Computer and Control Engineering Program

2019-2020

B. Sc. Computer and Control Engineering

Programme Specification

A. Basic Information:	
Programme Title	**Computer and Control Engineering**
Parent Department	**Electrical Engineering**
Programme Nature	**Single:** ■ **Double:** ☐ **Multiple:** ☐
Coordinator	**Prof. Dr. Amany M. Sarhan**
External Evaluator(s)	**Dr. Abd El Maksoud Taalab**
Review Date	
Date of Approval	

B. Professional Information:

1. Programme aims at qualifying the graduating engineers in the main topics:

- Provide the students with required knowledge to understand concepts and theories of mathematics and science.
- Help the students to understand computer hardware and computerized devices.
- Provide the students with the knowledge needed to interact with computer programming and software systems.
- Assist the students to acquire the skills of computer networking and web design.
- Enable the students to deal with computer-controlled systems.
- Enhance the students' skills to interact with the hardware and software industry.
- Provide students with comprehensive, interdisciplinary training in computer science and engineering.
- Promote the development of innovative systems and solutions using hardware and software integration.

2. Programme Intended Learning outcomes

A. Knowledge and understanding:

By the end of this programme students should be able to:

A1. Describe computer architecture, organization, and interfacing.
A2. Illustrate software engineering methodologies and quality measures.
A3. List functions and concepts of operating systems. .
A4. Explain programming concepts with emphasize on the object-oriented programming.
A5. Define database and information management systems.
A6. Illustrate models of computer networks and their usage in communication covering many related topics including security.
A7. Describe computer-controlled systems and the basics of control theory.
A8. Explain artificial intelligence and its applications such as expert systems and decision making systems.

B. Intellectual skills:

By the end of this programme students should be able to:

B1. Reconstruct the appropriate hardware and software systems and constructs for specific application.
B2. Analyze and logically arrange data concepts and relevant relationships in information management systems.
B3. Formulate the security issues in computers and computer networks.
B4. Analyze the feasibility of systems as a step in planning phase including economical, operational, and technical feasibility and identifying the risks.
B5. Measure the errors sources in various systems either in hardware or software systems.
B6. Integrate non homogenous hardware and software platforms into one system application.
B7. Evaluate computer-controlled systems performance.

C. Professional and practical skills:

At the end of this programme students should be able to:

C1. Design and apply computer networks by building practical networks, such as LANs (local area networks) and WLAN (wireless local area networks) according to specific environment constrains.
C2. Design and implement computer-controlled systems taking into consideration possible risks.
C3. Perform experiments dealing with different instrumentation devices and data acquisition systems with the ability to understand the produced results.
C4. Solve computer information problems and network security issues.
C5. Apply software development life cycle to produce software systems that include various components such as: graphics, database and complicated computations.
C6. Apply modeling tools, analytical tools, techniques, equipments and software packages to computer and control design problems.

D. General and transferable skills:

By the end of this programme students should be able to:

D1. Work competently among team workers of different task assignments .
D2. Manage their own learning and development, and time management and organizational skills.
D3. Make good relations with colleagues, bosses, and clients, and adapt to varying work environments.
D4. Communicate with others.
D5. Present projects, reports and data using different techniques (computer, manual… etc.).

3. Programme Academic standards

3.A National Academic Standards (NARS):

……

3.B External references standards (Benchmarks):

……..

3.C Comparison of provision to references standards:

Attached

4. Curriculum Structure and contents:

4.A Programme duration :10 semesters (5 years)

4.B Programme structure:

4.B.1 Number of contact hours per week:

Prep. year	First term:	Lectures	16	Lab.	14	Total	30
	Second term:	Lectures	17	Lab.	13	Total	30
Level – 1	First term:	Lectures	20	Lab.	10	Total	30
	Second term:	Lectures	19	Lab.	11	Total	30
Level – 2	First term:	Lectures	21	Lab.	9	Total	30
	Second term:	Lectures	21	Lab.	9	Total	30
Level – 3	First term:	Lectures	23	Lab.	12	Total	35
	Second term:	Lectures	20	Lab.	10	Total	30
Level – 4	First term:	Lectures	20	Lab.	10	Total	30
	Second term:	Lectures	18	Lab.	12	Total	30
Overall	Contact hours	Lectures	162	Lab.	73	Total	245

4.B.2	Number of contact hours	Compulsory	28.8	Optional	None	Optional	None
4.B.3	Number of contact hours of basic sciences courses:			No. 8.8		%	27.85
4.B.4	Number of contact hours of courses of social sciences and humanities:			No.	1.9	%	6.1
4.B.5	Number of credit hours of specialized courses:			No.	21.1	%	66.77
4.B.6	Number of credit hours of other courses:			No.	0	%	0
4.B.7	Practical/field training (Summer training)			weeks	4		

4.B.8 Programme levels (in credit hours system): Not applicable

5. Courses contributing to the programme

Preparatory year

Prep	Semester 1	Course Title	Lec.	Prac	Exer.	Total Hours
Code	Obligatory:					
PME0102	x	Engineering Physics (1) a	4		2	6
PME0003	x	Engineering Mechanics	2		2	4
PME0104	x	Engineering Chemistry	3		2	5
PME0101	x	Engineering Mathematics (1) a	4		2	6
MPD0001	x	Engineering Drawing and Projection	2		3	5
CCE0101	x	Computer Technology	2		2	4

Prep	Semester 2	Course Title	Lec.	Prac.	Exer.	Total Hours
Code	Obligatory:					
PME0202	x	Engineering Physics (1) b	4		3	7
PME0003	x	Engineering Mechanics	2		2	4
MPD0001	x	Engineering Drawing and Projection	1		4	5
PME0201	x	Engineering Mathematics (1) b	4		2	6
MPD0202	x	Production Engineering	2		2	4
***02H2	x	History of Engineering and Technology	2		-	2
***02H1	x	Technical English	2		-	2

Level One

Level 1	Semester 1	Course Title	Lec.	Prac.	Exer.	Total Hours
Code	Obligatory:					
PME1106	x	Engineering Mathematics (2) a	3		2	5
EPM1101	x	Electrical Circuits (1)	4		2	6
CCE1103	x	Computer Programming (1)	2		2	4
EEC1101	x	Electronics (1)	4		2	6
EEC/EPM1160	x	Electrical And Electronic Materials	3		1	4
CCE1102	x	Fundamentals of Logic Design	4		1	5

Level 1	Semester 2	Course Title	Lec.	Prac.	Exer.	Total Hours
Code	Obligatory:					
PME1206	x	Engineering Mathematics (2) b	3		2	5
EPM1202	x	Electrical Measurements	4		2	6
CCE1204	x	Computer Programming (2)	2		2	4
CCE1205	x	Computer Hardware	3		1	4
EEC1202	x	Electronics (2)	4		2	6
EPM1203	x	Electrical Circuits (2)	3		2	5

Level Two

Level 2	Semester 1	Course Title	Lec.	Prac.	Exer.	Total Hours
Code	Obligatory:					
PME2111	x	Engineering Mathematics (3) a	4		1	5
CCE2106	x	Data Structures and Algorithms	4		2	6
CCE2107	x	Digital systems	4		1	5
CCE2108	x	Microprocessors and Interfacing Systems	3		2	5
EEC2146	x	Electronic circuits and Measurements	3		2	5
EPM2143	x	Energy Conversion	3		1	4

Level 2	Semester 2	Course Title	Lec.	Prac.	Exer.	Total Hours
Code	Obligatory:					
PME2211	x	Engineering Mathematics (3) b	4		1	5
CCE2209	x	Computer Architecture	4		2	6
CCE2210	x	Signals and Systems Engineering	4		2	6
CCE2211	x	Computer Graphics	3		2	5
CCE22H3	x	Society of Information Technology	2		-	2
EEC2247	x	Communication systems	4		2	6

Level Three

Level 3	Semester 1	Course Title	Lec.	Prac.	Exer.	Total Hours
Code	Obligatory:					
CCE3112	x	Database Systems	4		2	6
CCE3113	x	Languages and Compilers	4		2	6
CCE3114	x	Operating Systems	3		2	5
CCE3115	x	Control Engineering	3		2	5
CCE3116	x	Digital Signal Processing	3		1	4
CCE3117	x	Fundamentals of Stochastic Processes	3		1	4
EP3107		Electric Power	3		2	5
EE3108		Electric Communications	3		2	5

Level 3	Semester 2	Course Title	Lec.	Prac.	Exer.	Total Hours
Code	Obligatory:					
CCE3218	x	Software Engineering	4		2	6
CCE3219	x	Artificial Intelligence and Expert Systems	4		2	6
CCE3220	x	Digital Control	4		2	6
CCE3221	x	Modeling and Simulation	3		2	5
CCE3222		Multimedia Systems	3		2	5
CCE3223		Programmable Logic Controllers	3		2	5
CCE3224		Computer – Aided Design	3		2	5
CCE3225		Operations Research	3		2	5
CCE32H4	x	Decision Support Systems	2		-	2

Level Four

Level 4	Semester 1	Course Title	Lec.	Prac.	Exer.	Total Hours
Code	Obligatory:					
CCE4126	x	Computer Networks	4		2	6
CCE4127	x	Microcontrollers Systems	3		1	4
CCE4128	x	Fuzzy Control	3		2	5
CCE4129	x	Neural Networks	3		2	5
CCE4130	x	Pattern Recognition and Digital Image Processing	4		1	5
CCE4131		Distributed Systems	3		2	5
CCE4132		Real-Time Systems	3		2	5
CCE4133		Adaptive Control	3		2	5
CCE4134		Stochastic Control	3		2	5

Level 4	Semester 2	Course Title	Lec.	Prac.	Exer.	Total Hours
Code	Obligatory:					
CCE4235	x	Information System Design	**3**		**1**	4
CCE4236	x	Computer and Network Security	3		1	4
CCE4237	x	Control and Instrumentation in Industrial Processes	4		2	6
CCE4238		Computer Vision	3		2	5
CCE4239		Data Mining	3		2	5
CCE4240		Electronic Commerce	3		2	5
CCE4241		Computer Systems Evaluation	3		2	5
CCE4242		Robotic Systems	3		2	5
CCE4243		Mobile Computing	3		2	5
CCE4244	x	Project	2		4	6

6. Programme admission requirements

Successively pass the preparatory year and the Electrical Engineering first year according to the roles of the faculty

7. Regulations for progression and programme completion

Preparatory – to fourth year- Successive grades in each year (maximum failure in 2 courses+2 humanity courses)- Failure courses must be passed in the following year- Successive grade in the "Graduation Project" in final (fourth) year as a graduation constraint- Failure courses after the fourth year can be examined in the November reset exam; else, the student has to examine these courses in the following year

8. Methods of intended learning outcomes assessment

Assessment Method	ILOs assessed
Written Examination	A1,A4,A6, B1,B2,B7,C1,C2,C5,D1,D2,D3
Oral Assessment	A8,A5,A6,B4,B6,B7,C4,C5,D4,D5
Practical Examination	A7,B3,B5,C3,C6,D3
Semester work	A2,A3,B5,C5,D3,D4

9. Evaluation of programme

Evaluator	Tool	Sample
1. Senior students	Questionnaire	About 50%
2. Alumni	Opinion poll	A number of graduate students extracting certificates or other documentations
3. Stakeholders(Employers)	Personal meeting	Not available
4.External Examiner(s)	Oral exam	Project about students
5. Others	-	-

Name	Signature	Date
Programme Coordinator:		
Head of Department:		
Dean of the Faculty:		

5.5 Programme Courses - ProgrammeILOs Matrix (Curriculum Map) University: Tanta

Course Code / Course Title	Programme outcomes																										
	Knowledge and Understanding								Intellectual Skills							Practical						Transferable				
	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
Preparatory year																										
Semester – 1																										
PME0101/Engineering Physics (1) a						X	X		X													X			X	
PME0102/Engineering Mechanics							X				X					X						X			X	
PME0103/Engineering Chemistry																X										X
PME0104/Engineering Mathematics (1) a		X	X								X		X		X		X				X					X
MPM0001/Engineering Drawing and Projection							X								X						X					
CCE0101/Computer Technology	X	X	X	X	X	X	X	X		X				X		X				X		X			X	
Preparatory year																										
Semester – 2																										
PME0202/Engineering Physics (1) b						X	X		X													X				
PME0003/Engineering Mechanics							X				X	X				X										X
MPD0001/Engineering Drawing and Projection							X								X						X					X
PME0201/Engineering Mathematics (1) b		X		X			X				X		X				X				X					X
MPM0202/Production Engineering		X							X			X			X		X				X					X
H2**/History of Engineering and Technology								X		X				X												X
H1**/Technical English	X		X					X			X				X										X	X

Course Code / Course Title	Programme outcomes																									
	Knowledge and Understanding								Intellectual Skills							Practical						Transferable				
	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
Level One																										
Semester – 1																										
PME1106/Engineering Mathematics (2) a		X	X								X		X		X		X				X					X
EPM1101/Electrical Circuits (1)	X					X	X		X									X				X	X	X		
CCE1103/Computer Programming (1)		X	X	X				X	X			X	X			X			X	X			X		X	
EEC1101/Electronics (1)	X						X		X									X				X				
EEC/EPM1160/Electrical And Electronic Materials	X					X	X		X									X					X		X	
CCE1102/Fundamentals of Logic Design	X								X		X			X		X	X	X			X	X				X
Level One																										
Semester – 2																										
PME1206/Engineering Mathematics (2) b		X	X								X		X		X		X				X					X
EMP1202/Electrical Measurements						X	X					X									X		X		X	
CCE1204/Computer Programming (2)		X	X	X				X	X			X	X			X			X	X			X		X	
CCE1205/Computer Hardware	X								X						X		X				X		X		X	
EEC1202/Electronics (2)	X														X			X				X				
EPM1203/Electrical Circuits (2)	X					X	X		X									X				X	X	X		
Level two																										
Semester – 1																										
PME2111/Engineering Mathematics (3) a		X	X								X		X		X		X				X					X
CCE2106/Data Structures and Algorithms		X	X	X	X				X	X							X		X	X	X	X	X			
CCE2107/Digital systems	X						X	X	X			X		X	X	X					X	X	X	X		

Course Code / Course Title	Programme outcomes																									
	Knowledge and Understanding								Intellectual Skills							Practical						Transferable				
	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
CCE2108/Microprocessors and Interfacing Systems	X							X	X	X			X		X	X				X			X	X		X
EEC2146/Electronic circuits and Measurements						X	X		X				X	X			X					X				
EPM2143/Energy Conversion								X							X		X									X
Level two																										
Semester – 2																										
PME2211/Engineering Mathematics (3) b		X	X								X		X		X		X				X					X
CCE2209/Computer Architecture	X						X		X		X			X	X		X	X			X	X				
CCE2210/Signals and Systems Engineering	X						X			X		X		X			X	X							X	
CCE2211/Computer Graphics	X	X		X					X		X	X							X	X		X	X			
CCE22H3/Society of Information Technology					X	X				X		X								X		X				X
EEC2247/Communication systems	X					X							X	X	X	X					X	X				
Level three																										
Semester – 1																										
CCE3112/Database Systems				X	X	X				X		X							X	X	X		X		X	X
CCE3113/Languages and Compilers		X	X	X					X					X		X			X	X			X	X	X	
CCE3114/Operating Systems		X	X	X					X	X				X		X				X		X	X	X		
CCE3115/Control Engineering							X		X						X		X	X				X	X			
CCE3116/Digital Signal Processing	X			X			X	X		X	X						X	X					X			
CCE3117/Fundamentals of Stochastic Processes		X		X	X		X	X			X		X		X			X			X		X			
Level three																										
Semester – 2																										

Course Code / Course Title	Programme outcomes																									
	Knowledge and Understanding								Intellectual Skills							Practical						Transferable				
	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
CCE3218/Software Engineering		X	X	X	X	X				X			X	X					X	X		X	X	X	X	
CCE3219/Artificial Intelligence and Expert Systems				X				X	X						X	X					X	X	X			X
CCE3220/Digital Control							X		X		X				X		X	X								X
CCE3221Modeling and Simulation							X	X	X			X		X			X	X			X		X			X
CCE322*/Elective Specialized Course (1)	X	X	X		X	X				X	X		X		X	X			X	X	X	X			X	
CCE32H4/Decision Support Systems		X				X		X	X						X						X	X				
Level four																										
Semester – 1																										
CCE4126/Computer Networks				X	X	X	X		X		X					X				X	X	X	X			
CCE4127/Microcontrollers Systems				X			X		X						X		X				X		X		X	
CCE4128/Fuzzy Control							X	X	X						X		X	X				X				
CCE4129/Neural Networks							X	X	X						X		X	X				X				X
CCE4130/Pattern Recognition and Digital Image Processing				X				X			X			X					X	X		X				
CCE41**/Elective Course (2)	X	X		X	X		X		X	X		X		X	X	X			X	X	X	X	X			X
Level four																										
Semester – 2																										
CCE4235/Information System Design		X			X	X		X	X			X				X			X		X	X	X			
CCE4236/Computer and Network Security		X		X		X					X								X			X	X			
CCE4237/Control and Instrumentation in Industrial Processes				X	X	X								X	X		X				X					X
CCE42**/Elective Course (3)	X	X		X		X	X	X	X		X		X		X	X	X			X	X	X	X	X		

Course Code / Course Title	Programme outcomes																										
	Knowledge and Understanding								Intellectual Skills							Practical						Transferable				
	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
CCE42**/Elective Course (4)	X		X		X			X	X	X		X		X	X	X		X	X		X	X	X		X	
CCE4244/Project	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Field training								X	X																X	

Programme coordinator: Prof. Dr. Amany Sarhan **Head of Department: Prof. Dr. Amany Sarhan**

3- Academic Standards

3a- External References for Standards (Benchmarks)
Academic Reference Standards (ARS)

3b- Comparison of Provision to External References

Department Standards	Reference Standards Academic Reference Standards (ARS)
Knowledge and Understanding: Graduates from computers and automatic control engineering should be able to:	
A1-A8	**1. Essential facts, concepts, principles and theories relevant to computer and control systems engineering.**
A3, A6 and A7	**2. Relevant mathematical methods, physical laws and the principles of electronic engineering science as applied to computer and control engineering systems;**
A1, A3, A5, A7 and A8	**3. Engineering principles in the fields of logic design, circuit analysis, machine and assembly languages, computer organization and architectures, memory hierarchy, advanced computer architectures, embedded systems, signal processing, operating systems, real-time systems, control systems, and reliability analysis.**
A2, A6 and A7	**4. Quality assessment of computer and control systems;**
A1, A2, A3, A5, A7 and A8	**5. Principles of design specific to computer and control engineering;**
A1, A2, A3, A5, A6 and A8	**6. Broad general education necessary to understand the impact of computer engineering solutions in a global and societal context;**
A2, A3, A4, A5, A7 and A8	7. **Related research methods and approaches to create more advanced products and control techniques.**
Intellectual Skills: Graduates from computers and automatic control engineering should be able to:	
B1, B4 and B6	**1. Demonstrate a high level of competence in identifying, defining and solving computer and control engineering problems**
B1, B2 and B3	**2. Select appropriate mathematical tools, computing methods, design techniques and tools in computer and control engineering disciplines, for modelling and analyzing computer and control systems**
B2, B5 and B7	**3. Evaluate different techniques and strategies for solving computer and control engineering problems**
B1, and B6	**4. Maintain a sound theoretical approach in dealing with new and advancing technology**
B1 and B5	**5. Analyze the test results of computer control systems using IT tools**
B6 and B7	**6. Cope with advanced techniques in control design and evaluation**
B6 and B7	**7. Understand and build embedded systems to carry on ever increasing user requirements including ease and safe of operation with multifunctioining.**
Professional and Practical Skills: Graduates from computers and automatic control engineering should be able to:	
C1 and C2	**1. Use laboratory and field equipment competently and safely**
C1, C2, C4 and C6	**2. Observe, record and analyze data in laboratory as well as in the field**
C1, C4, C5 and C6	**3. Use appropriate specialized computer software, computational tools and packages to a variety of computer and control engineering**

	problems
C4, C5 and C6	**4. Write computer programs suitable for the system in hand.**
C2 and C4	**5. Integrate technical professionalism with societal and ethical responsibility**
C1, C2, C3 and C6	**6. Implement computer and control system using relevant equipment and computers**
C1, C2, C3 and C6	**7. Apply control design techniques to experimental hardware and evaluate its performance in presence of disturbance and noise in addition to sensors**
C2, C3 and C6	**8. Practice some of the experimental embedded systems and interfacing techniques with control and sensors of different technologies.**
General and Transferable Skills: **Graduates from computers and automatic control engineering should be able to demonstrate the general and transferable skills of engineering graduate.**	
The same as compared to the NARS below	

3c. Comparison to basic NARS

Actual Standards	Reference Standards National Academic Reference Standards (NARS)
Knowledge and Understanding	
Graduates from computers and automatic control engineering should be able to:	**The graduates of the engineering programs should be able to demonstrate the knowledge and understanding of:**
A7	**a) Concepts and theories of mathematics and sciences, appropriate to the discipline.**
A6	**b) Basics of information and communication technology (ICT)**
A8	**c) Characteristics of engineering materials related to the discipline.**
A1, A7, and A8	**d) Principles of design including elements design, process and/or a system related to specific disciplines.**
A8	**e) Methodologies of solving engineering problems, data collection and interpretation**
A2 and A5	**f) Quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.**
A5	**g) Business and management principles relevant to engineering.**
A1, and A8	**h) Current engineering technologies as related to disciplines.** **i) Contemporary engineering topics.**
Intellectual Skills	
B2, B3 and B4	**a) Select appropriate mathematical and computer-based methods for modelling and analyzing problems**
B1 and B4	**b) Select appropriate solutions for engineering problems based on analytical thinking.**

	c) Think in a creative and innovative way in problem solving and design.
B1 and B6	**d) Combine, exchange, and assess different ideas, views, and knowledge from a range of sources.**
B5 and B7	**e) Assess and evaluate the characteristics and performance of components, systems and processes.**
B5 and B7	**f) Investigate the failure of components, systems, and processes.**
B1, B4, and B5	**g) Solve engineering problems, often on the basis of limited and possibly contradicting information.**
B1 and B5	**h) Select and appraise appropriate ICT tools to a variety of engineering problems.**
B2, B5 and B7	**i) Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.**
B1, B4 and B6	**j) Incorporate economic, societal, environmental dimensions and risk management in design.**
B2 and B5	**k) Analyze results of numerical models and assess their limitations.**
B1, and B6	**i) Create systematic and methodic approaches when dealing with new and advancing technology**
Professional and Practical Skills	
C2, C5 And C6	**a) Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.**
C1, C2, C4 and C5	**b) Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services.** **c) Create and/or re-design a process, component or system, and carry out specialized engineering designs.**
C1, C2, C5 and C6	**d) Practice the neatness and aesthetics in design and approach.**
C2 and C3	**e) Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results.**
C5 and C6	**f) Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.**
C2 and C6	**g) Apply numerical modelling methods to engineering problems.**
C2 and C4	**h) Apply safe systems at work and observe the appropriate steps to manage risks.**
C1, C2, C3 and C6	**i) Demonstrate basic organizational and project management skills.**
C1, C2 And C6	**j) Apply quality assurance procedures and follow codes and standards.**
C1, C4, C5 And C6	**k) Exchange knowledge and skills with engineering community and industry.**
C4	**i) Prepare and present technical reports.**
General and Transferable Skills	

D1, D3 and D4	**a) Collaborate effectively within multidisciplinary team**
D1 and D5	**b) Work in stressful environment and within constraints**
D1, D3, D4 and D5	**c) Communicate effectively**
D1 and D5	**d) Demonstrate efficient IT capabilities**
D1 and D5	**e) Lead and motivate individuals**
D1 and D5	**f) Effectively manage tasks, time, and resources**
D2 and D5	**g) Search for information and engage in life-long self learning discipline**
D1, D3, D4 and D5	**h) Acquire entrepreneurial skills**
D1, D2, and D5	**i) Refer to relevant literatures**

Course specification

Preparatory Year

First Term

Course Specification

Course Title	**Computer Technology**	
Course Code	**EC0101**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mohamed Shoeb**	
Teaching Staff	**Dr. Mohamed Shoeb – Dr. Amr El-kholy**	
Level	**Preparatory Year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 2 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and control engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Enhance the information about computer field
- Acquire knowledge about the history of building the computer
- Help the student to deal with the computer with deeper understanding to its hardware, software and operating system

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Enumerate the basic parts of computer.
A2. State the history of building the computer
A3. List the famous operating systems and programming languages.
A4. Identify some software packages.
A5. Mention computer network concepts and ideas.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Choose the basic parts of computer based on their function.
B2. Integrate between famous operating systems
B3. Differentiate between the high level and low level programming languages.
B4. Choose the proper software packages for a certain task.
B5. Compare between the various computer network topologies.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Apply basic information to recognize computer functions.

C2. Apply different features to identify computer components.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Share ideas and communicate with others.

3. Course Contents

Week	Topics
1-2	The computer age :an overview
3-5	Hardware components
6-7	Operating systems
8-10	Low-level and high-level languages
11-13	Popular software packages
14	Introduction to computer networks

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problems solving

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	70 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	3 hrs (overall)	Weeks: 3,5,8,9,11	30 %

6. List of references

Course notes:

- *Prepared by the lecturer and handed to the students at the lectures.*

Essential Books:

- *Mano M A, and Ciletti, M D, "Digital Design," 4th Ed., Prentice Hall. 2007.*

Web sites:

- www.wikipedia.com
- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *Microprocessor lab.*
- *Data-show system.*

	Course Coordinator	Head of Department
Name	**Prof. Dr. Elsayed Sallam**	Prof. Dr. Amany sarhan
Name (Arabic)	**أ.د. السيد سلام**	**أ. د. أماني سرحان**
Signature		
Date	28/ 8 /2018	28/ 8 /2018

Course contents – Course ILOs Matrix

Course Code / Course Title: EC0101/ Computer Technology

Course Contents	Course outcomes (ILOs)														
	Knowledge and Understanding					Intellectual Skills					Professional skills		General and Transferable Skills		
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	D1	D2	D3
The computer age :an overview		x									x		x		
Hardware components	x					x					x		x		
Operating systems			x				x					x		x	
Low-level and high-level languages			x					x						x	
Popular software packages				x					x			x			x
Introduction to computer networks					x					x	x				x

Course coordinator: Dr. Mohamed Shoeb **Head of Department:** Prof. Dr. Amany sarhan

Course specification

First Year

First Term

Course Specification

Course Title	**Fundamentals of Logic Design**	
Course Code	**CCE1102**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Nada Elshenawy**	
Teaching Staff	**Dr. Nada Elshenawy – Dr. Tahani Alam**	
Branch / Level	**Electrical Engineering /First year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 4 h lectures**
	Practical	**14 x 1 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Acquaint the student with the principles and theorems of logic systems.
- Introduce the student to the field of logic system analysis and design.
- Provide the student with the skill of practical using of logical gates.
- Assist the student to engage in practical life.

2. Intended Learning outcomes (ILOs)

A. Knowledge and Understanding

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

A1. Describe the logic gates and logic circuits and their simplification methods (map and Boolean algebra).
A2. Mention the concepts of combinational circuits.
A3. State the characteristics of the famous combinational circuits (adders, decoders,....).
A4. State the concepts of sequential circuits.
A5. Describe the famous flip-flops (D, JK,....).
A6. List the design procedure of combinational circuits to satisfy given requirements.

B. Intellectual Skills

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

B1. Differentiate between logic gates according to their function.
B2. Analyze the combinational circuits and build the corresponding truth table.
B3. Explain the circuit simplification using both Boolean algebra and Karnaugh maps for sequential and combinational circuits.
B4. Integrate the various logic gates and famous circuits to construct large combinational circuits.
B5. Distinguish between combinational and sequential circuits.

C. Professional and Practical Skills

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

C1. Design and implement the basic combinational and sequential circuits in the lab.
C2. Make digital systems from groups of available modules and apply them practically in the lab.
C3. Verify systematically to the least costly digital design by minimizing the circuit.
C4. Validate the variety of sequential and combinational circuits to obtain their response.

D. General and Transferable Skills

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

D1. Learn information retrieval skills through books and the WWW.
D2. Learn to work competently among team workers of different task assignments.
D3. Deal with individuals and motivating them for novel ideas.
D4. Learn to make good relations with colleagues, bosses, and clients, and adapt to varying work environments.

3. Course Contents

Week	Topics
1-3	Simplification of logic-gate networks
4-7	Combinational circuits concepts and famous circuits
8-12	Logic systems design
13-14	Sequential circuits

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

4.4- Quizes

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	68 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	6 hrs	Through Term	32 %

6. List of references

Course notes:

- *Amany Sarhan, "Fundementals of logic design," 2014.*

Essential Books:

- *M.M.Mano, 'Digital Design', 5th Ed., Prentice-Hall, 2012.*

- *S.Brown and Z.Vranesic, 'Fundamentals of Digital Logic with VHDL Design', McGraw-Hill, 2011.*

Web sites:

- www.wikipedia.com
- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *Logic lab.*

	Course Coordinator	Head of Department
Name	Prof. Dr. Amany sarhan	Prof. Dr. Amany sarhan
Name (Arabic)	أ. د. أماني سرحان	أ. د. أماني سرحان
Signature		
Date	3/ 9/2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE1102/ Fundementals of Logic Design

Course Contents	Course outcomes (ILOs)																		
	Intellectual Skills						General and Transferable Skills					Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4
Simplification of logic-gate networks	X	X		X			X			X			X		X		X		X
Combinational circuits concepts and famous circuits			X		X				X		X	X			X	X		X	
Logic systems design		X		X		X		X	X			X		X			X		X
Sequential circuits	X					X	X			X			X					X	

Course coordinator: **Dr. Nada Elshenawy** Head of Department: **Prof. Dr. Amany sarhan**

Course Specification

Course Title	**Computer Programming (1)**	
Course Code	**CCE1103**	
Academic Year	**2019-2020**	
Coordinator	**Prof. Dr. Elsayed Sallam**	
Teaching Staff	**Prof. Dr. Elsayed Sallam**	
Branch / Level	**Electrical Engineering /First year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 2 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce the student to the programming methods in high-level Languages
- Familiarize the student with structured programming, flowcharts and pseudo codes.
- Provide the student with the skill of practical using of high-level languages.
- Train in writing programmed solutions to electrical engineering problems.
- Assist the student to engage in practical life.

2. Intended Learning outcomes (ILOs)

A. *Knowledge and Understanding*

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

A1. Describe the programming and algorithms basics.
A2. Define loops and decision making.
A3. Tell the effect of functions and subroutines.
A4. Mention the characteristics of arrays, strings, and pointers.
A5. Define the structured programming and programming approaches.

B. Intellectual Skills

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

B1. Evaluate the programs written in high-level languages.
B2. Distinguish between the appropriate data types and control structures for the given problem.
B3. Justify the sources of error in the code and debug it.
B4. Criticize the merits of readability, conciseness, efficiency, and productivity in program development.

C. Professional and Practical Skills

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

C1. Make programs for the solution of a wide range of scientific and engineering problems.
C2. Solve the programs to check its performance for different inputs.
C3. Validate and implement problem aspects and requirements into program concepts.
C4. Use the visual studio software package to write, compile and run programs.
C5. Draw flowcharts and pseudo codes for problems and concert them into code.

D. General and Transferable Skills

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

D1. Learn information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Deal with reports using word editor in an acceptable form.
D3. Learn to make good relations with colleagues, bosses, and clients, and adapt to varying work environments.

3. Course Contents

Week	Topics
1-2	Programming basics
3-4	Loops and decision making
5-6	Functions and subroutines
7-8	Arrays, strings, and pointers
9-10	Structured programming
11-12	Software design principles
13-14	Programming approaches

4. Teaching and Learning Methods

4.1- Lectures

4.2- Lab experiments

4.3- Case studies

4-4- Problem solving

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	60 %
Oral Assessment	15 mins	15	10 %
Practical Examination	15 mins	15	10 %
Semester work	5 hrs	Through Term	20%

6. List of references

Course Notes:

- *El Sayed Sallam, 'Introduction to programming ', 2014.*

Essential Books:

- *H.M. Deitel and P. J. Deitel, 'C++ How to program ', 6th Ed., Prentice-Hall, 2013.*
- *Stephen Prata, "C++ Primer Plus," 6th Ed., Sams, 2011.*
- *Andrew Koenig and Barbra E. Moo, "Accelerated C++: Practical Programming by Example," 4th Ed., Addison Wesley Professional, 2010.*
- *Stanely B. Lippman, Josa E. Lajoie and Barbra E. Moo, "C++ Premiere," 5th Ed., Addison Wesley Professional, 2012.*
- *Bjame Stroustrup, "Programming: Princeples and Practice Using C++," 2nd Ed., Addison Wesley Professional, 2014.*
-

Web sites:

- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-096-introduction-to-c-january-iap-2011/lecture-notes/
- www-inst.eecs.berkeley.edu/classes-eecs.html#cs
- http://www.doc.ic.ac.uk/~wjk/c++Intro/

7. Facilities required for teaching and learning

- *Software lab*

	Course Coordinator	**Head of Department**
Name	Prof. Dr. Elsayed Sallam	Prof. Dr. Amany sarhan
Name (Arabic)	أ. د. السيد سلام	أ. د. أماني سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2018

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE1103 / Computer Programming (1)

Course Contents	Course outcomes ILOs																
	Intellectual Skills					General and Transferable Skills				Professional and Practical Skills					General and Transferable Skills		
	A1	A2	A3	A4	A5	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	D3
Programming basics	X			X							X		X		X	X	
Loops and decision making		X						X		X	X	X	X			X	
Functions and subroutines			X						X	X	X		X		X		X
Arrays, strings, and pointers				X				X		X	X		X	X		X	
Structured programming		X			X		X						X		X		
Software design principles			X		X	X	X		X	X			X	X		X	X
Programming approaches					X				X			X	X		X		X

Course coordinator: **Prof. Dr. El Sayed Sallam** Assoc.Head of Department: **Prof. Dr. Amany sarhan**

Course specification

First Year

Second Term

Course Specification

Course Title	**Computer Programming (2)**	
Course Code	**CCE1204**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mohamed Shoeb**	
Teaching Staff	**Dr. Mohamed Shoeb**	
Branch / Level	**Electrical Engineering / First year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 2 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Acquaint the student with the methods of designing, testing, and evaluating a complete computer program.
- Familiarize the student with ad hoc software packages.
- Train in writing programmed solutions to electrical engineering problems.
- Introduce the student to object-oriented programming.
- Assist the student to engage in practical life.

2. Intended Learning outcomes (ILOs)

A. Knowledge and Understanding :

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

A1. Describe the Characteristics of object-oriented programming.
A2. Mention the usage Streams and Files.
A3. Describe Templates and Exceptions.
A4. Explain some examples of application of programming techniques to electrical engineering problems.

B. Intellectual skills:

By the end of this course, the students will be able to:

B1. Differentiate between high-level and low-level languages.
B2. Distinguish between data structures and classes.
B3. Distinguish between pointers and ordinary variables.
B4. Choose the suitable constructs for a program.
B5. Justify the source of error in the code.

C. Professional and practical skills:

By the end of this course, the students will be able to:

C1. Make computer programs for the solution of a wide variety of problems that contains classes and data structures.

C2. Use the visual studio software package to write, compile and run programs.
C3. Apply Compiling and testing a program.
C4. Validate problem aspects and requirements, especially in electrical engineering, into program concepts and constructs.

D. General and transferable skills:

By the end of this course, the students will be able to:

D1. Learn information retrieval skills through books and the WWW.
D2. Deal with ideas and communicate with others
D3. Learn to present reports using different techniques (computer, manual... etc.).

3. Course Contents

Week	Topics
1-3	Characteristics of object-oriented programming
4-7	Streams and Files
8-11	Templates and Exceptions
12-14	Engineering applications

4. Teaching and Learning Methods

4.1- Lectures

4.2- Lab experiments

4.3- Problem Solving

4-4- Quizes

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	60 %
Oral Assessment	15 mins	15	10 %
Practical Examination	15 mins	15	10 %
Semester work	5 hrs	Through Term	20%

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *H.M. Deitel and P. J. Deitel, 'C++ How to program ', 6th Ed., Prentice-Hall, 2013.*

- *Stephen Prata, "C++ Primer Plus," 6th Ed., Sams, 2011.*
- *Andrew Koenig and Barbra E. Moo, "Accelerated C++: Practical Programming by Example," 4th Ed., Addison Wesley Professional, 2010.*
- *Stanely B. Lippman, Josa E. Lajoie and Barbra E. Moo, "C++ Premiere," 5th Ed., Addison Wesley Professional, 2012.*
- *Bjame Stroustrup, "Programming: Princeples and Practice Using C++," 2nd Ed., Addison Wesley Professional, 2014.*
-

Web sites:

- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-096-introduction-to-c-january-iap-2011/lecture-notes/
- www-inst.eecs.berkeley.edu/classes-eecs.html#cs
- http://www.doc.ic.ac.uk/~wjk/c++Intro/

7. Facilities required for teaching and learning

- *Software lab*

	Course Coordinator	Head of Department
Name	Dr. Mohamed Shoeb	Prof. Dr. Amany sarhan
Name (Arabic)	د. محمد شعيب	أ. د. أماني سرحان
Signature		
Date	3/9/2019	3/9/2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE1204 / Computer Programming (2)

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills					Professional and Practical Skills				General and Transferable Skills		
	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
Characteristics of object-oriented programming	X	X		X	X	X	X			X		X		X		X
Streams and Files		X		X			X		X		X				X	X
Templates and Exceptions			X	X		X		X	X			X		X		X
Engineering applications	X			X			X		X				X		X	X

Course coordinator: Dr. Mohamed Shoeb

Assoc.Head of Department: Prof. Dr. Amany sarhan

Course Specification

Course Title	**Computer Hardware**	
Course Code	**CCE1205**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Hany Elghaysh**	
Teaching Staff	**Dr. Hany Elghaysh**	
Branch / Level	**Electrical Engineering / First year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 2 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Familiarize the student with Input/output devices and how to perform intended functions.
- Familiarize the student with Memory system and how to perform intended functions.
- Familiarize the student with Arithmetic/logic modules and how to perform intended functions.
- Introduce the student to the field of embedded systems.
- Introduce the student to the practical life of computer hardware.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Describe input/output organization and their interconnection.
A2. List principles and types of memory system.
A3. Outline components of basic units of computer systems like arithmetic units and processing unit.
A4. State the types of machine instructions and the usage of each.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Relate between the different types of memory.
B2. Differentiate between the different types of interrupts.
B3. Distinguish between the various input/output devices and the characteristics of each.
B4. Comment on the ALU modules, machine instruction sets and the addressing modes.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Illustrate and apply understanding of memory systems, including cache memory.
C2. Design arithmetic modules.
C3. Design a special purpose instruction set.
C4. Combine the various components of computer to build the whole system.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Learn information retrieval skills through books and the WWW.
D2. Deal with ideas and communicate with others
D3. Learn to present reports using different techniques (computer, manual... etc.).

3. Course Contents

Week	Topics
1-3	Input/output organization and operations
4-7	Memory system and operations
8-9	Processing modules
10-11	Arithmetic/logic modules
12-14	Machine instructions and programs

4. Teaching and Learning Methods

4.1- Lectures

4.2- Lab experiments

4.3- Problem Solving

4.4- Quizes

4.5- Group projects

4.6- Reoprts

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	70 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	5 hrs	Through term	30 %

6. List of references

Course book:

- *Amany Sarhan, "Computer Hardware", 2014.*

Essential Books:

- *C. Hamacher, Z. Vranesic, and S. Zaky, 'Computer Organization', 6th Ed., McGraw-Hill, 2011.*

- *David Harris and Sarah Harris, "Digital Design and Computer Architecture," 2nd Edition, Morgan Kaufmann, 2012.*
- *David A. Patterson and John L. Hennessy, "Computer Organization and Design," 5th Ed., Morgan Kaufmann, 2011.*

Web sites:

- www.wikepedia.org
- www-inst.eecs.berkeley.edu/classes-eecs.html#cs
- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu
- www.acm.org

7. Facilities required for teaching and learning

- Hardware lab.

	Course Coordinator	Head of Department
Name	Dr. Hany Elghaysh	Prof. Dr. Amany sarhan
Name (Arabic)	د. هانى الغايش	أ. د.م. أمانى سرحان
Signature		
Date	3/9/2019	3/9/2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE1205 / Computer Hardware

Course Contents	Course outcomes (ILOs)														
	Intellectual Skills				General and Transferable Skills				Professional and Practical Skills				General and Transferable Skills		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3
Input/output organization and operations	X			X	X		X		X		X		X		X
Memory system and operations		X		X	X			X	X	X				X	
Processing modules		X	X	X		X					X		X		X
Arithmetic/logic modules	X		X			X	X			X		X		X	
Machine instructions and programs		X		X				X			X	X	X		X

Course coordinator: **Dr. Hany Elghaysh** Assoc.Head of Department: **Prof. Dr. Amany sarhan**

Course specification

Second Year

First Term

Course Specification

Course Title	**Data Structures and Algorithms**	
Course Code	**CCE2106**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mohamed Eyta**	
Teaching Staff	**Dr. Mohamed Eyta**	
Level	**Second year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 4 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Assist the student to understand and apply the main characteristics of common data structures.
- Enable the student to understand and apply the algorithms of common operations.
- Encourage the student to design programs based on data structures
- Introduce the student to the different methods for algorithm evaluation

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Define the Algorithm and list its distinctive features
A2. Write down the relation between abstract data types, classes, and objects.
A3. State the usage of the recursion-based problem solving
A4. Define: Lists, stacks, queues, tables, trees, and graphs
A5. Enumerate the algorithm analysis methods
A6. List the algorithm design methods

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Evaluate algorithms efficiency and compute their complexity.
B2. Analyze and design of algorithms
B3. Correlate data structures in information system development.
B4. Choose the most appropriate data structure for a particular problem
B5. Distinguish between important computer algorithms using those structures.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Code simple and complex data structures.

C2. Analyze, design, test and evaluate various types of algorithms.
C3. Use data structures to build complex algorithms.
C4. Employ data-driven approaches for information system development.
C5. Master object-oriented programming.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities
D2. Make good relations with colleagues, bosses, and clients, and adapt to varying work environments.
D3. Work in groups in projects and manage the work tasks between them

3. Course Contents

Week	Topics
1	Algorithm definition and overview on data structures
2-3	Abstract data types, classes, and objects
4-5	Lists, stacks, queues, tables, trees, and graphs
6	Sort Algorithms
7	Search Algorithms
8-10	Algorithm analysis
11-14	Algorithm design

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

4.4- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	68 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	5 hrs	Weeks:3,4,7,8,9,11	32%

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- Brad Miller, *Problem Solving with Algorithms and Data Structures using Python, 2018.*
- *A. M. Berman, ' Data Structures via C++,' Oxford University Press, 2007.*

- *J.P. Tremblay and G.A. Cheston, 'Data structures and software development in an object-oriented domain', Prentice-Hall, 2002.*
- *Michael T. Goodrich and Roberto Tamassia, "Data Structures and Algorithms in Python," 1st Ed., Wiley 2013.*
-

Web sites:

- *http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/lecture-videos/*
- *https://courses.csail.mit.edu/6.851/spring12/lectures/*
- *http://www.cs.berkeley.edu/~jrs/61b/*

7. Facilities required for teaching and learning

- *Computer lab*

	Course Coordinator	Head of Department
Name	**Dr. Mohamed Eyta**	Prof. Dr. Amany sarhan
Name (Arabic)	**د. محمد عيطة**	**أ. د. أمانى سرحان**
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE2106 / Data Structures and Algorithms

Course Contents	Course outcomes ILOs																		
	Knowledge and Understanding						Intellectual Skills					Professional and Practical Skills					General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3
Algorithm definition and overview on data structures	x				x		x			x		x					x	x	
Abstract data types, classes, and objects		x	x					x			x			x					x
Lists, stacks, queues, tables, trees, and graphs		x			x			x			x			x				x	
Sort Algorithms		x				x	x			x			x		x		x		x
Search Algorithms			x						x	x				x			x		
Algorithm analysis	x			x			x	x			x		x		x				x
Algorithm design	x		x			x			x		x	x				x		x	

Course coordinator:. **Dr. Mohamed Eyta** **Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Digital Systems**	
Course Code	**CCE2107**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mahmoud AlShewimy**	
Teaching Staff	**Dr. Mahmoud AlShewimy**	
Level	**Second year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 4 h lectures**
	Practical	**14 x 1 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce the student to the field of sequential system analysis and design.
- Enable the student to use and simulate the different types of flip-flops.
- Acquaint the student with the principles and theorems of sequential systems, famous circuits (counters and registers).
- Enable the student to design, simulate and apply different combinational and sequential systems
- Assist the student to design digital systems using ASM charts.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Define the sequential systems
A2. List the various types of flip-flops and their function.
A3. State the principles of Finite state machine (Mealy and Moore).
A4. Define the concepts of Registers, shift registers, asynchronous and synchronous counters.
A5. List the components of the ASM charts.
A6. Realize the VHDL language basics.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Analyze synchronous circuits.
B2. Differentiate between the various flip-flops according to their functions
B3. Criticize the usage and design of synchronous and asynchronous counters.
B4. Integrate sequential and combinational devices to build digital systems using ASM chart
B5. Choose the proper components to build digital systems based on a given specification after building ASM chart.
B6. Estimate the source of error in digital circuits

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Design and build digital systems from groups of available modules.
C2. Implement and test various sequential circuits in the lab, conclude on the results and find the source of errors in such circuits.
C3. Apply various digital circuits.
C4. Use the principles of finite state machine in design of sequential systems.
C5. Implement and analyze various logic gates, combinational and sequential circuit using VHDL using the Active VHDL simulator.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments
D3. Lead individuals and motivating them for novel ideas.
D4. Present projects, reports and data using different technique (computer, manual… etc.).

3. Course Contents

Week	Topics
1	Concepts of sequential systems
2-3	Various types of flip-flops and their function
4-6	Analysis and design steps of synchronous sequential digital elements.
7-8	Finite state machine
9-11	Registers, shift registers, asynchronous and synchronous counters.
12	Design with ASM charts.
13-14	Algorithm design

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

4.4- Reports

4.5- Group projects

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	4 hrs	16	60 %
Oral Assessment	15 mins	1٥	10%
Practical Examination	15 mins	15	10%
Semester work	٦ hrs	Weekly	20 %

6. List of references

- *Course notes: Amany Sarhan, "Digital Systems", 2012.*

Essential Books:

- *M.M. Mano and M. D. Ciletti, 'Digital Design with introduction to the Veriloh HDL', 5th Ed., Prentice-Hall, 2012.*
- *M.M. Mano and C.R. Kime, 'Logic and Computer Design Fundamentals,' 4th Ed., Prentic-Hall, 2007.*
- *S. Brown and Z. Vranesic, 'Fundamentals of Digital Logic with VHDL Design,' McGraw-Hill, 2008.*
- *Wakerly J F, 'Digital Design Principles and Practices,' 5th Ed., Prentice-Hall, 2012.*

Web sites:

- http://cva.stanford.edu/books/dig_sys_engr/lectures/
- http://www.ece.uic.edu/~dutt/courses/ece465/lect-notes.html
- http://www.utdallas.edu/~dodge/EE2310/

7. Facilities required for teaching and learning

- *Logic kits lab*
- *VHDL simulator*
- *Computer lab*

	Course Coordinator	Head of Department
Name	Dr. Mahmoud AlShewimy	Prof. Dr. Amany sarhan
Name (Arabic)	د. محمود الشويمى	أ.د. أمانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE2107 / Digital Systems

Course Contents	Course outcomes ILOs																				
	Knowledge and Understanding						Knowledge and Understanding						Knowledge and Understanding					Knowledge and Understanding			
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	D1	D2	D3	D4
Concepts of sequential systems	x						x			x			x					x		x	
Various types of flip-flops and their function		x			x			x							x	x				x	
Analysis and design steps of synchronous sequential digital elements.		x						x							x	x		x			
Finite state machine					x					x				x				x			x
Registers, shift registers, asynchronous and synchronous counters.			x		x				x		x				x			x			
Design with ASM charts				x					x			x							x	x	
Algorithm design		x				x		x				x					x		x		

Course coordinator: Dr. Mahmoud AlShewimy **Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Microprocessors and Interfacing Systems**	
Course Code	**CCE2108**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Amr El-Kholy**	
Teaching Staff	**Dr. Amr El-Kholy**	
Level	**second year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce the student to the field of microprocessor-based industrial control.
- Acquaint the student with microprocessor architecture and programming.
- Assist the student to design and apply machine programs.
- Enable the student to work with microprocessor controlled systems.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Describe the microprocessor architecture.
A2. State the general steps in microprocessor programming.
A3. Mention the need and construction of memory interface.
A4. Enumerate the input/output interface, digital to analog and analog to digital converters
A5. Outline the principles of microprocessor-based industrial control.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Distinguish the different microprocessor usage in the numerous operating conditions of the digital computer.
B2. Differentiate between different families of microprocessors and choose the best of them to a specific application.
B3. Develop digital control systems built around microprocessors.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Illustrate application-oriented microprocessor programs.
C2. Make Interface microprocessors to peripherals.
C3. Build microprocessor-based control systems for industrial processes

taking into account the possible risks.

C4. Validate that the microprocessor-based control systems based on new technologies and feedback.

C5. Put into practice how to write and apply microprocessor programs for a variety of control tasks in the lab.

C6. Put into practice the requirements to build controlled systems using microprocessors and present a feasibility study about that.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Learn how to work among team workers of different task assignments.

D2. Deal with individuals and motivating them for novel ideas.

D3. Deal with the need of continuing professional development in recognition for the need for lifelong learning.

3. Course Contents

Week	Topics
1-2	Microprocessor architecture
3-5	Microprocessor Programming
6-7	Memory interface
8-9	Input/output interface
10-11	Sensors, transducers, converters
12-14	Microprocessor-based control

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	4 hrs	16	60 %
Oral Assessment	30mins	15	20 %
Practical Examination	--	--	--
Semester work	4 hrs	Weeks: 3,5,6,8,9,12	20%

6. List of references

Course notes:

- *Mohamed Shoeb, 'Introduction to Microprocessors', 2014.*

Essential Books:

- *B.B. Brey, 'The Intel Microprocessors', 8th Ed., Pearson, 2008.*

- *Kip Irvine, "Assembly Language for Intel-based Computers", 4th Edition, Prentice-Hall, 2003.*
- *Senthil Kumar, N and M Saravanan, "Microprocessors and Microcontrollers," Oxford University Press, 2011.*

Web sites:

- http://freevideolectures.com/Course/3018/Microprocessors-and-Microcontrollers
- http://www3.imperial.ac.uk/physicsuglabs/thirdyearlab/microprocessor/lectures
- www.aust.edu/cse/moinul/8086_lectures.pdf

7. Facilities required for teaching and learning

- *Microprocessor lab*

	Course Coordinator	Head of Department
Name	Dr. Amr El-Kholy	Prof. Dr. Amany sarhan
Name (Arabic)	د.عمرو الخولى	أ.د.م.أماني سرحان
Signature		
Date	3/ 9 /2019	3/9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE2108 / Microprocessors and Interfacing Systems

Course Contents	Course outcomes ILOs																
	Knowledge and Understanding					Intellectual Skills			Professional and Practical Skills						General and Transferable Skills		
	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	C5	C6	D1	D2	D3
Microprocessor architecture	X			X			X					X	X				X
Microprocessor Programming		X				X		X	X	X		X			X	X	
Memory interface	X		X			X	X				X				X		X
Input/output interface		X			X	X	X			X		X	X	X		X	
Sensors, transducers, converters			X				X	X				X		X		X	
Microprocessor-based control	X				X		X		X		X				X		X

Course coordinator: Dr. Amr El-Kholy **Head of Department:** Prof. Dr. Amany sarhan

Course specification

Second Year

Second Term

Course Specification

Course Title	**Computer Architecture**	
Course Code	**CCE2209**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mahmoud AlShewimy**	
Teaching Staff	**Dr. Mahmoud AlShewimy**	
Level	**Second year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 4 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Help the student to understand the organization of computer input/output
- Assist the student to recognize the structure of the various components of the computer and how they work together to perform intended functions.
- Encourage the student to know the fundamentals of embedded systems.
- Help the student to realize the roles processing modules

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Define the machine instruction and how they are used to make programs.
A2. Enumerate the input/output organization.
A3. Describe the memory system.
A4. Define the role of the arithmetic modules.
A5. Describe the processing unit.
A6. Outline the essentials of embedded systems.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Differentiate between the ways of instruction execution.
B2. Develop microprogramming and microprogram organization.
B3. Justify interrupts and specify hardware and software needed to support them.
B4. Justify the ways to correlate between the different parts of the computer according to their function.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Illustrate the hierarchy design of memory systems, including cache memory and virtual memory.
C2. Design of input/output systems as standalone and with direct memory access as an input/output mechanism for high-speed operation.
C3. Illustrate the Design of arithmetic modules that include high-speed adders, multipliers, and division circuit.
C4. Make the experiments for design input/output interface circuits.
C5. Put the integrated arithmetic modules, memory system, input/output system and control unit to build complete computer.
C6. Make enhance to the design of computer system based on the various technologies in the input/output devices and memory organizations.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Learn information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Learn how to present projects, reports and data using different techniques (computer, manual... etc.).
D3. Deal with computer venders and after-sale service providers.

3. Course Contents

Week	Topics
1-2	Input/output organization, interrupts
3-5	DMA and bus system
6-7	Memory system
8-9	Arithmetic modules
10-11	Processing modules
12-14	Introduction to pipelining, superscalar processors and parallel processing
13-14	Introduction to embedded systems

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	4 hrs	Week 16	60 %
Oral Assessment	30 mins	15	20 %
Practical Examination	--	--	--
Semester work	3 hrs	Weeks: 3,5,6,8,9,10,12	20%

6. List of references

- *Course notes: Prepared by the lecturer and handed to the students at the term.*

Essential Books:

- *Hamacher, Z. Vranesic, and S. Zaky, 'Computer Organization', 7th Ed., McGraw-Hill, 2011.*
- *Andrew S. Tanenbaum and Todd Austin, "Structured Computer Organization," 6th Edition, Prentice Hall, 2012.*
- *D. A. Patterson and J. L. Hennessy, 'Computer Architecture: A Quantitative Approach', 5th Ed., Morgan Kaufmann, 2013.*

Web sites:

- http://www.ece.cmu.edu/~ece447/s13/doku.php?id=schedule
- *www.cs.utexas.edu/users/mckinley/352/lectures*
- *ww.eecs.harvard.edu/~dbrooks/cs146*

7. Facilities required for teaching and learning

- *Hardware lab*

	Course Coordinator	Head of Department
Name	Dr. Mahmoud AlShewimy	Prof. Dr. Amany sarhan
Name (Arabic)	د. محمود الشويمي	أ.د. أمانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE2209 / Computer Architecture

Course Contents	Course outcomes ILOs																		
	Knowledge and Understanding						Intellectual Skills				Professional and Practical Skills						General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	C1	C2	C3	C4	C5	C6	D1	D2	D3
Input/output organization, interrupts		X	X			X		X			X			X				X	X
DMA and bus system				X				X			X				X	X			
Memory system		X							X				X					X	
Arithmetic modules			X			X	X					X			X		X		X
Processing modules	X							X		X		X		X				X	
Introduction to pipelining, superscalar processors and parallel processing	X			X		X				X			X		X		X	X	
Introduction to embedded systems		X			X		X				X				X	X			X

Course coordinator: Dr. Mahmoud AlShewimy **Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Signals and Systems Engineering**	
Course Code	**CCE2210**	
Academic Year	**2019-2020**	
Coordinator	**Prof. Dr. Mahmoud Fahmy**	
Teaching Staff	**Prof. Dr. Mahmoud Fahmy**	
Level	**Second year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 4 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Help the student to understand the main types of systems.
- Assist the student to analyze the system in time-domain and frequency domain
- Encourage the student to know and apply the main methods used in the analyses of dynamic systems.
- Help the student to work in the field of digital systems.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Mention principles of continuous time linear systems
A2. Define the concept of Feedback, Laplace transform and block diagrams
A3. Draw the signal flow graphs and State-variable models
A4. Describe Steady state and transient analysis
A5. Mention the need for discrete-time linear systems

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Deduce Laplace transform of the input/output relationships
B2. Reduce and simplify block diagrams
B3. Analyze the system in steady state and transient point of view

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Build the block diagram of a system from its components.
C2. Construct the signal flow diagram for a system.
C3. Identify the eignstructure of a system and analyze them.
C4. Recognize the discrete-time linear characteristics.
C5. Use Matalb to simulate a group of systems and signals.

C6. Improve the system performance though feedback elements.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Manage their own learning and development, and time management and organizational skills.
D2. Apply and raise awareness of professional ethics.
D3. Use different sources of information: books, Internet, ...

3. Course Contents

Week	Topics
1-2	Continuous time linear systems
3	Concept of Feedback
4-5	Laplace transform and block diagrams
6-7	Signal flow graphs
8-9	State-variable models
10-11	Steady state and transient analysis
12-13	Eignstructure and Z-transform
14	Discrete-time linear systems

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	60 %
Oral Assessment	30 mins	15	20%
Practical Examination	--	--	--
Semester work	4 hrs	Weeks:2,4,5,7,8,11,12	20%

6. List of references

Course notes prepared by the lecturer

Essential Books:

- *Simon Haykin and Barry Van Veen,"Signals and Systems", 2nd Ed., Wiley, 2003.*
- *B.P. Lathi, "Linear Systems and Signals," 2nd Ed., 2007.*
- *A.V. Oppenheim and A.S. Willsky, "Signals and Systems," 2nd Ed., 2001.*
- *Luis Chaparro, "Signals and Systems using MATLAB," 2nd Edition, Academic Press 2014*

Web sites:

- http://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011/lecture-notes/
- http://stanford.edu/~boyd/ee102/
- www.eas.uccs.edu/wickert/ece2610/

7. Facilities required for teaching and learning

- *Computer lab*
- *Matlab Simulator*

	Course Coordinator	Head of Department
Name	Prof. Dr. Mahmoud Fahmy	Prof. Dr. Amany sarhan
Name (Arabic)	أ.د.م. محمود فهمي	أ.د.أماني سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE2210 / Signals and Systems Engineering

Course Contents	Course outcomes ILOs																
	Knowledge and Understanding					Intellectual Skills			Professional and Practical Skills						General and Transferable Skills		
	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	C5	C6	D1	D2	D3
Continuous time linear systems	X			X			X					X	X				X
Concept of Feedback		X				X		X	X	X		X			X	X	
Laplace transform and block diagrams	X		X			X	X				X				X		X
Signal flow graphs		X			X	X	X			X		X	X	X		X	
State-variable models			X				X	X								X	
Steady state and transient analysis	X				X		X		X		X				X		X
Eignstructure and Z-transform	X		X		X		X			X		X			X	X	
Discrete-time linear systems		X				X			X				X			X	

Course coordinator: Prof. Dr. Mahmoud Fahmy **Assoc.Head of Department: Prof. Dr. Amany sarhan**

Course Specification

Course Title	**Computer Graphics**	
Course Code	**CCE2211**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mohamed Eita**	
Teaching Staff	**Dr. Mohamed Eita**	
Level	**Second Year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Help the student to understand the basic mathematical and technological aspects related to computer graphics
- Assist the student to know the where and when to use computer graphics.
- Help the student to realize the difference between 2D and 3D graphics
- Encourage the student to work in the field of graphics based on an engineering background.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Mention the application of computer graphics
A2. List different color models
A3. Mention the different models used for lighting and shading
A4. Enumerate different object transformation (translation, rotating, scaling)
A5. Define the human vision characteristics and how they can affect the graphics rendering
A6. Define Texture, shadows and radiosity
A7. List the relation between hierarchical modeling and flat modeling

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Differentiate between different illumination and shading models
B2. Compare shading models from performance and image quality points of views
B3. Choose the order of object transformation that gives the desired image
B4. Analyze a graphic program to determine weakness and points for increasing the performance

B5. Link between the mathematical operation and its effect on the rendered image
B6. Compare between different shading models
B7. Differentiate between texture and shading

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Set up a graphic library an make it ready to be used
C2. Design and implementation of graphics examples
C3. Construct complex 3D scene from basic primitives
C4. Tune shading parameters to get the most realistic images according to the object materials.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Present projects, reports and data using different techniques (computer, manual... etc.).

3. Course Contents

Week	Topics
1	Introduction to computer graphics and its application
2-3	Graphic pipeline, color models and introduction to OpenGL
4-6	Lighting and shading
7-8	Modeling and transformation
9-11	Specifying curves and curved surfaces
12-14	Texture and ray tracing

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	60 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	5 hrs	Weeks:3,4,6,8,9,10,12	40%

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the term.

Essential Books:

- *Fabio Ganovelli, Massimiliano Corsini, Sumanta Pattanaik, Marco Di Benedetto, "Introduction to Computer Graphics: A Practical Learning Approach," CRC Press, 2014.*
- *Mike Ohlson de fine , Python Graphics for Games 3: Working in 3 Dimensions: Object Creation and Animation with OpenGL and Blender (Volume 3), 2015.*

Web sites:

- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-837-computer-graphics-fall-2012/
- https://www.edx.org/course/foundations-computer-graphics-uc-berkeleyx-cs184-1x

7. Facilities required for teaching and learning

- *Computer lab*
- *Graphics packages*

	Course Coordinator	Head of Department
Name	Dr. Mohamed Eita	Prof. Dr. Amany sarhan
Name (Arabic)	د.محمد عيطه	أ.د. أماني سرحان
Signature		
Date	3/9/2019	3/9/2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE2211 / Computer Graphics

Course Contents	Course outcomes ILOs																				
	Knowledge and Understanding							Intellectual Skills							Professional and Practical Skills				General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D1	D2	D3
Introduction to computer graphics and its application	X							X							X						X
Graphic pipeline, color models and introduction to OpenGL	X							X	X					X							X
Lighting and shading		X								X					X		X		X	X	X
Modeling and transformation			X									X	X				X	X			X
Specifying curves and curved surfaces				X	X						X	X				X		X	X	X	
Texture and ray tracing						X	X						X	X				X			X

Course coordinator: Dr. Mohamed Eita **Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Society of Information Technology**	
Course Code	**CCE22H3**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Amr Elkholy**	
Teaching Staff	**Dr. Amr Elkholy**	
Level	**Second Year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 2 h lectures**
	Practical	**14 x -- h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Help the student to understand the basic concepts of information technology and basic skills in the use of the PC and its software
- Assist the student to understand and apply the basic concepts and strategies used in building successful information systems.
- Encourage the student to work in information systems development.
- Introduce him to the services offered by the internet and computer laws, legislation and protection strategies.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Enumerate the reasons behind information systems that are essential to business.
A2. Mention how computers process data into useful information for problem solving and decision-making.
A3. Describe the threats facing the information system.
A4. List the laws and legislation governing the IS
A5. Outline the features for information exchange that can be conducted over the World Wide Web.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Analyze the different business functions and the role of it in these functions.
B2. Choose the proper type of security techniques for the current system
B3. Differentiate between engineering and non-engineering applications.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Apply the proper security and privacy strategy to the IS.
C2. Use the various protection strategies of equipments, network and programs.
C3. Identify the role of Internet services provided to users.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Manage their own learning and development, and time management and organizational skills.
D2. Apply and raise awareness of professional ethics.
D3. Use different sources of information: books, Internet, ...
D4. Demonstrate the key trends in IS strategy and the impact they may have

3. Course Contents

Week	Topics
1	Introduction of information technology and human-computer relationship
2-3	Various issues of system security and viruses
4-6	Protection strategies
7-8	Computer laws and legislation
9-11	Service offered by internet
12-13	Mechanisms of administrative work
14	Software projects

4. Teaching and Learning Methods

4.1- Lectures

4.2- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	80 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	3 hrs	Weeks: 4,6,8,11	20%

6. List of references

- *Course notes: Prepared by the lecturer and handed to the students at the term.*

Essential Books:

- *June Jamrich Parsons, Dan Oia and Stephanie Low, New Perspectives: Computers, Technology, and Society, Second edition, 1999.*

Web sites:

- www.ece.eng.ua.edu
- www.ieeexplore.ieee.org

7. Facilities required for teaching and learning

- *Software lab*

	Course Coordinator	Head of Department
Name	Dr. Amr Elkholy	Prof. Dr. Amany sarhan
Name (Arabic)	د. عمرو الخولى	أ.د. أماني سرحان
Signature		
Date	3/9/2019	3/9/2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE22H3 / Society of Information Technology

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding					Intellectual Skills				Professional and Practical Skills			General and Transferable Skills			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4
Introduction of information technology and human-computer relationship	x					x	x			x			x		x	
Various issues of system security and viruses		x			x	x			x							x
Protection strategies			x			x					x				x	
Computer laws and legislation		x			x		x			x		x	x			x
Service offered by internet			x					x					x			
Mechanisms of administrative work	x			x							x			x		x

Course coordinator: Dr. Amr Elkholy **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course specification

Third Year

First Term

Course Specification

Course Title	**Database Systems**	
Course Code	**CCE3112**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Rada Basuony**	
Teaching Staff	**Dr. Rada Basuony**	
Level	**Third year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 4 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Provide the basic knowledge required by practicing engineers to deal with the database systems.
- Familiarize the student with the concepts, languages, and architectures of database systems.
- Introduce the student to database design and technology
- Train the student in writing programs in both data definition and data manipulation languages.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Describe the relational data model.
A2. Recognize the relation between relational algebra and relational calculus.
A3. Realize the usage of SQL (Structured Query Language).
A4. Mention the steps of database conceptual design.
A5. Outline the steps of database logical design.
A6. Mention the factors of database technology.
A7. Write down the need for database recovery and backup

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Analyze and collect data needed to build database system.
B2. Correlate between the basic operations of database and the constructs of SQL.
B3. Differentiate between the relational data models.
B4. Recover database after failure using the concepts of obtaining backups.
B5. Select the proper method to secure databases.
B6. Integrate database in software applications.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Construct E-R (Entity-Relationship) models for data in the conceptual phase of design.
C2. Construct relational data models in the logical phase of design.
C3. Implement database systems using SQL server software package.
C4. Repair database hardware and software.
C5. Design and document commercial database systems.
C6. Design Database as a creative thinking undertaking.
C7. Plan database security and authorization schema.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Work competently among team workers of different task assignments.
D2. Manage their learning and development, and time management and organizational skills.
D3. Appreciate of the need for continuing professional development in recognition for the need for lifelong learning.
D4. Be ambitious and willing to participate, with confidence and enthusiasm, in private projects and investments.

3. Course Contents

Week	Topics
1-2	Information and Data-Database and database management systems
3-5	Relational data models
6-7	Relational algebra- Relational Calculus
8-9	Structured Query Language(SQL)
10-11	Database conceptual design
12-14	Database logical design-Database technology

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

4.4- Group project

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	60 %
Oral Assessment	15 mins	15	10 %
Practical Examination	15 mins	15	10%
Semester work	5 hrs	Weeks: 5,8,10,12	20 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *Jeffrey A. Hoffer, Mary Prescott and Fred McFadden, ' Modern Database Management,' 11th Ed., Addison-Wesley, 2012.*
- *Rebecca M. Riordan, "Designing effective database systems," Addison-Wesley, NJ, 2005.*
- *Carlos Coronel and Steven Morris, Database Systems: Design, Implementation, & Management," 11th Ed., Cengage Learning, 2014.*

Web sites:

- http://www.lynda.com/Access-tutorials/Relational-Database-Fundamentals/145932-2.html
- https://class.stanford.edu/courses/Home/Databases/Engineering/about

7. Facilities required for teaching and learning

- *Computer lab*
- *Sql server package*

	Course Coordinator	Head of Department
Name	**Dr. Rada Basuony**	Prof. Dr. Amany sarhan
Name (Arabic)	**د. رضا بسيونى**	**أ. د. أماني سرحان**
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE3112 / Database Systems

Course Contents	Course outcomes ILOs																						
	Knowledge and Understanding							Intellectual Skills						Professional and Practical Skills							General and Transferable Skills			
	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4
Information and Data-Database and database management systems	X							X						X			X				X	X		
Relational data models		X							X			X				X		X					X	X
Relational algebra-Relational Calculus		X	X						X				X			X		X	X				X	
Structured Query Language(SQL)				X	X	X						X	X		X				X		X	X		
Database conceptual design			X		X		X			X	X					X				X	X			X
Database logical design-Database technology						X	X					X	X						X	X	X			X

Course coordinator: **Dr. Rada Basuony** Assoc.Head of Department: **Prof. Dr. Amany sarhan**

Course Specification

Course Title	**Languages and Compilers**	
Course Code	**CCE3113**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Tahany Allam**	
Teaching Staff	**Dr. Tahany Allam**	
Level	**Third year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 4 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Provide the student with basic concepts of the compiler, as a software translator from a program in a high-level language to an equivalent program in a machine language.
- Teach the student the details of the different phases of compiler design.
- Help and assist the student to understand an existing compiler.
- Encourage the student to design and implement a simple compiler.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Define Lexical analysis.
A2. Describe Syntax analysis.
A3. Mention the role of top-down and bottom-up parsing.
A4. Define Code generation.
A5. List the steps of optimization of compiler design.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. View the construction of a compiler as made up of two logical parts: the machine- independent front end and the machine-dependent back end.
B2. Differentiate between the tables that result from the lexical analysis phase and how they are implemented by sequential search, binary search tree, or hash table.
B3. Identify ambiguities in grammars for programming languages and applying procedures that resolve such ambiguities.
B4. Use mathematics involving sets and relations in working with top-down and bottom-up parsing algorithms.
B5. Take decisions based on a compromise between running time and memory space needed.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Work with compilers in programming with high-level languages.
C2. Perform lexical analysis, where words are identified in the source program.
C3. Use finite-state machines to specify programming language elements.
C4. Perform syntax analysis, where token streams are checked for proper syntax.
C5. Perform code generation, where syntax trees are converted to instructions.
C6. Apply optimization techniques to improve generated code with the purpose of minimizing running time and/or memory space needed.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Work competently among team workers of different task assignments.
D2. Manage their learning and development, and time management and organizational skills.
D3. Appreciate of the need for continuing professional development in recognition for the need for lifelong learning.
D4. Be ambitious and willing to participate, with confidence and enthusiasm, in private projects and investments.

3. Course Contents

Week	Topics
1-2	Imperative programming Languages
3-5	Functional programming language-logic programming languages
6-7	Object-oriented language- Compiler structures
8-9	Lexical analysis- Syntax analysis
10-11	Semantic analysis- Pattern matching and parsing
12-14	Code generation -Optimization

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	66.7 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	4 hrs	Weeks:3,5,6,8,10	33.3 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *A. A. Puntambekar, "Principles of compiler design," Technical Pub. Pune, New delhi, 2008.*
- *Keith Cooper and Linda Torczon, "Engineering a Compiler," 2nd Ed., Morgan Kaufmann, 2011.*
- *Dick Grune and Kees van Reeuwijk, "Modern Compiler Design," 2nd Ed., Springer, 2012.*

Web sites:

- https://www.coursera.org/course/compilers
- https://class.stanford.edu/courses/Engineering/Compilers/Fall2014/

7. Facilities required for teaching and learning

- *Computer lab*

	Course Coordinator	Head of Department
Name	**Dr. Tahany Allam**	Prof. Dr. Amany sarhan
Name (Arabic)	د.تهانى علام	أ. د. أمانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE3113 / Languages and Compilers

Course Contents	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills						General and Transferable Skills			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4
Imperative programming Languages	X					X					X	X					X	X		
Functional programming language- logic programming languages		X			X		X						X						X	
Object-oriented language- Compiler structures		X	X				X						X	X					X	
Lexical analysis- Syntax analysis				X				X	X			X				X	X	X		
Semantic analysis- Pattern matching and parsing			X		X			X		X				X	X					X
Code generation -Optimization			X		X	X		X		X	X			X	X			X	X	X

Course coordinator: Dr. Tahany Allam **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Operating Systems**	
Course Code	**CCE3114**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Rada Basuony**	
Teaching Staff	**Dr. Rada Basuony**	
Level	**Third year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x ٣ h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Assist the student to understand and apply the various concepts of operating systems and how these concepts are applied in real computer systems.
- Acquaint the student with protection and security policies of the different processes in an operating system.
- Assist the student to understand processor and disk scheduling.
- Introduce the student with the concept of concurrency control and mutual exclusions.
- Help the student to work with various types of operating system understanding the functions and implementation of each part.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Realize the functions and concepts of an operating system.
A2. Recognize the principles of process management, including inter process communication, scheduling, synchronization, deadlocks, and threads.
A3. Know the idea of storage management, including memories and file systems.
A4. Describe the role of Input/output management.
A5. Enumerate the protection mechanisms and security systems.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Evaluate the role of the operating system as an extended (or virtual) machine and as a resource manager.
B2. b2. Visualize the process concept and concurrency as the heart of an operating system.
B3. Deal with memory and input/output management systems.
B4. Analyze protection and security policies of operating systems.

B5. Estimate the source of error in the operating system functions.
B6. Specify input/output devices and interfaces.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Integrate operating system concepts to describe, evaluate, and test a real system.
C2. Read and modify operating system source code.
C3. Design paging systems.
C4. Develop file systems.
C5. Manage protection and security systems for access control and information protection.
C6. Work with famous operating systems such as Windows and Linux.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Lead individuals and motivating them for novel ideas.
D4. Be ambitious and willing to participate, with confidence and enthusiasm, in private projects and investments.

3. Course Contents

Week	Topics
1-2	Concepts and Functions of an operating system –Operating system structure
3-5	Process description and control- processor and disk scheduling
6-8	Concurrency control- Mutual exclusion and synchronization- Deadlocks and starvation – Memory management
9-11	Input/output management- File management
12-14	Distributed operating system

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	68%
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	3hr	Weeks: 4,6,8,12	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *William Stallings, "Operating systems: internals and design principles," 8th Ed., Pearson/Prentice Hall, NJ, 2014.*
- *H.M. Deitel, P.J. Deitel and D.R. Choffnes, "Operating systems," Pearson Prentice Hall, 2006.*
- *Abraham Silberschatz and Peter B. Galvin, "Operating System Concepts," 9th Ed., Wiley, 2012.*

Web sites:

- http://www.scs.stanford.edu/15wi-cs140/
- https://www.udacity.com/wiki/ud156
- http://www.cs.kent.edu/~farrell/osf03/oldnotes/

7. Facilities required for teaching and learning

- *Computer lab*
- *Different versions of operating systems*

	Course Coordinator	Head of Department
Name	**Dr. Rada Basuony**	Prof. Dr. Amany sarhan
Name (Arabic)	**د. رضا بسيونى**	**أ. د. أمانى سرحان**
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE3114/ Operating Systems

Course Contents	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills						Professional and Practical Skills						General and Transferable Skills			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4
Concepts and Functions of an operating system – Operating system structure	X					X						X						X	X		
Process description and control- processor and disk scheduling		X					X		X					X						X	
Concurrency control- Mutual exclusion and synchronization- Deadlocks and starvation – Memory management		X	X				X	X						X	X						X
Input/output management- File management			X	X					X	X			X				X	X	X		
Distributed operating system			X		X			X	X		X			X		X		X			

Course coordinator: Dr. Rada Basuony **Assoc.Head of Department: Prof. Dr. Amany sarhan**

Course Specification

Course Title	**Control Engineering**	
Course Code	**CCE3115**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mohamed Eita**	
Teaching Staff	**Dr. Mohamed Eita**	
Level	**Third year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Enable the student to know and work with control components, control system analysis, and system response evaluation.
- Provide the student an introduction to the field of control system design.
- Introduce the PID controller to the student.
- Help the student with the ways of designing the state space approaches of any given control system.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Define control components.
A2. Mention the meaning of control system stability.
A3. Describe Root loci
A4. Recognize Nyquist diagrams.
A5. Write the usage of Bode plots.
A6. Outline essentials of control system design.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Represent control system through differential equations, block diagrams, and signal flow graphs.
B2. Perform Control system analysis in terms of sensitivity, stability, and frequency response.
B3. Perform System stability analysis.
B4. Synthesize compensation networks for control systems.
B5. Synthesize feedback control systems via pole-placement techniques.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Work with root loci, Nyquist diagrams, and Bode plots in control system analysis and design.
C2. Apply control system compensation in the frequency domain.
C3. Work with MATLAB software package in studying control systems.
C4. Incorporate feedback elements in engineering systems.
C5. Reshape system response according to given requirements.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Make good relations with colleagues, bosses, and clients, and adapt to varying work environments.
D2. Be ambitious and willing to participate, with confidence and enthusiasm, in private projects and investments.
D3. Be ambitious and willing to participate, with confidence and enthusiasm, in private projects and investments.
D4. Lead individuals and motivating them for novel ideas.

3. Course Contents

Week	Topics
1-2	Systems control concept-Control components-Control measurement –Role of the computer as controller - Stability
3-4	Root Locus
5-7	Nyquist diagrams
8-10	Bode plots- Control electronics- PID controller
11-12	State variable approaches-Eigen structure assignment
13-14	Computer –aided analysis and design of control systems

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Reports

4.4- Case studies

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16 week	60%
Oral Assessment	15 mins	15 week	10 %
Practical Examination	15 mins	15 week	10%
Semester work	4 hrs	Weeks: 3,5,7,8,11,12	20 %

6. List of references

Essential Books:

- *G. F. Franklin, J. D. Powell, and A. Emami-Naeini, "Feedback Control of Dynamic System," 6th Ed., Pearson, Prentice-Hall, 2010.*
- *Onkar N. Pandey,"Process Control Engineering," S.K.Kataria & Sons, 2011.*
- *Norman S. Nise, "Control Systems Engineering," 7th Ed., Wiley, 2014.*

Web sites:

- www-inst.eecs.berkeley.edu/classes-eecs.html#cs
- http://www.learnerstv.com/Free-engineering-Video-lectures-ltv045-Page1.htm
- http://www.controleng.com/media-library/online-training-for-engineers.html

7. Facilities required for teaching and learning

- *Computer lab*
- *Control lab*
- *Simulation pacakge*

	Course Coordinator	Head of Department
Name	**Dr. Mohamed Eita**	Prof. Dr. Amany sarhan
Name (Arabic)	**د.محمد عيطه**	**أ. د. أمانى سرحان**
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE3115/ Control Engineering

Course Contents	Course outcomes ILOs																			
	Knowledge and Understanding						Intellectual Skills					Professional and Practical Skills					General and Transferable Skills			
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4
Systems control concept-Control components-Control measurement –Role of the computer as controller - Stability	X						X					X						X		
Root Locus		X						X				X			X		X		X	
Nyquist diagrams		X	X						X					X			X			X
Bode plots- Control electronics- PID controller				X							X		X			X		X		
State variable approaches-Eigen structure assignment					X		X		X	X				X			X			X
Computer –aided analysis and design of control systems					X	X		X				X			X		X		X	

Course coordinator: Dr. Mohamed Eita **Head of Department: Prof. Dr. Amany sarhan**

Course Specification

Course Title	**Digital Signal Processing**	
Course Code	**CCE3116**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mohamed Arafa**	
Teaching Staff	**Dr. Mohamed Arafa**	
Level	**Third year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x ٣ h lectures**
	Practical	**14 x ١ h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Provide an introductory treatment of digital signal processing algorithms and implementation.
- Enable the student to understand detailed discussion of sampling, architecture, addressing modes and instrumentation set of digital signal processors discrete Fourier transform, fast Fourier transform, and digital filtering.
- Help to the student to know the multi rate signal processing
- Help the student to understand and apply the linear prediction and optimum linear filters and power spectrum estimation.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Define Digital signal processing.
A2. Write the meaning of signals and systems, time and frequency domains.
A3. List Fast Fourier Transform algorithms.
A4. Outline sampling effects, aliasing, reconstruction, discrete Fourier Transform.
A5. Mention the usage of multirate digital signal processing.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Classify different types of signals.
B2. Select the appropriate filter type for the application.
B3. Differentiate between and choose from the various Fast Fourier Transform algorithms.
B4. Evaluate sampling and reconstruction of signals.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Implement digital filters such as FIR, IIR, subband, multirate, and adaptive filters using high-speed processors..
C2. Apply linear prediction and optimum linear filters.
C3. Make power spectrum estimation.
C4. Apply mathematical transforms such as FFT and DFT to signal processing problems.
C5. Apply systems concepts such as sampling, aliasing, and reconstruction to signal processing problems.
C6. Design digital filters to manipulate discrete parameter signals using signal processing algorithms and techniques.
C7. Apply frequency analysis of signals and systems.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Present projects, reports and data using different techniques (computer, manual... etc.).
D2. Be ambitious and willing to participate, with confidence and enthusiasm, in private projects and investments.
D3. Be ambitious and willing to participate, with confidence and enthusiasm, in private projects and investments.
D4. Lead individuals and motivating them for novel ideas.

3. Course Contents

Week	Topics
1	Introduction to digital signals and classification of signals
2-3	Discrete-time signals and systems
4-6	Discrete Fourier Transform and Fast Fourier Transform algorithms
7-9	Design of digital filters
10-12	Multirate digital signal processing and linear prediction
13-14	Power spectrum estimation

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	70%
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	4 hrs	Weeks: 3,5,6,8,10.11	30 %

6. List of references

Essential Books:

- *Richard G. Lyons, "Understanding Digital Signal Processing," 3rd Ed., Prentice Hall, 2010.*
- *John G. Proakis and Dimitris K Manolakis, "Digital Signal Processing," 4th Ed., Prentice Hall, 2006.*
- *Alan V. Oppenheim and Ronald W. Schafer, "Discrete-Time Signal Processing," 4th Ed., Prentice Hall, 2012.*
- *Vinay K. Ingle, "Digital Signal Processing Using MATLAB," 3rd Ed., Cengage Learning, 2011.*

Web sites:

- https://www.coursera.org/course/dsp
- http://ocw.mit.edu/resources/res-6-008-digital-signal-processing-spring-2011/

7. Facilities required for teaching and learning

- *Computerlab*
- *Matlab Simulation package*

	Course Coordinator	Head of Department
Name	Dr. Mohamed Arafa	Prof. Dr. Amany sarhan
Name (Arabic)	د. محمد عرفه	أ. د. أمانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE3116/ Digital Signal Processing

Course Contents	Course outcomes ILOs																				
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills							General and Transferable Skills			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4
Introduction to digital signals and classification of signals	X					X								X			X		X		
Discrete-time signals and systems		X					X				X		X			X		X		X	
Discrete Fourier Transform and Fast Fourier Transform algorithms			X				X	X					X			X		X			X
Design of digital filters				X					X	X		X			X				X		
Multirate digital signal processing and linear prediction			X		X			X	X				X				X	X			X
Power spectrum estimation	X				X		X			X	X			X				X		X	

Course coordinator: Dr. **Mohamed Arafa** **Assoc.Head of Department: Prof. Dr. Amany sarhan**

Course Specification

Course Title	**Fundamentals of Stochastic Processes**	
Course Code	**CCE3117**	
Academic Year	**2019-2020**	
Coordinator	**Prof. Dr. Said Salam**	
Teaching Staff	**Prof. Dr. Said Salam**	
Level	**Third year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x ٢ h lectures**
	Practical	**14 x ١ h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Assist the student to understand and work with the basics of probability and random variables.
- Help the student to learn the definitions of probability, sampling and combination analysis.
- Assist the student to apply the conditional probability.
- Introduce the student to the field of probabilistic processes.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Describe the basics of probability theory.
A2. Define the random variables.
A3. Explain the functions of random variables.
A4. Mention the meaning of stochastic processes.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Define and measure probability.
B2. Differentiate between classical and relative frequency definitions of probability.
B3. Perform sampling and combinatorial analysis.
B4. Correlate between the density function and conditional distributions.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Apply joint and marginal distribution functions.
C2. Use single and multiple-variable functions.
C3. Determine the expected values and moment.
C4. Apply the stochastic process into real-life.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Lead individuals and motivating them for novel ideas.
D4. Present projects, reports and data using different techniques (computer, manual... etc.).

3. Course Contents

Week	Topics
1-2	Introduction to probability theory
3-5	Random variables: definition and distribution functions, and density functions
6-8	Density functions and joint and marginal and conditional distributions
9-10	Single and multiple-variable functions, expected values and moment
11-12	Fundamental theorem of expectation
13-14	Introduction to stochastic process

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Quizes

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	70%
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	4 hrs	Weeks: 4,8,11	30 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *D. Wackerly, W. Mendenhall and R.L. Schraffer, "Mathematical Statistics with Applications", 8th Ed., Duxbury, 2012.*
- *W. Mendenhall, R.J. Beaver and B. Beaver, "Introduction to Probability and Statistics", 14th Ed., Duxbury Press: Belmont, CA, 2012.*
- *J.T. MacClave and T. Sincich, "Statistics," 12th Ed., Pearson, 2012.*

Web sites:

- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-262-discrete-stochastic-processes-spring-2011/
- http://stoch-appl.mit.edu/

7. Facilities required for teaching and learning

- *Datashow*

	Course Coordinator	Head of Department
Name	Prof. Dr. **Said Salam**	Prof. Dr. Amany sarhan
Name (Arabic)	**أ.د. سيد سلام**	**أ. د. أماني سرحان**
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE3117/ Fundamentals of Stochastic Processes

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
Introduction to probability theory	X				X				X				X	X		
Random variables: definition and distribution functions, and density functions		X				X					X				X	
Density functions and joint and marginal and conditional distributions		X	X			X					X					X
Single and multiple-variable functions, expected values and moment				X				X		X			X		X	
Fundamental theorem of expectation			X				X		X		X		X			X
Introduction to stochastic process				X				X				X			X	X

Course coordinator: Prof. Dr.Said Salam **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course specification

Third Year

Second Term

Course Specification

Course Title	**Software Engineering**	
Course Code	**CCE3218**	
Academic Year	**2019-2020**	
Coordinator	**Asso. Prof. Dr. Amany Sarhan**	
Teaching Staff	**Asso. Prof. Dr. Amany Sarhan**	
Level	**Third year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 4 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce the student to the field of software engineering.
- Assist the student to work in software development projects through step by step guidance through the course to achieve such goal.
- Provide the student with the various sources and models of software and how to choose between them according to the needs.
- Discuss with the student the software quality measures required to obtain a high quality product with emphasis on the software cost issue.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. List the models and sources of software development processes.
A2. Define Structured Analysis and Object Modeling techniques in the Software Development Process.
A3. Describe Software requirements.
A4. State the types of Software design.
A5. Define software testing, particularly module testing techniques, and maintenance.
A6. Mention the role of software quality management.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Differentiate between the various types of software development life cycles.
B2. Express correctly user requirements and software system requirements.
B3. Analyze the requirements of a system.
B4. Differentiate between the various design architectures of software system.
B5. Integrate the phases of software to obtain a complete development.

B6. Plan the testing for a software module using a number of testing techniques to discover program faults.
B7. Conclude on software quality with reference to standard specifications.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Collect the requirement for some applications.
C2. Design different types of software architectures, including system structure, control, and modular decomposition.
C3. Test Software to discover any faults in the system, using testing workbenches.
C4. Estimate the cost and effort required for software production.
C5. Manage software quality to ensure that software has a low (acceptable) number of defects and that it conforms to the required standards.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Lead individuals and motivating them for novel ideas.
D4. Present projects, reports and data using different techniques (computer, manual... etc.).

3. Course Contents

Week	Topics
1-2	Software development process Models
3-5	Structured and Object-oriented techniques
6-9	Software requirements
10-11	Software design
12-13	Software testing and maintenance
14	Software quality management

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

4.4- Team Projects

4.5- E-learning course

4.6- Quizes

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	60%
Oral Assessment	15 mins	15	10 %
Practical Examination	15 mins	15	10 %
Semester work	6 hrs	Weekly	20 %

6. List of references

- *Course notes: Amany Sarhan, "Software Engineering", 2014.*

Essential Books:

- *Lonnie D. Bently and Jeffery L. Whitten, "System analysis and design for the global enterprise," 8th Ed., McGraw-hill, 2011.*
- *Jeffrey A. Hoffer, Joey George and Joseph S. Valacich, "Modern system analysis and design," 7th Ed., 2013.*
- *I. Sommerville, 'Software Engineering', 9th Ed., Addison-Wesley, 2010.*
- *Grady Booch, Robert A. Maksimchu and Michael W. Engle, "Object-Oriented Analysis and Design with Applicatins," 4th Ed., Addison-Wesley Professional, 2010.*

Web sites:

- https://www.edx.org/job/software-engineer
- https://www.edx.org/course/engineering-software-service-uc-berkeleyx-cs169-1x#.VLTr_8mrxVw
- https://www.edx.org/course/engineering-software-service-uc-berkeleyx-cs169-1x#.VLTr_8mrxVw
- www-inst.eecs.berkeley.edu/classes-eecs.html#cs
- http://www.londonmet.ac.uk/pgprospectus/courses/software-engineering.cfm
- http://www.cse.unr.edu/~sushil/class/425/notes/
- http://www.abdn.ac.uk/~csc220/teaching/CS5037/lectures/

7. Facilities required for teaching and learning

- *Computer lab*

	Course Coordinator	Head of Department
Name	Asso. Prof. Dr. Amany Sarhan	Prof. Dr. Amany sarhan
Name (Arabic)	أ. د. أمانى سرحان	أ. د. أمانى سرحان
Signature		
Date	3/ 9 /2019	3/9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE3218/ Software Engineering

Course Contents	Course outcomes ILOs																				
	Knowledge and Understanding						Intellectual Skills							Professional and Practical Skills					General and Transferable Skills			
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	D1	D2	D3	D4
Software development process Models	X						X	X			X					X			X			
Structured and Object-oriented techniques		X	X						X						X						X	
Software requirements				X					X	X				X			X			X		X
Software design					X			X		X						X				X		
Software testing and maintenance					X				X			X		X				X				X
Software quality management						X					X		X					X	X		X	X

Course coordinator: Assoc. Prof Dr.Amany Sarhan **Head of Department:** Assoc. Prof Dr.Amany Sarhan

Course Specification

Course Title	**Artificial Intelligence and Expert Systems**	
Course Code	**CCE3219**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Reda Elbasuony**	
Teaching Staff	**Dr. Reda Elbasuony**	
Level	**Third year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 4 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Enable the student to work with knowledge-based systems and search techniques.
- Train the student in programming languages like PROLOG, used in the artificial intelligent discipline .
- Acquaint the student with expert system architectures.
- Acquaint the student with Natural language understanding and other field of AI.
- Train the student to use, analyze and apply some search techniques.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Recognize the AI concepts and programming languages.
A2. List the types of environments and problems.
A3. Enumerate different search techniques
A4. Mention different methods of knowledge representation.
A5. Define the knowledge organization and manipulation.
A6. Outline the principles of natural language processing.
A7. Outline the principles of computer vision.
A8. Describe Expert system architectures

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Differentiate between the various functions of AI systems.
B2. Choose the appropriate search technique according to the given problem.
B3. Criticize knowledge and how it dominates thinking and directions of research in the field of AI.
B4. Analyze and design AI programs written in PROLOG.
B5. Reason with incomplete and uncertain knowledge.
B6. Analyze expert system architectures.
B7. Choose the best representation for the knowledge on hand.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Apply the various types of search techniques.
C2. Construct knowledge-based systems and apply methods of knowledge representation, organization, manipulation, and acquisition.
C3. Write AI programs.
C4. Use matching techniques.
C5. Apply search strategies.
C6. Organize knowledge within computer memory
C7. Build expert system architectures, such as rule-based systems, frame-based systems, and decision-tree systems .

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities .
D2. Work competently among team workers of different task assignments.
D3. Appreciate of the need for continuing professional development in recognition for the need for lifelong learning.
D4. Present projects, reports and data using different techniques (computer, manual... etc.).

3. Course Contents

Week	Topics
1	Introduction to AI
2	AI programming languages
3-4	Search techniques
5	Knowledge representation
6-7	Knowledge organization and manipulation
8-9	Principles of natural language processing
10-12	Expert system architectures- method of inference- uncertainty
13-14	Natural language processing

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

4.4- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	60%
Oral Assessment	15 mins	15	10 %
Practical Examination	15 mins	15	10%
Semester work	4 hrs	Weeks: 3,5,7,8,9,10	20 %

6. List of references

- *Course notes: Prepared by the lecturer and handed to the students at the lectures.*

Essential Books:

- *D .W .Patterson, 'Introduction to Artificial Intelligence and Expert Systems', Phi Learning, 2009.*
- *R .Stuart and P.Norving, 'Artificial Intelligence :A Modern Approach', 2nd Ed., Prentice-Hall, 2002.*
- *Kevin Warwick, "Artificial Intelligence: The Basics," 1st Ed., Routledge, 2011.*
- *Keith Frankish and William M. Ramsey, "The Cambridge Handbook of Artificial Intelligence," Cambridge University Press, 2014.*

Web sites:

- *htts://www.udacity.com/course/cs271*
- *https://www.edx.org/course/artificial-intelligence-uc-berkeleyx-cs188-1x-0#.VLTsaMmrxVw*
- *https://www.coursera.org/course/aiplan*
- *http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/*

7. Facilities required for teaching and learning

- *Software lab*
- *New Books*

	Course Coordinator	Head of Department
Name	Dr.Reda Elbasuony	Prof. Dr. Amany sarhan
Name (Arabic)	د. رضا البسيونى	أ. د.أمانى سرحان
Signature		
Date	3/ 9 /2019	3/9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE3219/ Artificial Intelligence and Expert Systems

Course Contents	Course outcomes ILOs																							
	Knowledge and Understanding								Intellectual Skills						Professional and Practical Skills							General and Transferable Skills			
	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4
Introduction to AI	X								X						X					X		X			X
AI programming languages	X	X							X			X					X	X						X	
Search techniques			X				X			X	X				X				X					X	X
Knowledge representation				X									X			X				X			X		X
Knowledge organization and manipulation					X															X			X		
Principles of natural language processing						X						X						X							X
Principles of computer vision							X					X		X							X			X	X
Expert system architectures- method of inference- uncertainty			X					X				X		X							X		X	X	X
Natural language processing		X						X					X								X		X		

Course coordinator: Dr. Reda Elbasuony **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Decision Support Systems**	
Course Code	**CCE32H4**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mahmoud Elshewemy**	
Teaching Staff	**Dr. Mahmoud Elshewemy**	
Level	**Third year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x ٢ h lectures**
	Practical	**14 x - h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Clarify the fundamental terms, concepts and theories associated with decision support systems, computerized decision aids, expert systems.
- Familiarize the student with quantitative-decision making.
- Assist the student to understand the information management techniques.
- Help the student to understand and apply the resource analysis techniques.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Define decision making.
A2. Mention the steps of decision analysis.
A3. Recall computer-aided project management.
A4. Enumerate the principles of information management.
A5. Describe Expert system architectures

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Discuss and develop skills in the analysis, design and implementation of computerized Decision Support Systems.
B2. Analyze decisions and resources .
B3. Evaluate the techniques for information management.
B4. Link between the decision making system and information systems.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Diagnose the organizational and social implications of Decision Support Systems.
C2. Implement of information systems
C3. Examine examples and case studies documenting computer support for organizational decision making, and various planning, analysis and control tasks

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Share ideas and communicate with others
D3. Present projects, reports and data using different techniques (computer, manual... etc.).
D4. Lead individuals and motivating them for novel ideas.

3. Course Contents

Week	Topics
1	Quantitative decision making
2	Principles of replacement, maintenance and simulation
3	Expert programs
4	Principles of decision analysis
5-6	Computer-aided project management
7-8	Principles of tabulation and resource analysis
9-10	Information management techniques
11-12	Decision support systems
13-14	Implementation of information systems

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	80%
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	4 hrs	Weeks: 4,6,8,9	20 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *G . Marakas, 'Decision Support Systems', Prentice-Hall, 2011.*
- *E .Turban and J .Aronson, 'Decision Support Systems and Intelligent Systems', Prentice-Hall, 2012.*
- *R .Clemen, 'Making Hard Decisions Second Edition', Duxbury, 2010.*
- *James Taylor, "Decision Management Systems: A Practical Guide to Using Business Rules and Predictive Analytics," (IBM Press), 2011.*
- *Vicki L. Sauter, "Decision Support Systems for Business Intelligence," 2nd Ed., Wiley, 2011.*

Web sites:

- ceit.aut.ac.ir/~shiry/lecture/DSS/Introduction.ppt
- *faculty.ksu.edu.sa/.../is465LectureNotes/07IntelligentDS..*

7. Facilities required for teaching and learning

- *Data show*

	Course Coordinator	**Head of Department**
Name	Dr. Mahmoud Elshewemy	Prof. Dr. Amany sarhan
Name (Arabic)	**د. محمود الشويمى**	**أ. د. أماني سرحان**
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE32H4/ Decision Support Systems

Course Contents	Course outcomes ILOs														
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills			General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4
Quantitative decision making	X								X			X			X
Principles of replacement, maintenance and simulation		X			X					X			X		
Expert programs	X								X						X
Principles of decision analysis	X	X			X	X					X			X	X
Computer-aided project management			X								X		X		
Principles of tabulation and resource analysis						X				X			X		X
Information management techniques				X	X		X			X				X	
Decision support systems			X					X	X	X		X		X	X
Implementation of information systems				X	X			X		X	X			X	X

Course coordinator: Dr. Mahmoud Elshewemy **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Modeling and Simulation**	
Course Code	**CCE3221**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mohamed Abd Allah**	
Teaching Staff	**Dr. Mohamed Abd Allah**	
Level	**Third year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x ٣ h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Familiarize the student with modeling and simulation basics.
- Assist the student to work in simulation languages, used in modeling and simulation of computer components.
- Enhance the student ability to work with object-oriented simulation.
- Help the student to know and apply the discrete simulation and continuous simulation.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Mention the need for modeling and simulation.
A2. List simulation languages.
A3. Recall general-purpose simulation packages .
A4. Define validity and credibility Techniques.
A5. Enumerate principles of object-oriented simulation.
A6. Mention principles of Statistical analysis.
A7. List optimization techniques.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Conclude on the objective of modeling and simulation.
B2. Formulate modeling and simulation programs.
B3. Analyze the techniques for increasing model validity and credibility.
B4. Evaluate different methods of optimization.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Construct a system model.
C2. Write modeling and simulation programs.

C3. Apply simulation methods.
C4. Match and analyze simulation results.
C5. Apply statistical analysis.
C6. Use optimization techniques.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Share ideas and communicate with others.
D2. Present projects, reports and data using different techniques (computer, manual... etc.).
D3. Lead individuals and motivating them for novel ideas
D4. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities

3. Course Contents

Week	Topics
1	Introduction to modeling and simulation basics
2	Model Types
3-4	Modeling and simulation of computer components
5-6	Principles of simulation languages
6-7	Principles of object oriented simulation
8-9	Principles of validity and credibility techniques
10	Random-variable generators
11-12	Statistical analysis
13-14	Optimization methods

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Case studies

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	68%
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	5 hrs	Weeks:3,4,6,8,10,11	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *Harvey Gould, Jan Tobochnik and Wolfgang Christian, "An introduction to computer simulation methods: applications to physical systems," Pearson Addison Wesley, San Francisco, 2012.*
- *Jerry Banks, John S. Carson, Barry L. Nelson and David M. Nicol, "Discrete-Event System Simulation," 6th Ed., Prentice Hall, 2013.*
- *B .P .Zeigler, H .Praehofer, and T .G .Kim, 'Theory of Modeling and Simulation :Integrating Discrete Event and Continuous Complex Dynamic Systems', Academic Press, 4th Ed., 2010 .*

Web sites:

- www-inst.eecs.berkeley.edu/classes-eecs.html#cs

7. Facilities required for teaching and learning

- *Software simulation lab*

	Course Coordinator	Head of Department
Name	Dr. Mohamed Abd Allah	Prof. Dr. Amany sarhan
Name (Arabic)	د. محمد عبدالله	أ. د. أماني سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE3221/ Modeling and Simulation

Course Contents	Course outcomes ILOs																				
	Knowledge and Understanding							Intellectual Skills				Professional and Practical Skills						General and Transferable Skills			
	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4
Introduction to modeling and simulation basics	X							X						X		X				X	X
Model Types	X											X						X			
Modeling and simulation of computer components	X		X						X			X		X					X	X	
Principles of simulation languages		X							X			X	X						X		
Principles of object oriented simulation					X				X			X									X
Principles of validity and credibility techniques				X						X					X			X	X		
Random-variable generators						X		X			X			X		X					X
Statistical analysis						X							X			X			X		
Optimization methods							X				X				X		X		X	X	X

Course coordinator: Dr. Mohamed Abd Allah **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Programmable Logic Controllers**	
Course Code	**CCE3223**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mohamed Abd Allah**	
Teaching Staff	**Dr. Mohamed Abd Allah**	
Level	**Third year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x ٣ h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Provide the student with the basics of programmable logic controller (PLC) and its applications in industry.
- Help the student to write PLC software using ladder diagram.
- Help the student how to use both Timers and Counters.
- Assist the student to understand and work with the data manipulated and communicated in the PLC.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Describe PLC hardware.
A2. List the components of PLC programming.
A3. Define Timers and counters
A4. Mention the idea of Process control and data acquisition.
A5. Enumerate the methods of Data manipulation and communication.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Analyze the role of PLCs in industrial control systems.
B2. Correlate between the PLC types and the PLC-based industrial control systems.
B3. Evaluate PLC systems.
B4. Evaluate and choose PLC for different applications.
B5. Plan feasibility studies to determine the technical specifications of PLC-based systems.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Design and construct of PLC-based industrial control systems.
C2. Build PLC networks.

C3. Work with industrial timers and counters.
C4. Maintain and troubleshooting of PLC systems.
C5. Master PLC software.
C6. Write application-oriented PLC programs using ladder diagrams.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW.
D2. Manage their own learning and development, and time management and organizational skills.
D3. Share ideas and communicate with others.
D4. Lead individuals and motivating them for novel ideas

3. Course Contents

Week	Topics
1-3	PLC hardware
4-8	PLC programming
9-10	Timers and counters
11-12	Process control and data acquisition
13-14	Data manipulation and communication

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	68%
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	5 hrs	Weeks:3,4,7,8,9,11	32 %

6. List of references

- *Course notes: Prepared by the lecturer and handed to the students at the lectures.*

Essential Books:

- *E. Mandado, J. Marcos, and S.A. Perez, 'Programmable Logic Devices and Logic Controllers', Prentice-Hall, 2012.*
- *G. Michel, 'Programmable Logic Controllers: Architecture and Application', John Wiley, 2013.*
- *Frank Petruzella, "Programmable Logic Controllers," 4th Ed., McGraw-Hill Science/Engineering/Math; 2010.*

- *William Bolton, "Programmable Logic Controllers," 5th Ed., Newnes; 2009.*

Web sites:

- www-inst.eecs.berkeley.edu/classes-eecs.html#cs
- http://plcprofessor.com/departments/plc-lecture-01a-introduction-programmable-logic-controllers-pt1

7. Facilities required for teaching and learning

- *PLC lab*

	Course Coordinator	Head of Department
Name	Dr. Mohamed Abd Allah	Prof. Dr. Amany sarhan
Name (Arabic)	د. محمد عبدالله	أ. د. أماني سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE3223/ Programmable Logic Controllers [Elective Specialized Course (1)]

Course Contents	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills						General and Transferable Skills			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4
PLC hardware	X					X	X			X	X			X			X			
PLC programming		X					X			X			X	X	X	X	X	X		
Timers and counters		X	X				X			X			X		X	X				X
Process control and data acquisition				X		X	X	X	X	X	X	X						X	X	X
Data manipulation and communication			X		X	X		X	X	X	X	X	X	X				X	X	X

Course coordinator: Dr. Mohamed Abd Allah **Assoc.Head of Department: Prof. Dr. Amany sarhan**

Course Specification

Course Title	**Digital Control**	
Course Code	**CCE3220**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mohamed Arafa**	
Teaching Staff	**Dr. Mohamed Arafa**	
Level	**Third year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 4 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Enable the student to understand the concepts and theorems of digital control of dynamic systems
- Provide the student with the methods of using the digital computers in controlling real-time systems.
- Help the student to determine the stability, controllability, and observability of any given system.
- Introduce the student to the optimal control methods.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Define sampled-data processes and z-transformation.
A2. Write the idea of digital system analysis using frequency response methods.
A3. Mention state-space analysis of digital systems.
A4. List the steps of digital controller design.
A5. Enumerate some of the digital filters and microprocessor applications.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Correlate between sampling and sampling rate selection.
B2. Criticize the central role digital computers in control systems.
B3. Analyze computer-controlled systems.
B4. Choose the proper state-space approach for digital system description, analysis, and synthesis.
B5. Evaluate digital control systems.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Work with z-transformation methods.
C2. Incorporate digital computers as control components in real-time systems.
C3. Work with root loci, Nyquist diagram, and Bode plots in dealing with digital control systems.
C4. Stabilize and satisfy design requirements of digital systems.
C5. Work with MATLAB software package in studying digital systems.
C6. Work with digital filters and microprocessor applications.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Appreciate of the need for continuing professional development in recognition for the need for lifelong learning.
D2. Make good relations with colleagues, bosses, and clients, and adapt to varying work environments.
D3. Be ambitious and willing to participate, with confidence and enthusiasm, in private projects and investments.
D4. Lead individuals and motivating them for novel ideas.

3. Course Contents

Week	Topics
1-3	Sampled-data processes and z-transformation
4-8	Digital system analysis using frequency response methods
9-10	State-space analysis of digital systems
11-12	Introduction to digital control system design
13-14	Digital filters and microprocessor applications

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	16	60%
Oral Assessment	15 mins	15	10%
Practical Examination	15 mins	15	10%
Semester work	4 hrs	Weeks:3,5,7,8,11,12	20 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *G. F. Franklin, J. D. Powell, and M. Workman, "Digital Control of Dynamic Systems," 4th Ed. , Addison-Wesley, 2012.*
- *J. R. Leigh, "Applied Digital Control: Theory, Design and Implementation," 2nd Ed., Dover Publications, 2006.*
- *Kannan Moudgalya, "Digital Control," 2nd Ed., Wiley-Interscience, 2009.*
- *Gene F. Franklin, Abbas Emami-Naeini and J. Da Powell, "Feedback Control of Dynamic Systems," 7th Ed., Prentice Hall, 2014.*

Web sites:

- www-inst.eecs.berkeley.edu/classes-eecs.html#cs
- *homes.et.aau.dk/yang/DE5/DC*
- http://course.ee.ust.hk/elec377/notes.htm

7. Facilities required for teaching and learning

- *Computer lab*
- *Simultion package*

	Course Coordinator	Head of Department
Name	Dr. Mohamed Arafa	Prof. Dr. Amany sarhan
Name (Arabic)	د. محمد عرفه	أ. د. أماني سرحان
Signature		
Date	3/ 9 /2019	3/9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE3220/ Digital Control

Course Contents	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills						General and Transferable Skills			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4
Sampled-data processes and z-transformation	X					X					X				X		X	X		
Digital system analysis using frequency response methods		X				X	X						X						X	X
State-space analysis of digital systems			X				X	X	X				X		X					X
Introduction to digital control system design				X					X	X		X		X			X			X
Digital filters and microprocessor applications					X		X	X		X					X	X	X	X	X	

Course coordinator: Dr. Mohamed Arafa

Assoc.Head of Department: Prof. Dr. Amany sarhan

Course specification

Fourth Year

First Term

Course Specification

Course Title	**Computer Networks**	
Course Code	**CCE4126**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Nada el shenawy**	
Teaching Staff	**Dr. Nada el shenawy**	
Branch / Level	**Fourth year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 4 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Provide the student with the knowledge of the different architectural models of computer networks.
- Introduce the student to the computer network protocols.
- Assist the student to solve problems and build projects in computer networks.
- Encourage the student to be familiar with the new trends in computer networks fields.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Mention the basic Network technologies and topologies
A2. List the types of Layered architecture and protocol models.
A3. List different types of transmission media characteristics and Error detection and correction
A4. Define the concept of automatic repeat request and flow control and Medium access control.
A5. Identify the structure of Local Area Network and bridges, and the techniques of Routing and Switching
A6. Outline the methodologies of network programming.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Differentiate between the architectures and functions of each layer of a computer network.
B2. Analyze network algorithms and protocols.
B3. Comment on the various data transmission systems.
B4. Integrate various types of computer networks and overcome mismatch of their protocols.
B5. Choose the appropriate network devices for certain application.
B6. Identify the security threats on networks.
B7. Identify and repair network defects.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Build practical networks, such as LANs (local area networks) and WANs (wide area networks).
C2. Supervise on network erection projects.
C3. Perform feasibility studies and determining technical specifications of computer networks.
C4. Develop and administrate of network systems.
C5. Simulate computer networks using package software.
C6. Design and implement a number of case studies.
C7. Manage and upgrade computer networks.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Share ideas and communicate with others
D4. Apply and raise awareness of professional ethics.
D5. Be ambitious and willing to participate, with confidence and enthusiasm, in private projects and investments

3. Course Contents

Week	Topics
1	Introduction to networking methodologies, Network technologies and topologies
2-3	Layered architecture and protocol models
4	Transmission media characteristics
5	Error detection and correction
6-7	Automatic repeat request and flow control and Medium access control
8	Local Area Network and bridges, Routing and Switching
9	Address and internetworking
10	Methodologies of network programming
11	Development and implementation of network applications, Client/Server model, Concurrency Programming
12	Interprocess communication, Remote Procedure calls
13	Distributed file system and distributed Computing, Mobile software agent
14	Case studies

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

4.4- Case studies

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	60 %
Oral Assessment	15 mins	Week: 15	10 %
Practical Examination	15 mins	Week: 15	10 %
Semester work	5 hrs	Weeks: 3,6,9,12	20 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *A. S. Tanenbaum and David J. Wetherall, 'Computer Networks', 5th Ed., Prentice-Hall, 2010.*
- *Kaveh Pahlavan and Prashant Krishnamurthy, "Networking Fundamentals: Wide, Local and Personal Area Communications," Wiley, 2009*
- *James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach," 6th Ed., Pearson 2012.*
- *William Stallings, "Data and Computer Communications," 9th Ed., Prentice Hall, 2010.*

Web sites:

- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-033-computer-system-engineering-spring-2009/video-lectures/lecture-9/
- http://www.cse.iitk.ac.in/users/dheeraj/cs425/
- http://www.cse.wustl.edu/~jain/videos.htm

7. Facilities required for teaching and learning

- *Computer network lab*
- *Network Simulation software*

	Course Coordinator	Head of Department
Name	Dr. Nada el shenawy	Prof. Dr. Amany sarhan
Name (Arabic)	د.ندا الشناوى	أ. د. أماني سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4126 / Computer Networks

Course Contents	Course outcomes ILOs																							
	Knowledge and Understanding						Intellectual Skills							Professional and Practical Skills							General and Transferable Skills				
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4	D5
Introduction to networking methodologies, Network technologies and topologies	X						X							X							X				
Layered architecture and protocol models		X					X	X						X	X						X				
Transmission media characteristics			X						X	X				X	X	X					X				
Error detection and correction			X										X		X							X			
Automatic repeat request and flow control and Medium access control				X						X			X					X				X			
Local Area Network and bridges, Routing and Switching					X						X			X		X				X			X		
Address and internetworking					X						X			X				X					X	X	
Methodologies of network programming						X						X					X	X	X					X	
Development and implementation of network applications, Client/Server model, Concurrency Programming						X				X		X					X	X		X				X	X
Interprocess communication, Remote Procedure calls						X						X			X			X							X
Distributed file system and distributed Computing, Mobile software agent						X				X		X						X					X	X	X
Case studies				X	X	X		X		X	X	X	X				X	X	X	X	X	X	X	X	X

Course coordinator: Dr. Nada El Shenawy **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Microcontroller Systems**	
Course Code	**CCE4127**	
Academic Year	**2019-2020**	
Coordinator	**Prof. Dr. Mohamed Talaat Faheem**	
Teaching Staff	**Prof. Dr. Mohamed Talaat Faheem**	
Branch / Level	**Fourth year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 1 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Enable the student to understand the design and development of microcontroller, DSP and microprocessor based systems.
- Help the student to work with the hardware configuration for peripheral modules.
- Introduce the student to layered software design and system development environment set up.
- Assist the student to solve problems and build projects using microcontrollers.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Describe the basic concepts of microcontroller, microprocessor and microcomputers.
A2. List microcontroller-based product and Microcontroller families
A3. Define the main components of microcontroller
A4. Describe the method of design and writing program modules for microcontroller.
A5. List and identify the types of Microcontroller analog-to-digital (A/D) converters and interfacing analog signals to microcontroller (A/D) converters.
A6. Mention the software control of input/output port lines and output interfacing devices.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Differentiate between the C language programs that set, clear, and examine bits from I/O devices and memory.
B2. Analyze C language programs that set, clear, and examine bits from I/O devices and memory.
B3. Select the proper microcontroller, microprocessor, and DSP for specified industrial applications based on feasibility study.

B4. Develop the various peripheral modules of a microcontroller.
B5. Distinguish sources of error in microcontroller systems.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Write a program using multiple software modules.
C2. Read a peripheral device such as an A/D converter using C language.
C3. Design and write efficient C program for microcontroller based systems.
C4. Design and implement the hardware and software of a microcontroller based system.
C5. Use and program different types of microcontrollers.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Work effectively on a team to achieve a certain task.
D2. Organize the tasks with each other to accomplish a specific deadline.
D6. Share ideas and communicate with others.

3. Course Contents

Week	Topics
1	Microcontroller vs. microprocessor and microcomputers
2-3	Overview of all microcontroller-based product and Microcontroller families
4-5	Main Components, Memory map
6	Programming model and Program design, Instruction Set
7-8	Design and writing program modules, Commands of Monitor Program, Utility Subroutines, Interrupt Vectors
9-10	Microcontroller programming in high-level language(C,C++)
11	Microcontroller analog-to-digital (A/D) converters
12	Interfacing analog signals to microcontroller (A/D) converters
13	Software control of input/output port lines
14	Output interfacing devices

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

4.4- Case studies

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	60 %
Oral Assessment	15 mins	Week: 15	10 %

Practical Examination	15 mins	Week: 15	10 %
Semester work	4 hrs	Weeks: 2,5,8,12	20 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *Chuck Hellebuyck, "Programming PICs in BASIC: 8-Pin Projects," - Volume 1CreateSpace, 2009.*
- *G. H. Miller and James S. McDonald, "Microcomputer Engineering,"4th Ed., Prentice Hall, 2014.*
- *Jonathan W. Valvano, "Introduction to Embedded Microcomputer Systems: Motorola 6811 and 6812 Simulation," Thomson, 2009.*

Web sites:

- http://nptel.iitk.ac.in/courses/Webcourse-contents/IIT-KANPUR/microcontrollers/micro/ui/TOC.htm
- *www.iuma.ulpgc.es/.../PowerPC-C-Iowa-CprE-211notes..*
- http://www.cs.uwec.edu/~ernstdj/courses/ce478/lectures.html

7. Facilities required for teaching and learning

- *Microcontroller lab*

	Course Coordinator	**Head of Department**
Name	Prof. Dr. Mohamed Talaat Faheem	Prof. Dr. Amany sarhan
Name (Arabic)	أ. د. محمد طلعت فهيم	أ. د. أماني سرحان
Signature		
Date	3/9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4127 / Microcontroller Systems

Course Contents	Course outcomes ILOs																		
	Knowledge and Understanding						Intellectual Skills					Professional and Practical Skills					General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3
Microcontroller vs. microprocessor and microcomputers	X						X						X					X	
Overview of all microcontroller-based product and Microcontroller families		X					X		X					X			X		X
Main Components, Memory map			X				X				X			X				X	
Programming model and Program design, Instruction Set				X				X							X		X		
Design and writing program modules, Commands of Monitor Program, Utility Subroutines, Interrupt Vectors					X	X		X			X	X		X	X	X			X
Microcontroller programming in high-level language(C,C++)						X		X						X			X	X	
Microcontroller analog-to-digital (A/D) converters					X				X						X				
Interfacing analog signals to microcontroller (A/D) converters					X				X	X	X		X			X	X	X	
Software control of input/output port lines						X		X		X	X	X	X	X		X	X	X	
Output interfacing devices					X					X			X		X				X

Course coordinator: Prof. Dr. Mohammed Talat Fahem **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Fuzzy Control**	
Course Code	**CCE4128**	
Academic Year	**2019-2020**	
Coordinator	**Dr.Mohamed Arafa**	
Teaching Staff	**Dr.Mohamed Arafa**	
Branch / Level	**Fourth year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Help the student to understand the fundamental knowledge of fuzzy sets, fuzzy logic, fuzzy decision making and fuzzy control systems.
- Equip graduate students with some state-of-the-art fuzzy-logic technology and fuzzy system design methodologies.
- Prepare the student for the rapidly evolving high-tech information-based financial market and modern industry.
- Assist the student to solve problems and build projects using fuzzy controllers.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Tell the basic principles of organizing a fuzzy logic system
A2. Outline the basic knowledge of fuzzy sets and fuzzy logic
A3. Define the basic notion of fuzzy rule base
A4. Enumerate the methods of building and simulating fuzzy control system.
A5. Describe the steps of design of fuzzy systems from input.
A6. Write down the relation between Fuzzy controllers, Fuzzy control of linear and nonlinear systems.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Synthesize the organization of a fuzzy logic system.
B2. Compare between fuzzy sets and fuzzy logic and their types.
B3. Criticize Fuzzy control of linear and nonlinear systems.
B4. Select the proper method of building a fuzzy control system.
B5. Locate criticize sources of errors in fuzzy control systems.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Apply basic knowledge of fuzzy information representation and processing.
C2. Code basic fuzzy inference and approximate reasoning.
C3. Apply basic fuzzy system modelling methods.
C4. Work with basic fuzzy PID control systems.
C5. Use Matlab software package for some fuzzy control systems.
C6. Use and construct a fuzzy controller for real-time systems.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Retrieve certain subject from the Internet and organize them as an acceptable structured document.
D2. Share ideas between them to achieve higher results.
D3. Apply and raise awareness of professional ethics.

3. Course Contents

Week	Topics
1	Definition of fuzzy system
2-3	Fuzzy sets
4	Linguistic variables
5-6	Fuzzy Logic
7	Approximation properties of fuzzy systems
8-9	Design of fuzzy systems from input
10	Output data
11-12	Fuzzy controllers
13	Fuzzy control of linear systems
14	Fuzzy control of nonlinear systems

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	60 %
Oral Assessment	30 mins	Week: 15	20 %
Practical Examination	--	--	--
Semester work	5 hrs	Weeks: 3,6,9,12	20 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *G. Chen and T. T. Pham, "Introduction to Fuzzy Sets, Fuzzy Logic, and Fuzzy Control Systems," CRC Press, 2009.*
- *Timothy J. Ross, "Fuzzy Logic with Engineering Applications," 3rd Ed., Wiley, 2010.*
- *Barnabas Bede, "Mathematics of Fuzzy Sets and Fuzzy Logic (Studies in Fuzziness and Soft Computing),", Springer; 2013 edition*
- *S.N. Sivanandam and S. Sumathi, "Introduction to Fuzzy Logic using MATLAB,", Springer, 2010.*

Web sites:

- https://www.cs.tcd.ie/Khurshid.Ahmad/Teaching/Lectures_on_Fuzzy_Logic/FuzzyLogicSystems.html
- http://education.ieee-cis.org/lectures/Popular-Video-Lectures.1/Fuzzy-Logic
- *ele.aut.ac.ir/~*abdollahi*/Lec_16_11_G.pdf*

7. Facilities required for teaching and learning

- *Software lab and package.*
- *Control lab*

	Course Coordinator	Head of Department
Name	Dr.Mohamed Arafa	Prof. Dr. Amany sarhan
Name (Arabic)	د.محمد عرفه	أ. د. أماني سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4128 / Fuzzy Control

Course Contents	Course outcomes ILOs																			
	Knowledge and Understanding						Intellectual Skills					Professional and Practical Skills						General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3
Definition of fuzzy system	X								X							X		X		
Fuzzy sets		X						X								X		X	X	
Linguistic variables			X				X	X								X			X	
Fuzzy Logic			X				X	X								X			X	
Approximation properties of fuzzy systems				X						X		X	X					X	X	X
Design of fuzzy systems from input				X	X					X		X	X			X				X
Output data						X					X			X				X	X	X
Fuzzy controllers						X				X	X			X	X	X	X	X		
Fuzzy control of linear systems						X			X	X	X						X	X		
Fuzzy control of nonlinear systems			X			X			X	X	X						X	X	X	

Course coordinator: Dr. Mohammed Arafa **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Neural Networks**	
Course Code	**CCE4129**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mahmoud Fahmy**	
Teaching Staff	**Dr. Mahmoud Fahmy – Dr.Amr El-Kholy**	
Branch / Level	**Fourth year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Teach the student the basic concepts and mathematical theorems of neural networks.
- Familiarize the student with the different applications of neural networks, especially in control engineering and pattern recognition.
- Assist the student to solve problems and build projects using neural networks technology.
- Encourage the student to understand the new trends and applications of neural networks and natural computing fields.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Mention the relation between Biological neural networks vs. artificial neural networks.
A2. Identify Backpropagation, Feedforward and feedback architectures.
A3. Enumerate and describe the learning techniques.
A4. Describe the single and multi -layer networks
A5. Define the statistical and self organizing neural networks.
A6. List the applications of neural network in control engineering and pattern recognition.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Correlate between neural network as a mathematical model and man's understanding of biological nervous systems.
B2. Grasp the ideas of designing and training a neural network to perform a specific task.
B3. Analyze of learning algorithms: supervised and unsupervised.
B4. Correlate probabilistic neural networks and their stochastic rules.
B5. Determine the applications for which neural networks are suitable.
B6. Choose the appropriate network architecture in the sense of the number of layers and the number of hidden neurons per layer.

B7. Differentiate between the learning algorithms.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Apply neural network for case studies.
C2. Design and test a neural network for a particular application.
C3. Use system modeling and simulation.
C4. Optimize the system's behavior by applying gradient-descent search techniques to train the neurons.
C5. Simulate neural networks by a software package such as MATLAB.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Perform self study of parts of the course.
D2. Use the internet as a source of continuing learning.
D3. Apply and raise awareness of professional ethics.

3. Course Contents

Week	Topics
1	What is a neural network
2-3	Models and architectures
4-6	Learning techniques
7-8	Single and multi -layer networks
9-10	Associative memory and feedback networks
11-12	Statistical networks
13	Self-organizing networks
14	Applications

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	6 hrs	Weeks: 3,6,9,14	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *Jeff Heaton, "Introduction to the Math of Neural Networks," Heaton Research, Inc., 2012.*
- *Martin T Hagan, Howard B Demuth, Mark H Beale and Orlando De Jesús, "Neural Network Design," 2nd Ed., Martin Hagan, 2014.*
- *Simon Haykin, "Neural networks and learning machines," Pearson, N.J., 2009.*

Web sites:

- https://www.coursera.org/course/**neural**nets
- *www.cs.stir.ac.uk/courses/ITNP4B/lectures*
- *ecee.colorado.edu/~ecen4831/demuth.html*

7. Facilities required for teaching and learning

- *Computer lab and simulation package*

	Course Coordinator	**Head of Department**
Name	Dr. Mahmoud Fahmy	Prof. Dr. Amany sarhan
Name (Arabic)	د. محمود فهمى	أ. د. أماني سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4129 / Neural Networks

Course Contents	Course outcomes ILOs																				
	Knowledge and Understanding						Intellectual Skills							Professional and Practical Skills					General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	D1	D2	D3
What is a neural network	X						X												X		
Models and architectures		X						X				X	X	X		X			X		
Learning techniques			X						X		X	X	X				X	X	X	X	X
Single and multi -layer networks				X						X				X	X			X		X	
Associative memory and feedback networks				X						X				X	X			X			X
Statistical networks					X						X						X	X		X	
Self-organizing networks					X						X						X	X		X	
Applications						X		X			X	X		X	X	X	X	X		X	X

Course coordinator: Dr. Mahmoud Fahmy

Assoc.Head of Department: Prof. Dr. Amany sarhan

Course Specification

Course Title	**Pattern Recognition and Digital Image Processing**	
Course Code	**CCE4130**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mahmoud Alshewimy**	
Teaching Staff	**Dr. Mahmoud Alshewimy**	
Branch / Level	**Fourth year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 4 h lectures**
	Practical	**14 x 1 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Help the student in understanding image processing and computer vision; its principles in signal processing, the theory of feature extraction and image analysis, its relation to human vision and technology for implementation.
- Discuss how these techniques are manifest in practical application, by a series of case studies which also highlight how image techniques can be deployed to success.
- Assist the student to build projects using image processing techniques.
- Encourage the student to understand the new trends in Pattern Recognition and Digital Image Processing field.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. List the different types of pattern recognition.
A2. Enumerate the feature extraction and analysis techniques.
A3. Define clustering techniques.
A4. Mention the task of statistical pattern recognition
A5. Write down how computers can process digital images, Image representation and transformation
A6. List the basic operations (their basis, implementation and consequences) in image processing and computer vision.
A7. Describe the relation to signal processing and other fields.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Differentiate between the types of pattern recognition.
B2. Correlate between the feature extraction types and techniques.
B3. Merge the processes of two-dimensional data together with any perceived similarity with the human vision system.
B4. Transform image into spatial.
B5. Identify source of error in the recognition phase.

B6. Differentiate between temporal and spatial image processing.
B7. Correlate between human and computer vision.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Apply the various image processing operations
C2. Use the MATLAB functions of image processing.
C3. Build pattern recognition system for certain application.
C4. Use feedback to improve the recognition accuracy.
C5. Use different devices to capture the input signals

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Make good relations with colleagues, bosses, and clients, and adapt to varying work environments.
D3. Share ideas and communicate with others.

3. Course Contents

Week	Topics
1-2	Type of pattern recognition
3-4	Feature extraction and analysis
5-6	Clustering
7	Statistical pattern recognition
8-9	Principal of image processing
10-11	Image representation and transformation
12-13	Image enhancement, Image restoration
14	Color image processing

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	5 hrs	Weeks: 2,5,8,12	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *Mark Nixon,"Feature Extraction & Image Processing for Computer Vision," 3rd Ed., Academic Press, 2012.*
- *Sergios Theodoridis and Aggelos Pikrakis, "Introduction to Pattern Recognition: A Matlab Approach, 1st Ed., Academic Press;, 2010.*
- *Geoff Dougherty, "Pattern Recognition and Classification: An Introduction," Springer; 2013 edition.*

Web sites:

- *www.inf.ed.ac.uk › Teaching › Courses › Mlpr*
- *ocw.mit.edu/...**pattern-recognition**.../**lecture-notes***
- http://psi.cse.tamu.edu/teaching/lecture_notes/

7. Facilities required for teaching and learning

- *Computer lab*
- *Simulation package*

	Course Coordinator	**Head of Department**
Name	Dr. Mahmoud Alshewimy	Prof. Dr. Amany sarhan
Name (Arabic)	**د.محمود الشويمي**	**أ. د. أماني سرحان**
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4130 / Pattern Recognition and Digital Image Processing

Course Contents	Course outcomes ILOs																					
	Knowledge and Understanding							Intellectual Skills							Professional and Practical Skills					General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	D1	D2	D3
Type of pattern recognition	X							X						X		X				X		
Feature extraction and analysis		X							X							X				X		
Clustering			X							X					X	X					X	
Statistical pattern recognition				X																	X	
Principal of image processing					X						X								X			X
Image representation and transformation						X							X		X	X			X			X
Image enhancement, Image restoration						X	X			X	X	X	X	X	X	X		X	X	X	X	X
Color image processing							X			X	X	X	X	X	X	X	X				X	X

Course coordinator: Dr. Mahmoud Alshewimy **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Elective course (2): Distributed Systems**	
Course Code	**CCE4131**	
Academic Year	**2019-2020**	
Coordinator	**Prof. Dr. Amany Sarhan**	
Teaching Staff	**Prof. Dr. Amany Sarhan**	
Branch / Level	**Fourth year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Encourage the student to understand the trend towards the distributed systems, their possible applications advantages and disadvantages.
- Explore the issues in very large scale systems - for example, with hundreds of thousands of nodes - and consider how such systems can be programmed.
- Provide examples including the Web (and 'grid computing' on a large scale), future pervasive computing systems, "large scale small scale" systems (i.e. small physical scale, such as mobile and Grid computing systems), Applications.
- Assist the student to solve problems and build projects using distributed systems.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. List the characteristics of large scale distributed systems in contrast to those of smaller systems.
A2. Enumerate the algorithms suitable for programming specific large scale systems;
A3. Describe the conceptual models of large scale pervasive computing systems.
A4. Explain the functions and parts of the distributed file systems.
A5. Realize Flynn's taxonomy.
A6. Tell the idea of the logical and timing and synchronization between processes.
A7. Describe and draw a sketch for the Interprocess communication and Remote Procedure calls (RMI and RPC).

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Differentiate between the various types of distributed hardware

architectures.
B2. Criticize the file systems types.
B3. Differentiate between the various approaches of communication in distributed systems.
B4. Distinguish between logical and physical timing.
B5. Compare between client-server and peer-to-peer models.
B6. Select between RMI and RPC communication protocols.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Design a parallel system for a number of tasks.
C2. Develop and apply practical client/server apnd peer to peer models.
C3. Simulate a large scale distributed system using the matlab functions.
C4. Conduct personal research on one of the advanced topics in distributed systems.
C5. Write programs to simulate client-server and peer-to-peer models.
C6. Use the available information to obtain the best organization of distributed systemManage and upgrade computer networks.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Participate in small group teaching
D2. Conduct personal research on a certain subject and present it in an organized way.
D3. Make a presentation in front of other to increase the communication ability.
D4. Produce an in-depth technical report on one of the subject and presenting solutions to a problem on their own.
D5. Appreciate the good lessening and accurate time attendance.

3. Course Contents

Week	Topics
1-2	Characterization of distributed systems, Principles of distributed systems design
3	Interprocess communication
4-6	Distributed databases, Distributed operating systems
7-8	File service, Name service
9	Time and coordination Replication
10-11	Shared data and transactions, Concurrency control
12-13	Recovery and fault tolerance, Distributed shared memory
14	Languages for distributed computing

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

4.4- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	4 hrs	Weeks: 3,6,9,14	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *Andrew S. Tanenbaum, "Distributed Operating systems", Prentice Hall, 5th Ed., 2010.*
- *George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed systems: concepts and design", Addison Wesley, 5th Edition, 2011.*
- *Harry F. Jordan and Gita Alaghband, "Fundamentals of parallel processing", Prentice Hall, 2nd Ed., 2009.*
- *Maarten Van Steen Andrew S. Tanenbaum, "Distributed systems", Pearson Education Limited; International ed of 2nd revised ed edition, 2013.*
- *Sanjay Razdan, "Fundamentals of Parallel Computing," Alpha Science International Ltd, 2014*

Web sites:

- https://courses.engr.illinois.edu/cs425/fa2013/lectures.html
- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-172-performance-engineering-of-software-systems-fall-2010/video-lectures/lecture-20-distributed-systems/
- http://courses.cs.washington.edu/courses/csep552/13sp/
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *Grid and Cluster lab*
- *New Books*

	Course Coordinator	Head of Department
Name	Prof. Dr. Amany sarhan	Prof. Dr. Amany sarhan
Name (Arabic)	أ. د. أمانى سرحان	أ. د. أمانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4131 / Elective course (2): Distributed Systems

Course Contents	Course outcomes ILOs																						
	Knowledge and Understanding							Intellectual Skills						Professional and Practical Skills						General and Transferable Skills				
	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
Characterization of distributed systems, Principles of distributed systems design	x							x																x
Interprocess communication		x			x				x				x		x	x			x			x	x	x
Distributed databases, Distributed operating systems		x	x		x		x			x				x	x	x		x	x	x		x	x	x
File service, Name service				x			x	x	x	x		x	x	x					x			x		x
Time and coordination Replication					x	x					x		x								x	x	x	x
Shared data and transactions, Concurrency control					x			x				x		x		x			x		x			x
Recovery and fault tolerance, Distributed shared memory					x			x						x		x		x	x	x	x			x
Languages for distributed computing			x		x		x			x	x	x					x			x	x	x	x	x

Course coordinator: Prof. Dr. Amany sarhan **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course specification

Fourth Year

Second Term

Course Specification

Course Title	**Information System Design**	
Course Code	**CCE4235**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Reda Elbasuony**	
Teaching Staff	**Dr. Reda Elbasuony**	
Branch / Level	**Fourth year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 1 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce the student to the IS characteristics and components.
- Enable the student to work in information systems.
- Discuss how to design IS in various ways specially using the object-oriented technique and on the web.
- Provide the students with many applications on IS.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. List the different steps of information system life cycle.
A2. Mention the role of database systems in information management.
A3. Enumerate the driven design methods.
A4. Write down the technology of database server.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Analyze the requirements of information system.
B2. Represent and arrange data required in the IS.
B3. Select the information retrieval approach.
B4. Integrate different databases in one IS.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Apply the steps of information system life cycle to build IS.
C2. Design the proper user interface for the information system.
C3. Design the information system in more than one way.
C4. Use the learned approaches in database to build an application of information-based system.
C5. Use SQL server package with .net package to obtain a complete implementation of IS.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Organize their time effectively.
D2. Apply and appreciate the professional ethics.
D3. Use general IT facilities

3. Course Contents

Week	Topics
1-3	Life cycle of information systems
4-6	Data-driven Design Methods
7	Technology of Database servers
8	Physical Database Design
9	Application Programs and user interface
10	Information Retrieval Systems
11	Information networks
12	Information systems on the world wide web
13-14	Design examples of integrated information systems

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	60 %
Oral Assessment	30 mins	Week: 15	20 %
Practical Examination	--	--	--
Semester work	5 hrs	Weeks: 4,7,10,14	20 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *Jeffrey A. Hoffer, Ramesh Venkataraman and Heikki Topi, 'Modern Database Management", 11th Ed., Prentice Hall, 2012.*
- *Graham Curtis, David Cobham, "Business Information Systems: Analysis, Design & Practice", 6th Ed.,Pearson Publications Company, 2008.*
- *Carlos Coronel and Steven Morris, "Database Systems: Design, Implementation, & Management," 11th Ed., Cengage Learning, 2014.*
- *Philip J. Pratt and Mary Z. Last, "Concepts of Database Management," 8th Ed., Cengage Learning, 2014.*

Web sites:

- http://pages.cs.wisc.edu/~dbbook/openAccess/thirdEdition/slides/slides3ed.html
- https://www.coursera.org/course/db
- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-830-database-systems-fall-2010/

7. Facilities required for teaching and learning

- *SQL server and .net framework*
- *Computer lab*

	Course Coordinator	Head of Department
Name	Dr.Reda Elbasuony	Prof. Dr. Amany sarhan
Name (Arabic)	د.رضا البسيونى	أ. د. أماني سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4235 / Information System Design

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills					General and Transferable Skills		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	D3
Life cycle of information systems	X	X			X				X					X		
Data-driven Design Methods			X		X	X				X	X			X		
Technology of Database servers			X	X	X						X	X			X	
Physical Database Design		X											X		X	
Application Programs and user interface		X			X					X			X			X
Information Retrieval Systems				X			X				X			X		
Information networks		X				X						X				X
Information systems on the world wide web		X					X			X	X	X				X
Design examples of integrated information systems				X				X	X	X	X	X	X	X	X	X

Course coordinator: Dr.Reda Elbasuony **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Computer and Network Security**	
Course Code	**CCE4236**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Tahani Allam**	
Teaching Staff	**Dr. Tahani Allam**	
Branch / Level	**Fourth year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 1 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Encourage the student to understand the many aspects of computer and data network security, and information assurance.
- Examine the rationale and necessity for securing computer systems and data networks, as well as methodologies for implementing security, security policies, best current practices, testing security, and incident response
- Help the student to understand the important security-related considerations when implementing computers, servers, and networks.
- Enable the student to apply and work in the field of computer and network security.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. List the sources of threat on the computer and network.
A2. Mention the different methods to protect the computer and network.
A3. Define the possibility to use different layers of security on the same system.
A4. Describe the role of operating systems in tracking and preventing the threats.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Differentiate between the various types of intrusion on the computer and the difference between them and the intrusion on the network.
B2. Perform intrusion detection and identify the cause.
B3. Select the proper security for the system based on feasibility study.
B4. Describe the ethical and legal considerations associated with "attacking" computer systems and networks.
B5. Analyze the impact of security policies and user security awareness to the "secure" operation of a network and the organization, in general.

B6. Evaluate the security vulnerabilities of common operating systems and data protocols.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Apply the studied encryption techniques using MATLAB.
C2. Analyze the log file to detect the intrusion.
C3. Use the available computer and network security programs to specify a level of protection to the system.
C4. Implement and plan a practical strategy for some case studies.
C5. Protect a given system from many types of threats using case studies.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Share ideas and communicate with others
D4. Present projects, reports and data using different techniques (computer, manual... etc.).
D5. Be ambitious and willing to participate, with confidence and enthusiasm, in private projects and investments.

3. Course Contents

Week	Topics
1-2	Overview of information security
3-4	Legislation and ethics
5-6	Computer virus and anti-virus programs
7-8	Data scrambling and nonlinear transformations
9	Cryptographic algorithms
10	Authentication Protocols, logging and authorization
11	Message integrity protocols
12	Digital signatures
13-14	Firewalls, Examples of security Protocols

4. Teaching and Learning Methods

4.1- Lectures

4.2- Reports

4.3- Lab experiments

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	60 %
Oral Assessment	15 mins	Week: 15	10 %
Practical Examination	15 mins	Week: 15	10 %
Semester work	6 hrs	Weeks: 3,6,9,14	20 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *William Stallings, "Cryptography and Network Security, principles and practice," 6 th Edition, 2013.*
- *Radia Perlman, "Network Security: Private Communication in a Public World," 2nd Ed., Series in Computer Networking and Security, 2008.*
- *Mark Ciampa, "Comp TIA Security+ Guide to Network Security Fundamentals," 5th Ed., Cengage Learning, 2014.*
- *William Stallings, "Network Security Essentials Applications and Standards," 5th Edition, Prentice Hal, 2013.*

Web sites:

- https://engineering.purdue.edu/kak/compsec/Lectures.html
- *www.cse.psu.edu/.../cse497b-**lecture**-13-**networksecurity***
- https://www.cs.columbia.edu/~smb/classes/f06/lectures.html
- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-033-computer-system-engineering-spring-2009/video-lectures/lecture-21/

7. Facilities required for teaching and learning

- *Network lab*
- Security packages

	Course Coordinator	Head of Department
Name	Dr Tahani Allam	Prof. Dr. Amany sarhan
Name (Arabic)	د.تهانى علام	أ. د. أماني سرحان
Signature		
Date	3/ 9 /2019	3/9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4236 / Computer and Network Security

Course Contents	Course outcomes ILOs																			
	Knowledge and Understanding				Intellectual Skills						Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	`A4	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Overview of information security	X				X				X	X						X				
Legislation and ethics	X				X			X			X					X				
Computer virus and anti-virus programs		X				X		X			X				X		X			
Data scrambling and nonlinear transformations		X					X							X	X		X			
Cryptographic algorithms		X	X					X			X				X			X	X	
Authentication Protocols, logging and authorization			X						X	X		X		X	X			X	X	X
Message integrity protocols				X				X		X			X		X				X	
Digital signatures				X					X	X					X				X	X
Firewalls, Examples of security Protocols				X		X	X		X	X		X	X	X	X		X			X

Course coordinator: Dr. Tahani Allam **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Control and Instrumentation in Industrial Processes**	
Course Code	**CCE4237**	
Academic Year	**2019-2020**	
Coordinator	**Prof. Dr. Mohamed Talaat Faheem**	
Teaching Staff	**Prof. Dr. Mohamed Talaat Faheem**	
Branch / Level	**Fourth year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 4 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Acquaint the student with integrated control and instrumentation systems in various industrial applications.
- Familiarize the student with human-machine interaction.
- Prepare the student for the rapidly evolving high-tech information-based modern industrial processes.
- Provide the student with the ability to work in many applications on control and instrumentation field.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Mention the importance of modeling and simulation of industrial processes.
A2. List the types of Sensors, transducers, and programmable logic controllers (PLCs).
A3. Describe the role of Microcontrollers.
A4. Enumerate the measurement of process variables.
A5. List the data acquisition systems.
A6. Give examples of integrated control and instrumentation systems.
A7. Define the role of human-machine interaction

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Analyze process control components and systems.
B2. Evaluate process instrumentation devices and systems.
B3. Suggest the proper interface of microcontrollers.
B4. Conclude on error of measurements and measuring instruments.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Implement data acquisition systems.
C2. Write application-oriented programs for microcontrollers.
C3. Manage industrial control and instrumentation systems.
C4. Perform feasibility studies and determining technical specifications of control and instrumentation systems.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Deal with self-study material to encourage them for continuing learning.
D2. Use different learning methods in one subject.
D3. Be familiar with different resources of learning.

3. Course Contents

Week	Topics
1	Types of industrial processes
2-3	Modeling and simulation of industrial processes
4-5	Digital instrumentation, smart sensors, Digital signal conditioning
6-7	Computer interfaces for data acquisition
8-9	Distributed digital control systems
10-11	Applications of microcontrollers and software design
12-13	Supervisory control and data acquisition (SCADA) system
14	Examples of computer control systems design in industrial processes

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	60 %
Oral Assessment	15 mins	Week: 15	10 %
Practical Examination	15 mins	Week: 15	10 %
Semester work	6 hrs	Weeks: 2,5,9,13	20 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *Terry L.M. Bartelt, "Instrumentation and Process Control," 1st Ed., Delmar Cengage Learning, 2006.*
- *Clarence W. de Silva, "Sensors and Actuators: Control System Instrumentation," 1st Ed., CRC Press, 2007.*
- *Franklyn W. Kirk, "Instrumentation and Process Control," 6th Ed., American Technical Publishers, 2014*
- by

- *Curtis D. Johnson, "Process Control Instrumentation Technology," 9th Ed., Prentice Hall, 2011.*

Web sites:

- *www.cod.edu/catalog/current/courses/.../index.pdf*
- http://www.sait.ca/programs-and-courses/full-time-studies/diplomas/instrumentation-engineering-technology-course-overview.php

7. Facilities required for teaching and learning

- *Process control lab.*

	Course Coordinator	Head of Department
Name	Prof. Dr. Mohamed Talaat Faheem	Prof. Dr. Amany sarhan
Name (Arabic)	ا.د. محمد طلعت فهيم	أ. د. أماني سرحان
Signature		
Date	3/9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4237/ Control and Instrumentation in Industrial Processes

Course Contents	Course outcomes ILOs																	
	Knowledge and Understanding							Intellectual Skills				Professional and Practical Skills				General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3
Types of industrial processes	X										X					X		
Modeling and simulation of industrial processes	X						X	X								X	X	
Digital instrumentation, smart sensors, Digital signal conditioning		X		X				X	X						X		X	
Computer interfaces for data acquisition		X		X	X		X					X						X
Distributed digital control systems						X			X					X				X
Applications of microcontrollers and software design			X							X			X	X				X
Supervisory control and data acquisition (SCADA) system					X						X	X		X	X		X	
Examples of computer control systems design in industrial processes						X	X		X		X			X	X		X	X

Course coordinator: Prof. Dr. Mohamed Talaat Faheem **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Elective course (3): Computer vision**	
Course Code	**CCE4238**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Amr Elkholy**	
Teaching Staff	**Dr. Amr Elkholy**	
Branch / Level	**Fourth year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce the students to the computer vision giving the relation between it and image processing field.
- Assist the student to realize the techniques of analyzing the image as still and in motion with emphasis on the practical applications.
- Convey the basic issues in computer vision and major approaches that address them.
- Provide the knowledge needed to read, understand and apply the more advanced topics and current research literature, and the ability to solve basic industrial "vision" problems.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Define the computer vision.
A2. List the image processing techniques involved in the vision.
A3. Explain the three and two dimension vision.
A4. Enumerate the difficulties that the vision problem involves.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Evaluate a simple vision system.
B2. Differentiate between the various edges detectors.
B3. Criticize the issues involved in color, texture, and motion.
B4. Link between the potential and the problems of active vision.
B5. Select the appropriate vision technique for a specific application.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Perform Image segmentation using various techniques.
C2. Use the different ways that the shape of an object can be recovered.

C3. Apply motion estimation techniques and compare between their results.
C4. Apply the studied image processing techniques using Matlab.
C5. Implement several image filtering algorithms.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Be familiar with the various web sites that provide academic information.
D2. Select group members to understanding and cooperating.
D3. Apply and raise awareness of professional ethics.

3. Course Contents

Week	Topics
1	Image processing and computer vision
2-3	Image modeling and analysis
4-5	Image segmentation
6-8	Image understanding
9-10	Motion estimation
11-12	Morphological image processing
13-14	Wavelets and multi resolution Processing

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Report

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	4 hrs	Weeks: 3,6,9,14	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *E.R. Davies, "Machine Vision: Theory, Algorithms, Practicalities", 4th Ed., Academic Press, 2012.*
- *D. Forsyth and J. Ponce, "Computer Vision: A Modern Approach", 2nd Ed., Prentice Hall, Englewood Cliffs, NY, 2011.*
- *Richard Szeliski, "Computer Vision: Algorithms and Applications," 1st Ed., Springer, 2010.*

Web sites:

- *cs.brown.edu/**course**s/cs143/*

- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *Simulation package.*
- *High sensitivity cameras.*

	Course Coordinator	Head of Department
Name	Dr. Amr Elkholy	Prof. Dr. Amany sarhan
Name (Arabic)	د. عمرو الخولى	أ. د. أماني سرحان
Signature		
Date	٣/ 9 /2019	٣/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4238 / Elective course (3): Computer vision

Course Contents	Course outcomes ILOs																
	Knowledge and Understanding				Intellectual Skills					Professional and Practical Skills					General and Transferable Skills		
	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3
Image processing and computer vision	X	X			X										X		
Image modeling and analysis	X		X		X								X		X		
Image segmentation		X				X	X			X			X			X	
image understanding		X					X						X			X	
Motion estimation			X	X			X	X			X	X	X		X		X
Morphological image processing			X					X	X		X		X	X	X		X
Wavelets and multi resolution Processing				X					X		X		X	X			X

Course coordinator: Dr. Amr Elkholy **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Elective course (3): Data Mining**	
Course Code	**CCE4239**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Reda Elbasiony**	
Teaching Staff		
Branch / Level	**Fourth year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Provide an introduction to the data mining importance and applications.
- Give a detailed study of different types of data mining techniques is given.
- Examine the various applications of the data mining on traditional, web data and data streams.
- Focus on applying techniques that can be used for data mining tasks such as classification, association rule mining, clustering, and numerical prediction. This includes probabilistic and statistical methods, genetic algorithms and neural networks, visualization techniques, and mathematical programming.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Write down the relation between data and knowledge
A2. Explain the emerging computer intensive data analysis methods, intelligent information systems, data mining techniques, and state-of-the-art results from the fields of financial engineering and computational finance.
A3. List the various types of clustering techniques.
A4. Mention the relation between text mining and mining the World Wide Web.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Differentiate between the various principles, methods and techniques in data mining.
B2. Explain how data mining can be used to address various problems.
B3. Evaluate the output produced from data mining and assess its significance.
B4. Criticize the different data mining algorithms.

B5. Compare between the promise of the new methods with current practice on financial institutions.
B6. Demonstrate the strengths and weaknesses of each of the new methods on financial data such as building and evaluating trading models, and managing risk.
B7. Relate and integrate often disparately experienced pieces of previous knowledge such as machine learning, neural networks and genetic algorithms

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Apply different data mining techniques and select an appropriate technique for a given data set and problem.
C2. Apply various data mining software, methods and techniques for specific applications;
C3. Provide practical experiences with these methods.
C4. Examine one or two of the techniques in great depth through a group project in conjunction with a major financial firm.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain report writing skills.
D2. Use general IT facilities to produce the reports.
D3. Apply and raise awareness of professional ethics.

3. Course Contents

Week	Topics
1	Introduction to data mining and machine learning
2-3	Input : Concepts, instances, Attributes
4-5	Output (Knowledge representation) : Decision tables , Decision Trees ,Classification rules, Association Rules, Clustering
6-7	Basic Algorithms
8-9	Real machine learning schemes
10-11	Engineering the input and output: Attribute Selection, Automatic Data Cleansing, Combining Multiple Models
12	Learning From Massive Data sets
13	Text mining
14	mining the world wide web

4. Teaching and Learning Methods

4.1- Lectures

4.2- Reports

4.3- Group Lab experiments

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	6 hrs	Weeks: all term	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *Ian H. Witten and Eibe Frank, "Data Mining: practical machine learning tools and techniques with Java implementations", Morgan Kaufmann Publishers, San Fransisco, CA, 2009.*
- *Jiawei Han and Micheline Kamber, "Data Mining: Concepts and Techniques," Morgan Kaufmann Publishers, San Fransisco, CA, 2008.*

Web sites:

- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *New books on data mining.*
- *Simulation tools.*

	Course Coordinator	Head of Department
Name	Dr. Reda Elbasiony	Prof. Dr. Amany sarhan
Name (Arabic)	د. رضا البسيونى	أ. د. أمانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4239 / Elective course (3): Data Mining

Course Contents	Course outcomes ILOs																	
	Knowledge and Understanding				Intellectual Skills							Professional and Practical Skills				General and Transferable Skills		
	A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D1	D2	D3
Introduction to data mining and machine learning	X				X											X		
Input : Concepts, instances, Attributes	X				X									X		X		
Output (Knowledge representation) : Decision tables , Decision Trees ,Classification rules, Association Rules, Clustering			X		X		X					X	X	X		X	X	
Basic Algorithms		X			X	X		X				X	X	X			X	
Real machine learning schemes		X				X								X			X	
Engineering the input and output: Attribute Selection, Automatic Data Cleansing, Combining Multiple Models			X				X						X					X
Learning From Massive Data sets			X						X	X	X	X	X	X	X			X
Text mining				X					X		X		X	X	X	X		X
mining the world wide web				X					X		X			X	X			X

Course coordinator: Dr. Reda Elbasiony **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Elective course (3): Electronic Commerce**	
Course Code	**CCE4240**	
Academic Year	**2019-2020**	
Coordinator	**Prof. Dr. Amany Sarhan**	
Teaching Staff		
Branch / Level	**Fourth year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Provide an overview of the legal and business issues affecting E-Business.
- Introduce the student to existing technologies for the Internet including tools, their use and their configuration for providing Internet services.
- Assist the student with knowledge on privacy and security issues for web-based systems, including legal and human aspects.
- Help the student to design and analyze the information content and presentation of web sites considering technical and legal aspects and how to assess and evaluate web sites.
- Encourage the student to build e-commerce with sites based on the given criteria.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Mention the fundamentals of e-business.
A2. List the economic models for E-Business.
A3. Tell the marketing strategies for E-Commerce.
A4. Enumerate the technologies and tools for the Internet.
A5. Describe the design principles for the form and contents of information-rich web sites.
A6. List the threats and considerations of e-commerce web pages.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Use knowledge and understanding of appropriate principles and guidelines to synthesize solution(s).
B2. Evaluate alternatives in terms of their attributes and trade-offs within a given problem.
B3. Select and customize existing technologies to set up and maintain web servers.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Design an E-commerce web page.
C2. Specify, build and manage form and content of information-rich web sites.
C3. Use knowledge and understanding of appropriate principles and guidelines to synthesize solutions for web design and administration.
C4. Analyze the different needs of an organization from the web site.
C5. Apply security schemes on the e-commerce web site.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Express ideas in writing and orally.
D2. Evaluate outcomes of group members and organize the work between them according to their expertise.
D3. Work on an on-going project and delivering it in parts in timely manner.
D4. Respect each other's opinions and to express themselves to show their point of view to others.

3. Course Contents

Week	Topics
1	Overview of electronic commerce (e-commerce)
2-3	Internet marketing
4-5	Electronic payment systems
6-7	On-line publication, business models and applications
8-9	Marketing strategies and programs
10-11	E-commerce security
12	Building e-commerce applications and infrastructure
13	Web programming languages
14	Applications

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Lab experiments

4.4- Reports

4.5- Group projects

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	6 hrs	Weekly	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *Kenneth Laudon and Carol Guercio Traver, "E-Commerce 2010," 6th Ed., Prentice Hall, 2009.*
- *Julius Wiedemann, "WEB Design: E-Commerce," Taschen, 2006.*

Web sites:

- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- Computer lab
- SQL server and . ner framework package

	Course Coordinator	Head of Department
Name	Prof. Dr. Amany Sarhan	Prof. Dr. Amany sarhan
Name (Arabic)	أ. د. أمانى سرحان	أ. د. أمانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4240 / Elective course (3): Electronic Commerce

Course Contents	Course outcomes ILOs																		
	Knowledge and Understanding						Intellectual Skills			Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	A6	B1	B2	B3	C1	C2	C3	C4	C5	D1	D2	D3	D4	
Overview of electronic commerce (e-commerce)	X								X	X	X					X	X		
internet marketing	X	X					X				X				X		X		
electronic payment systems	X	X					X	X	X		X	X			X		X	X	
on-line publication-Business models and applications		X						X				X	X			X		X	
Marketing strategies and programs			X				X	X					X						
e-commerce security						X		X				X	X	X	X	X	X	X	
Building e-commerce applications and infrastructure				X	X					X	X	X	X		X	X	X	X	
Web programming languages					X				X	X	X	X		X	X	X	X		
Applications				X		X			X	X	X		X	X	X	X	X	X	

Course coordinator: Prof. Dr. Amany Sarhan Head of Department: Prof. Dr. Amany sarhan

Course Specification

Course Title	**Elective course (4): Robotic Systems**	
Course Code	**CCE4242**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mohamed Arafa**	
Teaching Staff		
Branch / Level	**Fourth year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Provide a detailed appreciation of the robotics to a range of tasks including computer integrated manufacture, together with none industrial applications.
- Discuss a detailed study of robotics is undertaken with particular emphasis on kinematics and the interpretation of sensory information.
- Examine the impact that biological systems have had on the development of robotics.
- Help the student to realize and apply the design principles of robotic systems for many robotics applications.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. Define the kinematics of a robotic system.
A2. List the Robotic sensors and their application.
A3. Enumerate the limitation of robotics, robotic end effectors and sensors in their working environment
A4. Describe the interaction of robotic systems with advanced manufacturing systems.

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Undertake a kinematics analysis of a robotic system
B2. Evaluate the benefits that a robot will bring to a manufacturing plant
B3. Distinguish between different sensing technologies and understand the principle of interpretating sensory information.
B4. Analyze a specific robot, and derive [A] and tool matrices.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Determine the best gripper for a particular application, including the derivation of the required wrench geometry.
C2. Put the requirements for manipulators.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Manage their learning and development, and time management and organizational skills.

3. Course Contents

Week	Topics
1	Introduction to robots
2-3	study of descriptions, transformations and orientations
4-5	Manipulator Kinematics
6-8	Inverse manipulator kinematics
9-11	Velocities, static forces, manipulator dynamics, trajectory generation
12	Position control of manipulators and force control of manipulators
13-14	Hybrid position, force control scheme, robot programming languages, industrial application

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	5 hrs	Weeks: 4,8,11,14	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *Reza N. Jazarv, "Theory of Applied Robotics: Kinematics, Dynamics, and Control," 2nd Ed., Springer, 2010.*
- *Maja J. Mataric, "The Robotics Primer (Intelligent Robotics and Autonomous Agents series)," The MIT Press, 2007.*
- *Saeed B. Niku, "Introduction to Robotics: Analysis, Control, Applications," 1st Ed., Wiley, 2010.*

- *Roland Siegwart, Illah Reza Nourbakhsh and Davide Scaramuzza, "Introduction to Autonomous Mobile Robots (Intelligent Robotics and Autonomous Agents series)," 2nd Ed., The MIT Press, 2011.*

Web sites:

- http://see.stanford.edu/see/lecturelist.aspx?coll=86cc8662-f6e4-43c3-a1be-b30d1d179743
- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-832-underactuated-robotics-spring-2009/video-lectures/
- http://www.princeton.edu/~stengel/MAE345Lectures.html
- http://www.cs.cmu.edu/afs/cs/academic/class/15494-s12/Lectures.html

7. Facilities required for teaching and learning

- Robotics lab.
- Control lab.
- Simulation package (Matlab)

	Course Coordinator	Head of Department
Name	Dr. Mohamed Arafa	Prof. Dr. Amany sarhan
Name (Arabic)	د. محمد عرفة	أ. د. أمانى سرحان
Signature		
Date	3/9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4242 / Elective course (4): Robotic Systems

Course Contents	Course outcomes ILOs												
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills		General and Transferable Skills		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	D1	D2	D3
Introduction to robots	X	X				X			X			X	
study of descriptions, transformations and orientations	X				X	X			X	X		X	
Manipulator Kinematics	X				X						X		X
Inverse manipulator kinematics		X					X			X	X		
Velocities, static forces, manipulator dynamics, trajectory generation			X				X			X	X	X	
Position control of manipulators and force control of manipulators			X	X				X	X	X	X	X	X
Hybrid position, force control scheme, robot programming languages, industrial application			X	X				X	X	X			X

Course coordinator: Dr. Mohamed Arafa **Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Elective course (4): Mobile Computing**	
Course Code	**CCE4243**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Hany ELghaysh**	
Teaching Staff	**Dr. Hany ELghaysh**	
Branch / Level	**Fourth year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce an overview of the technologies underlying modern mobile computing environments.
- Assist the student to be familiar with the new trends in mobile computing fields.
- Help the student to work with the mobile computing technology.
- Provide the students with examples on the applications of mobile computing.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. List the mobile computing application technologies, operating systems and communications.
A2. Mention advanced Network Technologies, design and security issues for enterprise wide mobile-enabled computer systems
A3. Enumerate the strategies for the design and deployment of computer systems incorporating mobile computing
A4. List the strategies for managing modern networked computer systems
A5. List the techniques for evaluating and managing the performance of computer systems and mobile communications
A6. Describe the technologies, tools and techniques for building and deploying mobile computer systems

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Synthesis of information from a variety of different sources
B2. Discuss the issues surrounding the Integration of theory and practice
B3. Plan, conduct and write up an academic piece of research.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Analyze, design, plan, build and deploy mobile technology enabled distributed computer systems using a variety of current Advanced Network Technologies and application technologies and architectures
C2. Evaluate and select appropriate technologies and tools for building modern mobile based computer systems
C3. Manage the development process in an individual or team context.
C4. Critically evaluate new and emerging mobile computing and communications technologies in terms of their suitability for particular development purposes.
C5. Manage and maintain the necessary network and mobile communications infrastructure to support a mobile technology enabled enterprise software system
C6. Design and build mobile computer systems and networks fit for a given business or e-commerce purpose.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Manage their own learning and development, and time management and organizational skills.

3. Course Contents

Week	Topics
1	Basics of mobile computing
2-3	Systems architecture
4-5	Medium access control protocols
6	Wireless local area networks
7-8	Connection and location management
9	Routing Protocols
10	Mobile IP / wireless TCP
11	Roaming and mobile handoff
12	Wireless application protocol (WAP)
13	Security and authentication
14	Examples of mobile systems

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	5 hrs	Weeks: 3,6,9,13	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *F. Adelstein, S.K.S. Gupta, G.G. Richard III and L. Schwiebert, Fundamentals of Mobile and Pervasive Computing, McGraw Hill, 2005.*
- *Jochen Schiller, "Mobile Communications," 2nd Ed., Pearson Education, 2003.*
- *Himanshu Dwivedi, Chris Clark and David Thiel, "Mobile Application Security," 1st Ed., McGraw-Hill Osborne Media, 2010.*

Web sites:

- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *Grid and cluster lab*
- *Simulation package*

	Course Coordinator	Head of Department
Name	Dr. Hany ELghaysh	Prof. Dr. Amany sarhan
Name (Arabic)	د. هانى الغايش	أ. د. أمانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Code / Course Title: CCE4243 / Elective course (4): Mobile Computing

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding						Intellectual Skills			Professional and Practical Skills				General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3
Basics of mobile computing	X															
Systems architecture	X	X					X			X				X		
Medium access control protocols		X	X				X	X		X						
Wireless local area networks				X			X	X		X	X			X		
Connection and location management			X				X	X			X					
Routing Protocols		X	X	X				X			X			X		
Mobile IP / wireless TCP		X	X	X	X			X			X		X	X		
Roaming and mobile handoff			X		X	X		X		X		X				
Wireless application protocol (WAP)					X	X			X	X		X	X		X	X
Security and authentication					X	X			X	X		X		X	X	X
Examples of mobile systems						X			X	X		X	X		X	X

Course coordinator: Dr. Hany ELghaysh **Assoc.Head of Department:** Prof. Dr. Amany sarhan

Course Specification

Course Title	**Project**	
Course Code	**CCE4244**	
Academic Year	**2019-2020**	
Coordinator	**Assoc. Prof. Dr. El Sayed Sallam**	
Teaching Staff	**Will be cited by the department**	
Branch / Level	**Fourth year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 2 h lectures**
	Practical	**14 x 4 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Assist the student to apply practically the fundamentals principles and the skills, which were gained during his study in the program.
- Acquire the skills for analyzing and designing of a complete engineering system, satisfying the concerned industrial code requirements.
- Enhance writing skills by submitting a technical report which includes the details of the project regarding the analysis, design and, when necessary, the related computer and experimental works.
- Enhance oral presentations of the project using suitable presentation software.
- Encourage the student to share ideas and work in a team in an efficient and effective manner under and supervision.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. List the main procedures of carrying out a research in a certain field
A2. Mention the modern issues related to the topic of the project
A3. Outline the mathematical and practical bases of the subject of the project
A4. List the different approaches in the field of the project topic

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Analyze for getting optimum specifications for all the required project's items.
B2. Selecting appropriate sensing and actuating elements required for his project.
B3. Eliminate the probably involved errors.
B4. Implement the required signal conditioning processing.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Select and buy all the project items.
C2. Handle and store samples when necessary
C3. Design and perform experiments within proper technical, safety and ethical framework
C4. Apply the appropriate lab equipments when testing the performance of the project.
C5. Diagnose practical troubleshooting problems that may be encountered during the project implementations.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Learn how to search and collect information about the topics of the project
D2. Be trained to carry out the task in the pre-specified time
D3. Become skilled to cooperate in the steps of the project

3. Course Contents

Week	Topics
1-3	Survey to determine the scope and requirements of the project
4-7	Purchase the required equipments
8-11	Perform the Main professional and practical part and test the project
12-13	Conclusions and recommendations
14	Writing the project book

4. Teaching and Learning Methods

4.1- Lectures

4.2- Seminars and discussion sessions.

4.3- Lab experiments

4.4- Reports on similar projects

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Second Semester work	8 hrs (overall)	Week: 1,5,7,8,9,11	40 %
Oral Exam	30-120 min	14th week	60 %

6. List of references

Course notes:--

Essential Books:

- *Depends on the subject*

Web sites:

- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *To be defined during the project*

	Course Coordinator	Head of Department
Name	Assoc. Prof. Dr. El Sayed Sallam	Prof. Dr. Amany sarhan
Name (Arabic)	أ. د.م. السيد سلام	أ. د. أمانى سرحان
Signature		
Date	3/ 9 /2019	3/9 /2019

Course contents – Course ILOs Matrix

Course Code / Course Title: CCE4244 / Project

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills					General and Transferable Skills		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	D3
Survey to determine the scope and requirements of the project	X	X												X	X	X
Purchase the required equipments	X	X	X	X	X	X								X	X	X
Perform the Main professional and practical part and test the project		X			X	X	X	X			X	X	X	X	X	
Conclusions and recommendations									X	X				X	X	X
Writing the project book			X											X		X

Course coordinator: Assoc. Prof. Dr. El Sayed Sallam

Assoc.Head of Department: Prof. Dr. Amany sarhan

CCE3225		Operations Research

CCE3222		Multimedia Systems
CCE3224		Computer – Aided Design
CCE4132		Real-Time Systems
CCE4133		Adaptive Control
CCE4134		Stochastic Control
CCE4241		Computer Systems Evaluation

Course Specification

Course Title	**Elective course (1): Operation Research**	
Course Code	**CCE3225**	
Academic Year	**2019-2020**	
Coordinator	**Assoc. Prof. Dr. Elsayed Sallam**	
Teaching Staff	**Assoc. Prof. Dr. Elsayed Sallam**	
Branch / Level	**Third year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce an overview of the technologies underlying modern mobile computing environments.
- Assist the student to be familiar with the new trends in mobile computing fields.
- Help the student to work with the mobile computing technology.
- Provide the students with examples on the applications of mobile computing.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. List the mobile computing application technologies, operating systems and communications.
A2. Mention advanced Network Technologies, design and security issues for enterprise wide mobile-enabled computer systems
A3. Enumerate the strategies for the design and deployment of computer systems incorporating mobile computing
A4. List the strategies for managing modern networked computer systems
A5. List the techniques for evaluating and managing the performance of computer systems and mobile communications
A6. Describe the technologies, tools and techniques for building and deploying mobile computer systems

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Synthesis of information from a variety of different sources
B2. Discuss the issues surrounding the Integration of theory and practice
B3. Plan, conduct and write up an academic piece of research.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Analyze, design, plan, build and deploy mobile technology enabled distributed computer systems using a variety of current Advanced Network Technologies and application technologies and architectures
C2. Evaluate and select appropriate technologies and tools for building modern mobile based computer systems
C3. Manage the development process in an individual or team context.
C4. Critically evaluate new and emerging mobile computing and communications technologies in terms of their suitability for particular development purposes.
C5. Manage and maintain the necessary network and mobile communications infrastructure to support a mobile technology enabled enterprise software system
C6. Design and build mobile computer systems and networks fit for a given business or e-commerce purpose.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Manage their own learning and development, and time management and organizational skills.

3. Course Contents

Week	Topics
1	Basics of mobile computing
2-3	Systems architecture
4-5	Medium access control protocols
6	Wireless local area networks
7-8	Connection and location management
9	Routing Protocols
10	Mobile IP / wireless TCP
11	Roaming and mobile handoff
12	Wireless application protocol (WAP)
13	Security and authentication
14	Examples of mobile systems

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %

Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	5 hrs	Weeks: 3,6,9,13	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *F. Adelstein, S.K.S. Gupta, G.G. Richard III and L. Schwiebert, Fundamentals of Mobile and Pervasive Computing, McGraw Hill, 2005.*
- *Jochen Schiller, "Mobile Communications," 2nd Ed., Pearson Education, 2003.*
- *Himanshu Dwivedi, Chris Clark and David Thiel, "Mobile Application Security," 1st Ed., McGraw-Hill Osborne Media, 2010.*

Web sites:

- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *New books on Mobile computing*

	Course Coordinator	**Head of Department**
Name	Assoc. Prof. Dr. El Sayed Sallam	Prof. Dr. Amany sarhan
Name (Arabic)	أ. د.م. السيد سلام	أ. د.امانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Code / Course Title: CCE3225/ Operations Research

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding						Intellectual Skills			Professional and Practical Skills				General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3
Basics of mobile computing	X															
Systems architecture	X	X					X			X				X		
Medium access control protocols		X	X				X	X		X						
Wireless local area networks				X			X	X		X	X			X		
Connection and location management			X				X	X			X					
Routing Protocols		X	X	X				X			X			X		
Mobile IP / wireless TCP		X	X	X	X			X			X		X	X		
Roaming and mobile handoff			X		X	X		X		X		X				
Wireless application protocol (WAP)					X	X			X	X		X	X		X	X
Security and authentication					X	X			X	X		X		X	X	X
Examples of mobile systems						X			X	X		X	X		X	X

Course coordinator: Assoc. Prof. Dr. El Sayed Sallam **Head of Department: Prof. Dr. Amany sarhan**

Course Specification

Course Title	**Multimedia Systems**	
Course Code	**CCE4243**	
Academic Year	**2019-2020**	
Coordinator	**Prof. Dr. Amany sarhan**	
Teaching Staff	**Prof. Dr. Amany sarhan**	
Branch / Level	**Fourth year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce an overview of the technologies underlying modern mobile computing environments.
- Assist the student to be familiar with the new trends in mobile computing fields.
- Help the student to work with the mobile computing technology.
- Provide the students with examples on the applications of mobile computing.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A7. List the mobile computing application technologies, operating systems and communications.
A8. Mention advanced Network Technologies, design and security issues for enterprise wide mobile-enabled computer systems
A9. Enumerate the strategies for the design and deployment of computer systems incorporating mobile computing
A10. List the strategies for managing modern networked computer systems
A11. List the techniques for evaluating and managing the performance of computer systems and mobile communications
A12. Describe the technologies, tools and techniques for building and deploying mobile computer systems

B. Intellectual skills:

By the end of this course, the students should be able to:

B4. Synthesis of information from a variety of different sources
B5. Discuss the issues surrounding the Integration of theory and practice
B6. Plan, conduct and write up an academic piece of research.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C7. Analyze, design, plan, build and deploy mobile technology enabled distributed computer systems using a variety of current Advanced Network Technologies and application technologies and architectures
C8. Evaluate and select appropriate technologies and tools for building modern mobile based computer systems
C9. Manage the development process in an individual or team context.
C10. Critically evaluate new and emerging mobile computing and communications technologies in terms of their suitability for particular development purposes.
C11. Manage and maintain the necessary network and mobile communications infrastructure to support a mobile technology enabled enterprise software system
C12. Design and build mobile computer systems and networks fit for a given business or e-commerce purpose.

D. General and transferable skills:

By the end of this course, the students should be able to:

D4. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D5. Work competently among team workers of different task assignments.
D6. Manage their own learning and development, and time management and organizational skills.

3. Course Contents

Week	Topics
1	Basics of mobile computing
2-3	Systems architecture
4-5	Medium access control protocols
6	Wireless local area networks
7-8	Connection and location management
9	Routing Protocols
10	Mobile IP / wireless TCP
11	Roaming and mobile handoff
12	Wireless application protocol (WAP)
13	Security and authentication
14	Examples of mobile systems

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %

Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	5 hrs	Weeks: 3,6,9,13	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *F. Adelstein, S.K.S. Gupta, G.G. Richard III and L. Schwiebert, Fundamentals of Mobile and Pervasive Computing, McGraw Hill, 2005.*
- *Jochen Schiller, "Mobile Communications," 2nd Ed., Pearson Education, 2003.*
- *Himanshu Dwivedi, Chris Clark and David Thiel, "Mobile Application Security," 1st Ed., McGraw-Hill Osborne Media, 2010.*

Web sites:

- www.wikipedia.com
- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *New books on Mobile computing*

	Course Coordinator	**Head of Department**
Name	Prof. Dr. Amany sarhan	Prof. Dr. Amany sarhan
Name (Arabic)	أ. د. أمانى سرحان	أ. د. امانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Code / Course Title: CCE4243 / Elective course (4): Mobile Computing

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding						Intellectual Skills			Professional and Practical Skills				General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3
Basics of mobile computing	X															
Systems architecture	X	X					X			X				X		
Medium access control protocols		X	X				X	X		X						
Wireless local area networks				X			X	X		X	X			X		
Connection and location management			X				X	X			X					
Routing Protocols		X	X	X				X			X			X		
Mobile IP / wireless TCP		X	X	X	X			X			X		X	X		
Roaming and mobile handoff			X		X	X		X		X		X				
Wireless application protocol (WAP)					X	X			X	X		X	X		X	X
Security and authentication					X	X			X	X		X		X	X	X
Examples of mobile systems						X			X	X		X	X		X	X

Course coordinator: Prof. Dr. Amany sarhan

Head of Department: Prof. Dr. Amany sarhan

Course Specification

Course Title	**Elective course (1): Computer – Aided Design**	
Course Code	**CCE3224**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Reda Elbasiony**	
Teaching Staff		
Branch / Level	**Third year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce an overview of the technologies underlying modern mobile computing environments.
- Assist the student to be familiar with the new trends in mobile computing fields.
- Help the student to work with the mobile computing technology.
- Provide the students with examples on the applications of mobile computing.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. List the mobile computing application technologies, operating systems and communications.
A2. Mention advanced Network Technologies, design and security issues for enterprise wide mobile-enabled computer systems
A3. Enumerate the strategies for the design and deployment of computer systems incorporating mobile computing
A4. List the strategies for managing modern networked computer systems
A5. List the techniques for evaluating and managing the performance of computer systems and mobile communications
A6. Describe the technologies, tools and techniques for building and deploying mobile computer systems

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Synthesis of information from a variety of different sources
B2. Discuss the issues surrounding the Integration of theory and practice
B3. Plan, conduct and write up an academic piece of research.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Analyze, design, plan, build and deploy mobile technology enabled distributed computer systems using a variety of current Advanced Network Technologies and application technologies and architectures
C2. Evaluate and select appropriate technologies and tools for building modern mobile based computer systems
C3. Manage the development process in an individual or team context.
C4. Critically evaluate new and emerging mobile computing and communications technologies in terms of their suitability for particular development purposes.
C5. Manage and maintain the necessary network and mobile communications infrastructure to support a mobile technology enabled enterprise software system
C6. Design and build mobile computer systems and networks fit for a given business or e-commerce purpose.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Manage their own learning and development, and time management and organizational skills.

3. Course Contents

Week	Topics
1	Basics of mobile computing
2-3	Systems architecture
4-5	Medium access control protocols
6	Wireless local area networks
7-8	Connection and location management
9	Routing Protocols
10	Mobile IP / wireless TCP
11	Roaming and mobile handoff
12	Wireless application protocol (WAP)
13	Security and authentication
14	Examples of mobile systems

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %
Oral Assessment	--	--	--
Practical Examination	--	--	--

Semester work	5 hrs	Weeks: 3,6,9,13	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *F. Adelstein, S.K.S. Gupta, G.G. Richard III and L. Schwiebert, Fundamentals of Mobile and Pervasive Computing, McGraw Hill, 2005.*
- *Jochen Schiller, "Mobile Communications," 2nd Ed., Pearson Education, 2003.*
- *Himanshu Dwivedi, Chris Clark and David Thiel, "Mobile Application Security," 1st Ed., McGraw-Hill Osborne Media, 2010.*

Web sites:

- www.wikipedia.com
- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *New books on Mobile computing*

	Course Coordinator	**Head of Department**
Name	Dr. Reda Elbasiony	Prof. Dr. Amany sarhan
Name (Arabic)	د. رضا البسيونى	أ. د.امانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Code / Course Title: CCE3224 / Elective course (1): Computer-Aided Design

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding						Intellectual Skills			Professional and Practical Skills				General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3
Basics of mobile computing	X															
Systems architecture	X	X					X			X				X		
Medium access control protocols		X	X				X	X		X						
Wireless local area networks				X			X	X		X	X			X		
Connection and location management			X				X	X			X					
Routing Protocols		X	X	X				X			X			X		
Mobile IP / wireless TCP		X	X	X	X			X			X		X	X		
Roaming and mobile handoff			X		X	X		X		X		X				
Wireless application protocol (WAP)					X	X			X	X		X	X		X	X
Security and authentication					X	X			X	X		X		X	X	X
Examples of mobile systems						X			X	X		X	X		X	X

Course coordinator: Dr. Reda Elbasiony **Head of Department: Prof. Dr. Amany sarhan**

Course Specification

Course Title	**Elective course (2):** Real-Time Systems	
Course Code	**CCE4132**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mohamed Arafa**	
Teaching Staff		
Branch / Level	**Fourth year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce an overview of the technologies underlying modern mobile computing environments.
- Assist the student to be familiar with the new trends in mobile computing fields.
- Help the student to work with the mobile computing technology.
- Provide the students with examples on the applications of mobile computing.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. List the mobile computing application technologies, operating systems and communications.
A2. Mention advanced Network Technologies, design and security issues for enterprise wide mobile-enabled computer systems
A3. Enumerate the strategies for the design and deployment of computer systems incorporating mobile computing
A4. List the strategies for managing modern networked computer systems
A5. List the techniques for evaluating and managing the performance of computer systems and mobile communications
A6. Describe the technologies, tools and techniques for building and deploying mobile computer systems

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Synthesis of information from a variety of different sources
B2. Discuss the issues surrounding the Integration of theory and practice
B3. Plan, conduct and write up an academic piece of research.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Analyze, design, plan, build and deploy mobile technology enabled distributed computer systems using a variety of current Advanced Network Technologies and application technologies and architectures
C2. Evaluate and select appropriate technologies and tools for building modern mobile based computer systems
C3. Manage the development process in an individual or team context.
C4. Critically evaluate new and emerging mobile computing and communications technologies in terms of their suitability for particular development purposes.
C5. Manage and maintain the necessary network and mobile communications infrastructure to support a mobile technology enabled enterprise software system
C6. Design and build mobile computer systems and networks fit for a given business or e-commerce purpose.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Manage their own learning and development, and time management and organizational skills.

3. Course Contents

Week	Topics
1	Basics of mobile computing
2-3	Systems architecture
4-5	Medium access control protocols
6	Wireless local area networks
7-8	Connection and location management
9	Routing Protocols
10	Mobile IP / wireless TCP
11	Roaming and mobile handoff
12	Wireless application protocol (WAP)
13	Security and authentication
14	Examples of mobile systems

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %
Oral Assessment	--	--	--

Practical Examination	--	--	--
Semester work	5 hrs	Weeks: 3,6,9,13	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *F. Adelstein, S.K.S. Gupta, G.G. Richard III and L. Schwiebert, Fundamentals of Mobile and Pervasive Computing, McGraw Hill, 2005.*
- *Jochen Schiller, "Mobile Communications," 2nd Ed., Pearson Education, 2003.*
- *Himanshu Dwivedi, Chris Clark and David Thiel, "Mobile Application Security," 1st Ed., McGraw-Hill Osborne Media, 2010.*

Web sites:

- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *New books on Mobile computing*

	Course Coordinator	**Head of Department**
Name	Dr. Mohamed Arafa	Prof. Dr. Amany sarhan
Name (Arabic)	د. محمد عرفة	أ. د.امانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Code / Course Title: CCE4132 / Elective course (2): Real-Time Systems

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding						Intellectual Skills			Professional and Practical Skills				General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3
Basics of mobile computing	X															
Systems architecture	X	X					X			X				X		
Medium access control protocols		X	X				X	X		X						
Wireless local area networks				X			X	X		X	X			X		
Connection and location management			X				X	X			X					
Routing Protocols		X	X	X				X			X			X		
Mobile IP / wireless TCP		X	X	X	X			X			X		X	X		
Roaming and mobile handoff			X		X	X		X		X		X				
Wireless application protocol (WAP)					X	X			X	X		X	X		X	X
Security and authentication					X	X			X	X		X		X	X	X
Examples of mobile systems						X			X	X		X	X		X	X

Course coordinator: Dr. Mohamed Arafa **Head of Department: Prof. Dr. Amany sarhan**

Course Specification

Course Title	**Elective course (2): Adaptive Control**	
Course Code	**CCE4133**	
Academic Year	**2019-2020**	
Coordinator	**Dr. Mohamed Arafa**	
Teaching Staff		
Branch / Level	**Fourth year**	
Semester	**First term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce an overview of the technologies underlying modern mobile computing environments.
- Assist the student to be familiar with the new trends in mobile computing fields.
- Help the student to work with the mobile computing technology.
- Provide the students with examples on the applications of mobile computing.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. List the mobile computing application technologies, operating systems and communications.
A2. Mention advanced Network Technologies, design and security issues for enterprise wide mobile-enabled computer systems
A3. Enumerate the strategies for the design and deployment of computer systems incorporating mobile computing
A4. List the strategies for managing modern networked computer systems
A5. List the techniques for evaluating and managing the performance of computer systems and mobile communications
A6. Describe the technologies, tools and techniques for building and deploying mobile computer systems

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Synthesis of information from a variety of different sources
B2. Discuss the issues surrounding the Integration of theory and practice
B3. Plan, conduct and write up an academic piece of research.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Analyze, design, plan, build and deploy mobile technology enabled distributed computer systems using a variety of current Advanced Network Technologies and application technologies and architectures
C2. Evaluate and select appropriate technologies and tools for building modern mobile based computer systems
C3. Manage the development process in an individual or team context.
C4. Critically evaluate new and emerging mobile computing and communications technologies in terms of their suitability for particular development purposes.
C5. Manage and maintain the necessary network and mobile communications infrastructure to support a mobile technology enabled enterprise software system
C6. Design and build mobile computer systems and networks fit for a given business or e-commerce purpose.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Manage their own learning and development, and time management and organizational skills.

3. Course Contents

Week	Topics
1	Basics of mobile computing
2-3	Systems architecture
4-5	Medium access control protocols
6	Wireless local area networks
7-8	Connection and location management
9	Routing Protocols
10	Mobile IP / wireless TCP
11	Roaming and mobile handoff
12	Wireless application protocol (WAP)
13	Security and authentication
14	Examples of mobile systems

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %
Oral Assessment	--	--	--

Practical Examination	--	--	--
Semester work	5 hrs	Weeks: 3,6,9,13	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *F. Adelstein, S.K.S. Gupta, G.G. Richard III and L. Schwiebert, Fundamentals of Mobile and Pervasive Computing, McGraw Hill, 2005.*
- *Jochen Schiller, "Mobile Communications," 2nd Ed., Pearson Education, 2003.*
- *Himanshu Dwivedi, Chris Clark and David Thiel, "Mobile Application Security," 1st Ed., McGraw-Hill Osborne Media, 2010.*

Web sites:

- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *New books on Mobile computing*

	Course Coordinator	**Head of Department**
Name	Dr. Mohamed Arafa	Prof. Dr. Amany sarhan
Name (Arabic)	د.محمد عرفة	أ. د.امانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Code / Course Title: CCE4133 / Elective course (2): Adaptive Control

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding						Intellectual Skills			Professional and Practical Skills				General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3
Basics of mobile computing	X															
Systems architecture	X	X					X			X				X		
Medium access control protocols		X	X				X	X		X						
Wireless local area networks				X			X	X		X	X			X		
Connection and location management			X				X	X			X					
Routing Protocols		X	X	X				X			X			X		
Mobile IP / wireless TCP		X	X	X	X			X			X		X	X		
Roaming and mobile handoff			X		X	X		X		X		X				
Wireless application protocol (WAP)					X	X			X	X		X	X		X	X
Security and authentication					X	X			X	X		X		X	X	X
Examples of mobile systems						X			X	X		X	X		X	X

Course coordinator: Dr. Wael Elawady **Head of Department: Prof. Dr. Amany sarhan**

Course Specification

Course Title	**Elective course (2): Stochastic Control**	
Course Code	**CCE4134**	
Academic Year	**2019-2020**	
Coordinator	**Assoc. Prof. Dr Elsayed Sallam**	
Teaching Staff		
Branch / Level	**Fourth year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce an overview of the technologies underlying modern mobile computing environments.
- Assist the student to be familiar with the new trends in mobile computing fields.
- Help the student to work with the mobile computing technology.
- Provide the students with examples on the applications of mobile computing.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. List the mobile computing application technologies, operating systems and communications.
A2. Mention advanced Network Technologies, design and security issues for enterprise wide mobile-enabled computer systems
A3. Enumerate the strategies for the design and deployment of computer systems incorporating mobile computing
A4. List the strategies for managing modern networked computer systems
A5. List the techniques for evaluating and managing the performance of computer systems and mobile communications
A6. Describe the technologies, tools and techniques for building and deploying mobile computer systems

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Synthesis of information from a variety of different sources
B2. Discuss the issues surrounding the Integration of theory and practice
B3. Plan, conduct and write up an academic piece of research.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Analyze, design, plan, build and deploy mobile technology enabled distributed computer systems using a variety of current Advanced Network Technologies and application technologies and architectures
C2. Evaluate and select appropriate technologies and tools for building modern mobile based computer systems
C3. Manage the development process in an individual or team context.
C4. Critically evaluate new and emerging mobile computing and communications technologies in terms of their suitability for particular development purposes.
C5. Manage and maintain the necessary network and mobile communications infrastructure to support a mobile technology enabled enterprise software system
C6. Design and build mobile computer systems and networks fit for a given business or e-commerce purpose.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Manage their own learning and development, and time management and organizational skills.

3. Course Contents

Week	Topics
1	Basics of mobile computing
2-3	Systems architecture
4-5	Medium access control protocols
6	Wireless local area networks
7-8	Connection and location management
9	Routing Protocols
10	Mobile IP / wireless TCP
11	Roaming and mobile handoff
12	Wireless application protocol (WAP)
13	Security and authentication
14	Examples of mobile systems

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %
Oral Assessment	--	--	--
Practical Examination	--	--	--

Semester work	5 hrs	Weeks: 3,6,9,13	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *F. Adelstein, S.K.S. Gupta, G.G. Richard III and L. Schwiebert, Fundamentals of Mobile and Pervasive Computing, McGraw Hill, 2005.*
- *Jochen Schiller, "Mobile Communications," 2nd Ed., Pearson Education, 2003.*
- *Himanshu Dwivedi, Chris Clark and David Thiel, "Mobile Application Security," 1st Ed., McGraw-Hill Osborne Media, 2010.*

Web sites:

- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *New books on Mobile computing*

	Course Coordinator	**Head of Department**
Name	Assoc. Prof. Dr. El Sayed Sallam	Prof. Dr. Amany sarhan
Name (Arabic)	أ. د.م. السيد سلام	أ. د.امانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Code / Course Title: CCE4134 / Elective course (2): Stochastic Control

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding						Intellectual Skills			Professional and Practical Skills				General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3
Basics of mobile computing	X															
Systems architecture	X	X					X			X				X		
Medium access control protocols		X	X				X	X		X						
Wireless local area networks				X			X	X		X	X			X		
Connection and location management			X				X	X			X					
Routing Protocols		X	X	X				X			X			X		
Mobile IP / wireless TCP		X	X	X	X			X			X		X	X		
Roaming and mobile handoff			X		X	X		X		X		X				
Wireless application protocol (WAP)					X	X			X	X		X	X		X	X
Security and authentication					X	X			X	X		X		X	X	X
Examples of mobile systems						X			X	X		X	X		X	X

Course coordinator: Assoc. Prof. Dr. El Sayed Sallam **Head of Department: Prof. Dr. Amany sarhan**

Course Specification

Course Title	**Elective course (4): Computer Systems Evaluation**	
Course Code	**CCE4241**	
Academic Year	**2019-2020**	
Coordinator	**Prof. Dr. Amany sarhan**	
Teaching Staff		
Branch / Level	**Fourth year**	
Semester	**Second term**	
Pre-Requisite	**NA**	
Course Delivery	**Lecture**	**14 x 3 h lectures**
	Practical	**14 x 2 h practical**
Parent Department	**Computer and Control Engineering**	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introduce an overview of the technologies underlying evaluating computer systems.
- Assist the student to be familiar with the new trends in computer evaluation field.
- Provide the students with examples on evaluation.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

A1. List the mobile computing application technologies, operating systems and communications.
A2. Mention advanced Network Technologies, design and security issues for enterprise wide mobile-enabled computer systems
A3. Enumerate the strategies for the design and deployment of computer systems incorporating mobile computing
A4. List the strategies for managing modern networked computer systems
A5. List the techniques for evaluating and managing the performance of computer systems and mobile communications
A6. Describe the technologies, tools and techniques for building and deploying mobile computer systems

B. Intellectual skills:

By the end of this course, the students should be able to:

B1. Synthesis of information from a variety of different sources
B2. Discuss the issues surrounding the Integration of theory and practice
B3. Plan, conduct and write up an academic piece of research.

C. Professional and practical skills:

By the end of this course, the students should be able to:

C1. Analyze, design, plan, build and deploy mobile technology enabled distributed computer systems using a variety of current Advanced Network Technologies and application technologies and architectures
C2. Evaluate and select appropriate technologies and tools for building modern mobile based computer systems
C3. Manage the development process in an individual or team context.
C4. Critically evaluate new and emerging mobile computing and communications technologies in terms of their suitability for particular development purposes.
C5. Manage and maintain the necessary network and mobile communications infrastructure to support a mobile technology enabled enterprise software system
C6. Design and build mobile computer systems and networks fit for a given business or e-commerce purpose.

D. General and transferable skills:

By the end of this course, the students should be able to:

D1. Obtain information retrieval skills through books and the WWW and to be able to use general IT facilities.
D2. Work competently among team workers of different task assignments.
D3. Manage their own learning and development, and time management and organizational skills.

3. Course Contents

Week	Topics
1	Basics of mobile computing
2-3	Systems architecture
4-5	Medium access control protocols
6	Wireless local area networks
7-10	Worload characterization, Performance criteria, Scheduling
11-13	Markovian queing models, Networks of quese, Unified performance
14	Reliability evaluation - simulation

4. Teaching and Learning Methods

4.1- Lectures

4.2- Problem solving

4.3- Reports

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 hrs	Week: 16	68 %
Oral Assessment	--	--	--
Practical Examination	--	--	--
Semester work	5 hrs	Weeks: 3,6,9,13	32 %

6. List of references

Course notes: Prepared by the lecturer and handed to the students at the lectures.

Essential Books:

- *F. Adelstein, S.K.S. Gupta, G.G. Richard III and L. Schwiebert, Fundamentals of Mobile and Pervasive Computing, McGraw Hill, 2005.*
- *Jochen Schiller, "Mobile Communications," 2nd Ed., Pearson Education, 2003.*
- *Himanshu Dwivedi, Chris Clark and David Thiel, "Mobile Application Security," 1st Ed., McGraw-Hill Osborne Media, 2010.*

Web sites:

- www.ieeexplore.ieee.org
- www.ece.eng.ua.edu

7. Facilities required for teaching and learning

- *New books on Mobile computing*

	Course Coordinator	Head of Department
Name	Prof. Dr. Amany sarhan	Prof. Dr. Amany sarhan
Name (Arabic)	أ. د. أمانى سرحان	أ. د. أمانى سرحان
Signature		
Date	3/ 9 /2019	3/ 9 /2019

Course contents – Course ILOs Matrix

Code / Course Title: CCE4241 / Elective course (4): Computer Systems Evaluation

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding						Intellectual Skills			Professional and Practical Skills				General and Transferable Skills		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3
Basics of mobile computing	X															
Systems architecture	X	X					X			X				X		
Medium access control protocols		X	X				X	X		X						
Wireless local area networks				X			X	X		X	X			X		
Connection and location management			X				X	X			X					
Routing Protocols		X	X	X				X			X			X		
Mobile IP / wireless TCP		X	X	X	X			X			X		X	X		
Roaming and mobile handoff			X		X	X		X		X		X				
Wireless application protocol (WAP)					X	X			X	X		X	X		X	X
Security and authentication					X	X			X	X		X		X	X	X
Examples of mobile systems						X			X	X		X	X		X	X

Course coordinator: Prof. Dr. Amany sarhan **Head of Department: Prof. Dr. Amany sarhan**