, SECAM video).
- ☐ Digital video
 - ☐ Color video representations.
 - ☐ Characteristics of video streams
 - ☐ Video formats.
 - ☐ Video compression.
 - ☐ Video equipment and applications.
 - ☐ Motion Estimation and Transform Coding.
 - ☐ Video Modeling and Retrieval.
 - ☐ Video Transcoding.
 - ☐ Video quality evaluation methods and metrics (Monitoring and QoS Measurement, Video Quality Measurements).

References:

- 4- Digital video and Audio broadcasting technology, Walter Fischer, 2010.
- 5- Digital video and audio Compression, Stephen J. Solari, 1997.
- 6- Fundamental of Digital Audio, new edition, David Patschke, Alan P. Kefauver,2007.

2-

7. Project

Description for Research Project

Research project is an study proposed by teacher (supervisor) and developed by student (fourth class only), this study aim to train the student on it is specialization of scientific (the scientific branch in computer sciences).

Time for Research Project

The Student given full academic year for accomplishes his study.

Exam for Research Project

Research project will be evaluated by a supervisor and Committee of Experts.

Format for Research Projects

Research projects are written up in standardized format. Be formal & objective in English language, & cite all sources. The format includes the following sections:

Title

Title would normally include the major variables of student study. For example:

“A protection system for an Internet site”

Abstract

Begin with a brief Abstract of the study, which summarizes the entire study into one paragraph. The reader should be able to tell from Abstract what theory and hypothesis were, who you studied and how, what your findings were, and what they meant for the theory.

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Method

1. Materials/Instruments , Describe any instruments employed to measure the variables of your study. (e.g. questionnaires, tests, etc.)
2. Procedure , The Procedure section reviews exactly how you did your study, & should include enough detail that anyone could repeat your procedure. Include your methodology (e.g. whether you did an experiment, or observation, etc.); a review of how you carried out the study; & any data analysis that you did.

Results

Include your results, summarized & presented in a way that is easy to follow & to understand. If possible, these results should be presented both in a table (which would include descriptive & inferential statistics) & in a written description of the results.

The results section should not include conclusions or interpretations; these would be in the Discussion section.

Discussion

Use the discussion to relate your results to the theory you described in the introduction. The "why" of your results are discussed here, & what they mean in terms of theory & research. Add a discussion of the limitations of your study.

References

All references in the introduction are included in the reference section at the end of the research report, in alphabetical order.

Appendix

Any information that is relevant to the study, but not needed within the body of the paper, should be included at the end of the report. These appendices would include further details of the research instructions, materials, results, psychological measures, etc., if needed. Your instructor may also wish you to attach the raw data of your project.

Forth Year/ 2nd Semester

1- Dynamic Web Programming

- JavaScript Functions, Lifetime of JavaScript Variables, Event Handler,
- Array, string and methods ,Insert Special Characters, Create New object
- Method of object set and get date, JavaScript Math Object
- Search Function Regular Expression , Form Validation ,
- JavaScript getElementById
- ASP Principles, IIS: internet information server
- ASP Objects, Response Object, write , clear, end, redirect, Request Object, get and post methods form and Queerstring, Cookies
- Active server pages Create & retrieve cookies, ASP-File System Object
- File system object copyfile, copyfolder, createtextfile, deletefile, deletefolder,
- ADO , SQL, Connection asp with database, objects Insert from asp to db Update ,delete Application e-mail

References:

- 1- Web Based Application.
- 2- Web Programming with ASP.

- 3- Multimedia Web Programming (Grassroots) Paperback , by Adrian Moore,2005.

2- Operating system II

- ☐ DeadLock
 - System Model
 - Necessary Conditions
 - Resource-Allocation Graph
 - Methods for Handling Deadlocks
 - Deadlock Prevention
 - Deadlock Avoidance
 - Safe State
 - Resource-Allocation-Graph Algorithm
 - Banker's Algorithm
 - Safety Algorithm
 - Resource-Request Algorithm
 - Dead Lock Detection
 - Detection-Algorithm Usage
 - Recovery from Deadlock

- ☐ Mass-Storage Structure
 - Overview of Mass-Storage Structure
 - Magnetic Disks
 - Disk Scheduling
 - FCFS Scheduling
 - SSTF Scheduling
 - SCAN Scheduling
 - C-SCAN Scheduling
 - LOOK Scheduling

- ☐ Virtual Memory
 - Demand Paging
 - Page Replacement
 - Basic Page Replacement
 - FIFO Page Replacement
 - Optimal Page Replacement
 - LRU Page Replacement

References

- 1- "Operating System Concepts" by Silberschatz, Galvin and Gagne, 2010.

3- Multimedia Security II

- ☐ Principles of Steganography (Frameworks for Secret Communication, Security of Steganography Systems, Active and Malicious Attackers),
- ☐ Steganalysis Introduction and Terminology,
- ☐ Multimedia Encryption Problem, the Secure Wavelet Transform, Chaos and Cryptography.
- ☐ Watermarking techniques, watermarking applications.
- ☐ Biometric Recognition
- ☐ Multimedia Fingerprinting.

References:

8. Embedded Multimedia Security Systems Algorithms and Architectures, Prasant Mohapatra, Springer-Verlag London 2013.
9. Cryptography and Network Security, William Stalling , 2003
10. Information Hiding Techniques for Steganography and Digital Watermarking, Stefan Katzenbeisser & Fabien A. P. Petitcolas, , 2000.

4.Multimedia Communications Network

- ☐ Architecture of Internet Multimedia Communication– Protocol Stack– Requirements and Design challenges of multimedia communications– Multimedia distribution models– Unicasting, Broadcasting and Multicasting.
- ☐ End to end solutions– Multimedia over TCP– Significance of UDP– Multimedia Streaming– Audio and Video Streaming– Interactive and non Interactive Multimedia.
- ☐ DIMENSIONS OF MULTIMEDIA COMMUNICATION, Multimedia Communication Applications, Streaming Versus Downloading, Streaming Media on Demand, Live Broadcast, and Real-Time Communication, Online Versus Off-Line Encoding.

References:

- 1- A Review of Multimedia Networking ,Alan Taylor and Madjid Merabti

Multimedia Data Compression /course 2

1. **Image Compression**
 - JPEG Compression
 - The Discrete Cosine Transform
 - Quantization.
 - Coding
 - Progressive Image Compression
2. **Video Compression**

- Digital Video
 - Video Compression
 - Differencing
 - Block difference
 - Motion Compensation
 - MPEG Compression
 - MPEG-1 Main Component
 - MPEG-4
 - H.261
- 3. Audio Compression**
- Digital Audio
 - Conventional Audio Compression Methods
 - Lossy Sound Compression
 - μ -Law and A-Law Companding

References:

1. Data Compression the Complete Reference, Davide Salamon, fourth edition, Springer.
2. Handbook of Data Compression Fifth Edition, Springer-Verlag London Limited 2010.

3-

11. Pattern Recognition

- ☐ Introduction of pattern recognition
- ☐ Basic Concepts of pattern recognition
- ☐ Optical Pattern Recognition
- ☐ Object Description and Representation
- ☐ Feature Selection and Generation
- ☐ SIFT and SIFR
- ☐ Harris Corner Detection
- ☐ Template Matching
- ☐ Clustering Techniques
- ☐ Clustering Algorithms
- ☐ Classification
- ☐ ID3 Algorithm
- ☐ OCR

References:

- 1- pattern recognition. Sergios Th., second edition.
- 2- Supervised and Unsupervised Pattern Recognition J. David Irwin, *Auburn University*

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