Program Specifications of

Information Technology (IT 2016-2017)

University: Mansoura **Faculty:** Computers and Information Sciences

A- Basic Information

1- Program title: B. Sc. in Information Technology

2- Program type: ☑ Single ☐ Double ☐ Multiple

3- Faculty: Computers and Information Sciences

4- Department: Information Technology

5- Coordinator(s) : Dr. Osama Ouda

6- External evaluator(s): Prof. Ibrahim El-Hennawy

7- Last date of program specifications approval:

B- Professional Information

1- Program Attributes

As per the NARS for Computing and Information, by the end of the program the students will have the ability to:

1- Knowledge of computing and mathematics appropriate to the discipline.
2- Analyze a problem, and identify and define the computing requirements appropriate to its solution.
3- Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.

4- Demonstrate independent critical thinking and problem solving skills and function effectively on a team to accomplish a common goal.
5- An understanding of professional, ethical, legal, security and social issues and responsibilities.
6- Communicate effectively with a range of audiences.
7- Analyze the local and global impact of computing on individuals, organizations, and society.
8- Recognition of the need for and an ability to engage in continuing professional development.
9- Use current techniques, skills, and tools necessary for Information technology practice and in the creation of an effective project plan.
10- Use and apply current technical concepts and practices in the core information technologies subjects.
11- Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
12- Address information technologies problems of organizations or individuals.
13- Effectively integrate IT-based solutions into the user environment.
14- Understand the best practices and standards and their application.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and Understanding

a1. Essential facts, concepts, principles and theories relating to computing and information and computer applications as appropriate to the program of study.

a2. Modeling and design of computer-based systems bearing in mind the trade-offs.

a3. Tools, practices and methodologies used in the specification, design, implementation and evaluation of computer software systems.

a4. Criteria and specifications appropriate to specific problems, and plan strategies for their solution.

a5. The extent to which a computer-based system meets the criteria defined for its current use and future development.

a6. The current and underlying technologies that support computer processing and inter-computer communication.

a7. Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.

a8. Management and economics principles relevant to computing and information disciplines.

a9. Professional, moral and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.

a10. Current developments in computing and information research.

a11. Requirements, practical constraints and computer-based systems.

a12. Demonstrate basic knowledge and understanding of fundamental principles of core computing.

a13. Demonstrate strong knowledge of fundamentals of programming and the construction of computer-based systems, data structures and algorithms, software engineering techniques and information retrieval.

a14. Provide a deeper understanding of some aspects of the subject, such as multimedia, computer and communication network, data mining and knowledge discovery, information storage and retrieval systems, mobile Communication Systems, pattern recognition, artificial Intelligence, cryptography and network security.

a15. Show the understanding of technologies for the design, development and management of database systems, systems analysis and design and of information retrieval systems.

a16. Know the role of human factors in the design of Information Technology systems.

a17. Apply tools and techniques for the design and development of applications.

a18. Know methods for the construction of web-based materials and systems, design of internet-based systems.

a19. Provide an understanding of legal, professional and moral aspects of the exploitation of IT.

a20. Understand the broad context within computer information technology such as quality, reliability, enterprise, employment law, accounting and health.

a21. Understand the challenges inherent in the maintenance and evolution of IT-based systems, and the techniques and best practices currently available for dealing with them.

B. Intellectual Skills

b1. Analyze computing problems and provide solutions related to the design and construction of computing systems.

b2. Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.

b3. Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.

b4. Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.

b5. Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.

b6. Evaluate the results of tests to investigate the functionality of computer systems.

b7. Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

b8. Familiar with the professional, legal, moral and ethical issues relevant to the computing industry.

b9. Evaluate research papers in a range of knowledge areas.

b10. Information technology systems problems, set goals towards solving them, observe results, reason and apply judgment.

b11. Identify attributes, components, relationships, patterns, main ideas, and errors.

b12. Summarize the proposed solutions ad their results.

b13. Restrict solution methodologies upon their results.

b14. Establish criteria, and verify solutions

b15. Identify a range of solutions and critically evaluate and justify proposed design solutions.

b16. Solve information technology problems with pressing commercial or industrial constraints.

b17. Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.

b18. Perform problem analysis from written descriptions; derive requirements specifications from an understanding of problems (analysis, synthesis).

b19. Create and/or justify designs to satisfy given requirements (synthesis, evaluation, application).

b20. Recognize the professional, moral and ethical issues of involved in the exploitation of Information Technology and be guided by their adoption, reflect on issues of professional practice within the discipline.

C. Professional and Practical Skills

c1. Operate computing equipment, recognizing its logical and physical properties, capabilities and limitations.

c2. Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.

c3. Deploy the equipment and tools used for the construction, maintenance and documentation of computer applications.

c4. Apply computing information retrieval skills in computing community environment and industry.

c5. Develop a range of fundamental research skills, through the use of online resources, technical repositories and library-based material

c6. Design, implement, maintain, and manage software systems.

c7. Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.

c8. Handle a mass of diverse data, assess risk and draw conclusions.

c9. Specify, investigate, analyze, design and develop computer-based systems using appropriate tools and techniques.

c10. Evaluate systems in terms of their quality and possible trade-offs, evaluate appropriate hardware and software solutions for given scenarios.

c11. Recognize risks or safety aspects involved in the operation of computer-based systems.

c12. Deploy tools for the implementation and documentation of computer-based systems.

c13. Work as part of a development team and to recognize the different roles of its members.

c14. Operate computing equipment efficiently, taking into account its logical and physical properties.

c15. Recognize and address professional, moral and ethical issues within the discipline.

c16. Effectively employ information-retrieval skills, (including the use of browsers, search engines, and on-line library catalogues), communicate effectively using a variety of communication methods, and communicate effectively with team members, managers and customers.

c17. Make effective use of general IT facilities, plan and manage a project to complete within budget and schedule

c18. Manage one's own learning and development, including time management and organizational skills.

c19. Present their work in the form of reports, oral presentations or an internet web site.

D. General and Transferable Skills

d1. Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.

d2. Demonstrate skills in group working, team management, time management and organizational skills.

d3. Show the use of information-retrieval.

d4. Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry or the academic community.

d5. Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.

d6. Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.

d7. Show the use of general computing facilities.

d8. Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.

3- Academic standards

3a External references for standards (Benchmarks)

The external references for standards considered in the development of this program were the National Academic Reference Standards (NARS) prepared by the Computing and Information education sector of the supreme council of universities in Egypt.

3b Comparison of provision to external references

Annex 1 of this document shows the relationship between the program courses and the program ILOs. Annex 2 shows the program attributes versus the program ILOs. In addition, Annex 3 and Annex 4 (xls files) explain how the ILOs of the current program compare to the requirements of the NARS.

4- Curriculum Structure and Contents

4a Program duration: Four academic years.
4b Program structure

1.	**No. of hours per week:** Lectures	**12**	Lab./Exercise:	**12**	Total:	**24**
2.	No. of credit hours: Compulsory	**105**	Elective:	**30**	Optional:	
3.	No. of credit hours of basic sciences courses:	**18**				
4.	No. of credit hours of courses of social sciences and humanities:	**15**				
5.	No. of credit hours of specialized courses:	**45**				
6.	No. of credit hours of other courses:	**48**				
7.	Practical/Field Training:	**9**				
8.	Program Levels (in credit-hours system):	**4**				

N.B. All hours are calculated on average per week-hours basis

5- Program courses

5.1 Level/Year of the program: 1 **Semester: 1**

a- Compulsory

Code No.	Course Title	Prereq.	No. of Units	No. of hours/week			Program ILOs Covered (By No.)
				Lect.	Lab.	Exer.	
CS111	Fundamentals of Computer Science	---	3	2	3	3	
CS112	Fundamentals of Programming	---	3	2	3	3	
UNI111	Discrete Mathematics	---	3	2	3	3	
UNI112	English for Computer Scientists	---	3	1	3	2	
UNI113	Physics	---	3	2	3	3	
UNI114	Human Rights	---	3	2	0	2	

5.2 Level/Year of the program: 1 **Semester: 2**

a- Compulsory

Code No.	Course Title	Prereq.	No. of Units	No. of hours/week			Program ILOs Covered (By No.)
				Lect.	Lab.	Exer.	
IT	Fundamentals of Information Technology	---	3	2	3	3	
CS123	Object Oriented Programming	---	3	2	3	3	
IS121	Fundamentals of Information Systems	---	3	2	3	3	
UNI125	Calculus	---	3	2	3	3	
IT124	Digital Logic Circuits	---	3	2	3	3	
UNI112	Probability Theory and Statistical Distributions (1)	---	3	2	3	3	

5.3 Level/Year of the program: 2 **Semester: 1**

a- Compulsory

Code No.	Course Title	Prereq.	No. of Units	No. of hours/week			Program ILOs Covered (By No.)
				Lect.	Lab.	Exer.	
CS211	Operating Systems	---	3	2	3	3	
IS211	Data Structures and Algorithms	---	3	2	3	3	
UNI211	Linear Algebra	---	3	2	3	3	
CS212	Computer Organization and Architecture	---	3	2	3	3	
IS211	Web Programming	---	3	2	3	3	

5.4 Level/Year of the program: 2 **Semester: 2**

a- Compulsory

Code No.	Course Title	Prereq.	No. of Units	No. of hours/week			Program ILOs Covered (By No.)
				Lect.	Lab.	Exer.	
UNI221	Probability Theory and Statistical Distributions (2)	UNI112	3	2	3	3	
IS222	Database Systems	---	3	2	3	3	
IT222	Data Communications	---	3	2	3	3	
IS223	Computer Graphics	---	3	2	3	3	
F223	Social, Ethical and Professional Issues	---	3	2	0	2	
US225	University selective	---	3	1	3	2	

b- University selective

Code No.	Course Title	Prereq.	No. of Units	No. of hours/week			Program ILOs Covered (By No.)
				Lect.	Lab.	Exer.	
	Operation Research	---	3				
	Cognitive psychology	---	3				
	Principles of Electronics	---	3				
	Law	---	3				
	Principles of Management	---	3				
	Numerical Analysis	---	3				

5.5 Level/Year of the program: 3 **Semester: 1**

a- Compulsory

Code No.	Course Title	Prereq.	No. of Units	No. of hours/week			Program ILOs Covered (By No.)
				Lect.	Lab.	Exer.	
IT311	Computer Networks	---	3	2	3	3	
CS311	Software Engineering	---	3	2	3	3	
IT312	Electronics	---	3	2	3	3	
IS313	Database Systems II	IS222	3	2	3	3	
UNI311	Research Methods	---	3	2	3	3	

5.6 Level/Year of the program: 3 **Semester: 2**

a- Compulsory

Code No.	Course Title	Prereq.	No. of Units	No. of hours/week			Program ILOs Covered (By No.)
				Lect.	Lab.	Exer.	
IT323	Soft Computing	---	3	2	3	3	
IT324	Image Processing	---	3	2	3	3	
IT325	Network Programming	---	3	2	3	3	
IT326	Human Computer Interaction	---	3	2	3	3	
IT321	Elective 1	---	3	2	3	3	

5.7 Level/Year of the program: 4 **Semester: 1**

a- Compulsory

Code No.	Course Title	Prereq.	No. of Units	No. of hours/week			Program ILOs Covered (By No.)
				Lect.	Lab.	Exer.	
IS411	Multimedia	---	3	2	3	3	
IT412	Mobile Computing	---	3	2	3	3	
IT413	Pattern Recognition	---	3	2	3	3	
IT414	Medical Informatics	---	3	2	3	3	
	Elective-2	---	3	2	3	3	
GP1	Graduate Project-1	---	2	2	3	-	

5.8 Level/Year of the program: 4 **Semester: 2**

a- Compulsory

Code No.	Course Title	Prereq.	No. of Units	No. of hours/week			Program ILOs Covered (By No.)
				Lect.	Lab.	Exer.	
IT421	Computer Security	---	3	2	3	3	
IS422	Data Mining	---	3	2	3	3	
IT423	Microprocessor Applications	---	3	2	3	3	
IT424	Selected Topics in IT	---	3	2	3	3	
	Elective-3	---	3	2	3	3	
GP2	Graduate Project-2	---	2	2	6	-	

Elective

Code No.	Course Title	Prereq.	No. of Units	No. of hours/week			Program ILOs Covered (By No.)
				Lect.	Lab.	Exer.	
IT331	Client Server Architectures	---	3				
CS333	Parallel Computing Basics	---	3				
IS331	Modeling and Simulation	---	3				
IT332	Advanced Computer Architectures	---	3				
IS332	Decision Support Systems	---	3				
CS312	Algorithms Analysis and Design	---	3				
IS432	Data Warehousing	---	3				
IT431	E-Learning	---	3				
IT432	Biometrics	---	3				
CS432	Embedded Systems	---	3				
IT431	VLSI Systems Design	---	3				
IT435	Computer Vision	---	3				
IT436	Systems Integration	---	3				
IT437	Speech Recognition	---	3				

6- Program admission requirements

Having Egyptian Secondary education or equivalent certificate with major in Mathematics.

7- Regulations for progression and program completion

7a Students must register during the official registration period at the times announced in the university calendar.

7b Student are required to complete successfully a minimum of 135 Credit Hours for graduation distributed as follows:

- University requirements: 15 Credit Hours
- College requirements: 66 Credit Hours (54 compulsory + 12 elective)
- Specialty requirements: 54 Credit Hours (36 compulsory + 18 elective)
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8- Evaluation of program intended learning outcomes

Evaluator	Tool	Sample %
1- Senior students	Evaluation sheet	
2- Alumni	Evaluation sheet & interview	**N/A**
3- Stakeholders **(**Employers)	Evaluation sheet & interview	
4-External Evaluator(s) (External Examiner(s))	Evaluation report	
5- Other		

Annex 1: ILOs - Course Matrix

	Course Name	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	a18	a19	a20	a21
First Year First Semester	Fund. of Computer Science	*		*				*				*	*	*			*	*	*			*
	Fundamentals of Programming	*		*				*					*	*				*	*	*	*	*
	Discrete Mathematics	*																		*		*
	English for Computer Scientists		*		*			*														
	Physics		*	*	*																	
	Human Rights	*				*		*		*							*			*	*	
First Year Second Semester	Fund. of Information Technology	*											*				*	*	*	*	*	*
	Object Oriented Programming	*		*				*						*				*	*	*	*	
	Fund. of Information Systems	*		*				*	*			*	*			*			*		*	*
	Calculus	*																*				
	Digital Logic Circuits	*					*	*														
	Probability Theory (1)	*	*		*													*		*		*
Second Year First Semester	Operating Systems	*		*		*	*	*			*	*		*				*		*	*	*
	Data Structures and Algorithms	*	*	*										*		*		*	*	*	*	*
	Linear Algebra																					
	Computer Organization	*	*	*				*			*	*		*								*
	Web Programming	*		*			*				*						*		*	*		
Second Year Second Semester	Probability Theory (2)																					
	Database Systems	*	*	*	*	*					*	*			*	*		*	*	*		*
	Data Communications	*					*	*							*	*	*	*		*		*
	Computer Graphics	*	*	*			*				*					*	*	*	*		*	
	Social, Ethical and Prof. Issues	*		*			*			*												
	University selective	*									*											
Third Year First Semester	Computer Networks	*	*				*							*			*					
	Software Engineering	*	*		*							*		*			*	*	*		*	*
	Electronics	*	*		*																	
	Database Systems II		*				*	*	*						*	*		*	*	*	*	*
	Research Methods	*		*	*					*	*							*				*
Third Year Second Semester	Soft Computing	*					*		*		*	*				*	*	*			*	*
	Image Processing	*		*			*						*			*	*	*			*	*
	Network Programming			*	*	*							*		*				*	*		*
	Human Computer Interaction	*	*					*				*		*			*	*	*		*	*
	Elective-1		*	*				*			*			*	*							
Fourth Year First Semester	Multimedia		*	*									*		*		*	*	*		*	*
	Mobile Computing	*			*		*					*			*		*	*		*	*	*
	Pattern Recognition	*	*		*								*		*	*	*	*				
	Medical Informatics	*	*	*														*				
	Elective-2	*	*	*		*					*		*					*				*
Fourth Year Second Semester	Computer Security	*			*		*								*		*	*	*	*	*	*
	Data Mining	*			*		*		*		*				*	*	*	*		*	*	*
	Microprocessor Applications	*		*				*										*				
	Selected Topics in IT	*	*	*	*				*		*		*	*								
	Elective-3	*		*		*		*						*								
	Biometrics	*		*	*										*	*		*		*	*	*

	Course Name	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	b14	b15	b16	b17	b18	b19	b20
First Year First Semester	Fund. of Computer Science		*															*			
	Fundamentals of Programming	*	*		*	*	*	*													
	Discrete Mathematics																				
	English for Computer Scientists																				
	Physics																				
	Human Rights								*												*
First Year Second Semester	Fund. of Information Technology		*								*	*	*			*					
	Object Oriented Programming	*	*	*	*	*	*													*	
	Fund. of Information Systems		*									*	*	*	*			*			
	Calculus																				
	Digital Logic Circuits		*	*		*															
	Probability Theory (1)																				
Second Year First Semester	Operating Systems	*	*	*	*		*	*										*		*	
	Data Structures and Algorithms	*	*	*	*	*	*	*				*	*		*	*		*			
	Linear Algebra																				
	Computer Organization																*				
	Web Programming	*			*	*	*				*							*		*	
Second Year Second Semester	Probability Theory (2)																				
	Database Systems	*	*	*	*	*	*					*					*	*			
	Data Communications		*														*	*			*
	Computer Graphics	*	*		*	*												*		*	*
	Social, Ethical and Prof. Issues								*												*
	University selective																				
Third Year First Semester	Computer Networks		*	*													*	*		*	
	Software Engineering	*	*	*	*	*	*	*			*	*	*	*	*	*	*	*		*	*
	Electronics																*				
	Database Systems II	*	*	*	*	*	*										*				
	Research Methods								*	*			*	*	*	*	*		*		*
Third Year Second Semester	Soft Computing	*	*	*	*	*	*	*			*	*	*	*	*	*		*	*		
	Image Processing	*	*	*	*	*	*													*	
	Network Programming	*	*	*	*	*	*	*									*	*		*	
	Human Computer Interaction	*	*					*				*			*	*	*	*		*	*
	Elective-1	*	*		*			*			*						*		*		
Fourth Year First Semester	Multimedia	*	*	*	*	*	*													*	
	Mobile Computing	*	*	*	*	*	*											*		*	
	Pattern Recognition	*	*	*	*	*	*	*			*	*		*	*					*	
	Medical Informatics	*	*	*	*	*	*													*	
	Elective-2	*	*				*					*	*	*				*			
Fourth Year Second Semester	Computer Security	*	*	*	*	*	*	*									*			*	*
	Data Mining	*	*	*	*	*	*					*			*		*				
	Microprocessor Applications	*	*	*													*	*			
	Selected Topics in IT									*	*	*		*	*						
	Elective-3																				
	Biometrics	*		*	*		*	*	*							*		*		*	

	Course Name	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19	d1	d2	d3	d4	d5	d6	d7	d8
First Year First Semester	Fund. of Computer Science	*	*		*	*									*					*	*		*	*				*
	Fundamentals of Programming	*	*			*		*	*								*	*	*	*	*		*					
	Discrete Mathematics					*																	*					
	English for Computer Scientists																			*			*			*		
	Physics																											
	Human Rights															*												*
First Year Second Semester	Fund. of Information Technology														*		*			*	*			*			*	
	Object Oriented Programming	*	*	*		*		*	*								*	*			*							
	Fund. of Information Systems																*	*	*	*				*				
	Calculus																								*			
	Digital Logic Circuits														*													*
	Probability Theory (1)																											
Second Year First Semester	Operating Systems	*			*		*								*		*		*	*	*	*						
	Data Structures and Algorithms														*		*	*	*	*	*	*			*			
	Linear Algebra																											
	Computer Organization	*		*			*								*		*	*			*	*						
	Web Programming																*		*	*	*	*						
Second Year Second Semester	Probability Theory (2)																								*			
	Database Systems														*		*			*	*	*						
	Data Communications														*						*	*						
	Computer Graphics														*		*	*			*	*						
	Social, Ethical and Prof. Issues																		*									
	University selective																								*			
Third Year First Semester	Computer Networks	*		*		*	*			*	*	*		*	*		*	*									*	*
	Software Engineering			*	*	*			*	*	*		*				*	*		*					*		*	*
	Electronics			*			*	*		*	*		*	*	*										*			
	Database Systems II	*			*		*		*	*	*			*	*		*			*					*	*		
	Research Methods	*	*	*				*	*	*		*	*	*			*		*	*						*		*
Third Year Second Semester	Soft Computing	*	*	*				*			*		*	*	*		*			*					*			*
	Image Processing					*	*	*			*		*		*					*					*			
	Network Programming	*		*						*			*	*	*		*	*									*	*
	Human Computer Interaction		*	*					*				*	*			*			*					*			
	Elective-1	*		*		*			*		*			*												*		
Fourth Year First Semester	Multimedia			*	*					*		*			*					*								*
	Mobile Computing	*		*	*			*			*	*		*	*		*	*							*			
	Pattern Recognition		*				*	*		*		*		*	*			*		*							*	
	Medical Informatics			*	*	*	*		*		*	*		*						*					*			
	Elective-2	*			*	*											*		*	*	*	*	*					
Fourth Year Second Semester	Computer Security			*		*			*		*	*		*	*	*				*							*	
	Data Mining	*			*	*			*		*	*			*					*						*		
	Microprocessor Applications		*		*			*		*		*			*											*		
	Selected Topics in IT	*	*		*		*		*		*	*		*	*		*								*			
	Elective-3	*		*		*		*		*		*		*											*			*
	Biometrics	*		*			*	*	*		*	*		*				*							*		*	*

Mansoura University

Faculty of Computers and Information Sciences

Course Specifications of

Fundamentals of Information Technology – IT121P – 2016/2017

University: Mansoura University **Faculty**: Computer and Information Sciences

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Program on which the course is given: General

Department offering the course: Department of Information Technology

Academic year/ Level: First Year

Date of specification approval:

A- Basic Information

Title : Fundamentals of Information Technology **Code :** IT121P

Credit Hours : 3 **Lecture :** 2 **Tutorial :** --- **Practical :** 2

B- Professional Information

1- Overall Aims of the Course

This course aim to provide the students with the introductory theory required to understand the components of computers systems, the operations of the systems and to expose students to some popular business application software.

A major component of the course is the practical application of the knowledge gained from the theoretical content.

2- Intended Learning Outcomes of the course (ILOs)

By completing this course successfully, the student will be able to:

a- Knowledge and Understanding

The student should acquire the knowledge and understanding of:

a1 - Essential facts, concepts, principles and theories relating to mobile computing and applications.

a12- Demonstrate basic knowledge and understanding of fundamental principles of core computing.

a16 - Know the role of human factors in the design of mobile systems.

a17 - Apply tools and techniques for the design and development of mobile applications.

a18- Know methods for the construction of web-based materials and systems, design of internet-based systems.

a19 - Provide an understanding of legal, professional and moral aspects of the exploitation of mobile systems.

a20 - Understand the broad context within computer information technology such as quality, reliability, and enterprise.

a21 - Understand the challenges inherent in the maintenance and evolution of mobile systems, and the techniques and best practices currently available for dealing with them.

b- Intellectual Skills

The student should be able to:

b2 - Realize the concepts, principles, theories and practices behind mobile computing and information as an academic discipline.

b10- Information technology systems problems, set goals towards solving them, observe results, reason and apply judgment.

b11- Identify attributes, components, relationships, patterns, main ideas, and errors.

b12- Summarize the proposed solutions and their results.

b15- Identify a range of solutions and critically evaluate and justify proposed design solutions.

c- Professional and Practical Skills

The student should be able to:

c14 - Operate mobile computing equipment efficiently, taking into account its logical and physical properties.

c16 - Effectively employ information-retrieval skills, (including the use of browsers, search engines, and on-line library catalogues), communicate effectively using a variety of communication methods, and communicate effectively with team members, managers and customers.

c19 - Present their work in the form of reports, oral presentations or an internet web site.

General and Transferable Skills

The student should be able to:

d1 – Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.

d4- Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry or the academic community.

d7- Show the use of general computing facilities.

3- Contents

No	Course Content	Lecture	Practical	Total
1	Operating Systems (Computer Classifications, Overview of Applications, Mail, News, Editors, RMIT News, FTP, Telnet.)	**2**	**---**	**2**
2	• Single User Operating Systems, Multi User Operating Systems.	**6**	**---**	**6**
3	The Internet, Netiquette, Ethics.	**2**	**---**	**2**
4	• The Programming Process, Programming languages, Collaborative Work.	**2**	**---**	**2**
5	• The Central Processor, Executing Program Instructions.	**2**	**---**	**2**
6	Spreadsheet Introduction. Spreadsheets and Graphics. • • •	**4**	**---**	**4**
7	Project Management Introduction. Managing a project.	**2**	**---**	**2**
8	Report Writing, Technical Reports, Document Enhancement.	**2**	**---**	**2**
9	Input and Output devices, Storage devices. Creating a Home Page, Introduction to HTML, Writing a resume. Systems Development Introduction, Systems Development Life Cycle.	**---**	**20**	**20**
	Total Hours	**22**	**20**	**42**

4- Assessment Schedule

Assessment Method	No.	Description	Week No.	Weight (%)
Assignment	1	Report	4	5
Written Exams	2	Midterm Exam	7	5
Lab exam	3	Creating website	11	20
Oral Exam	4	Oral questions	11	10
Written Exams	5	Final Exam	14	60
Total				100

5- List of references

5.1 Course Notes

- Lecture handouts delivered to students at the end of each lecture.

5.2 Essential Books (Text Books)

Fundamentals of Information Technology (Third Edition)
Originally published: August 2002
Author: Deepak Bharihoke

Fundamentals of Information Technology
Dr. Durgesh Pant, Mahesh Kumar Sharma
Laxmi Publications Pvt Limited, 2008 - 227 pages

6- Facilities Required for Teaching and Learning

- Data show.

Course Content/ILO Matrix

Course Content	a1	a4	a6	a11	a14	a16	a17	a19	a20	a21	b1	b2	b3	b4	b5	b6	b17	b19	c1	c3	c4	c7	c10	c11	c13	c14	c16	c17	d5
Operating Systems	●			●		●		●		●		●	●										●						
Single User Operating Systems	●	●	●	●	●	●	●	●	●		●	●	●	●								●	●	●					●
The Internet, Netiquette, Ethics.	●		●	●								●	●								●	●	●						
The Programming Process	●	●	●	●		●		●	●	●		●	●		●		●	●	●	●		●	●						
The Central Processor	●	●	●	●		●		●	●	●		●	●		●		●	●				●	●	●					
Spreadsheet Introduction	●	●	●		●					●	●	●		●		●						●	●						●
Project Management Introduction	●	●		●	●				●	●	●	●	●	●	●	●	●	●				●	●						●
Student Activity		●		●	●	●		●	●		●		●	●	●			●	●	●	●		●		●		●		

Learning Method/ILO Matrix

Course Content	a1	a4	a6	a11	a14	a16	a17	a19	a20	a21	b1	b2	b3	b4	b5	b6	b17	b19	c1	c3	c4	c7	c10	c11	c13	c14	c16	c17	d5
Lectures	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●		●
Practical			●	●				●	●					●	●	●	●	●			●	●	●	●	●	●	●	●	●

Assessment Methods/ILO Matrix

Course Content	a1	a4	a6	a11	a14	a16	a17	a19	a20	a21	b1	b2	b3	b4	b5	b6	b17	b19	c1	c3	c4	c7	c10	c11	c13	c14	c16	c17	d5
Assignment			●	●				●	●					●	●	●	●	●			●	●	●		●		●	●	
Midterm		●		●	●		●		●	●	●	●	●																
Oral Exam		●		●		●	●	●	●					●	●	●	●	●					●						
Lab Exam				●			●				●					●	●	●	●	●						●		●	
Final Exam	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				●	●	●					●

Course Coordinator: DR. Osama Oouda
Head of Department: Prof. Ahmed Atwan
Date: 17/8/2017

Mansoura University

Faculty of Computers and Information Sciences

Course Specification of

Digital Logic Circuit – IT124P – 2016/2017

University: Mansoura University **Faculty**: Computers and Information Sciences

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Program on which the course is given: General

Department offering the course: Information Technology

Academic Year/Level: 2016/2017 – Level 001

Date: 16/8/2017

C- Basic Information

1- Title : Digital Logic Circuits **Code :** IT124P

2- Credit Hours : 3 **Lectures :** 2 **Tutorial :** 0 **Practical :** 2

D- Professional Information

1- Overall Aims of the Course

This course aims to:

- Provide students with an introduction to system modeling using both computer simulation and mathematical techniques.
- Give students a broad oversight of the discipline of logic design using a variety of modeling paradigms such as simulation, queuing theory, stochastic process algebras and stochastic Petri nets.
- Allow students to understand the ideas underlying the creation and implementation of integrated circuits.

2- Intended Learning Outcomes of the course (ILOs)

By completing this course successfully, the student will be able to:

a- Knowledge and Understanding

a1. Understand the essential professional standards relevant to Computer Science.

a6. Understand the fundamental topics in Computers, including hardware and software architectures, operating systems, parallel and distributed computing, systems and software tools.

a7. Select advanced topics to provide a deeper understanding of some aspects of the subject

b- Intellectual Skills

b2. Perform comparisons between (algorithms, software design methods, techniques...etc.).

b3. Summarize the proposed solutions and their results.

b5. Restrict solution methodologies upon their results.

c- Professional and Practical Skills

c3. Acquire knowledge and skills through a staged approach in which they achieve different levels as each academic term progresses.

c5. Communicate effectively by oral, written and visual means.

c9. Specify, design, and implement computer-based systems.

c10. Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.

d- Transferable Skills

d2. Demonstrate skills in group working, team management, time management and organizational skills.

d4. Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry or the academic community.

3- Contents

No	Course Content	Lecture	Practical	Total
1	Number system	3	3	6
2	Boolean operation and gates	3	3	6
3	Boolean Algebra	4	4	8
4	Simplification and K-map	6	6	12
5	Combinational logic circuits	4	4	8
6	Sequential logic circuits	4	4	8
Total Hours		**24**	**24**	**48**

4- Assessment Schedule

Assessment Method	No	Description	Week no	Weight (%)
Assignment	1	Sheet	3-4-5-6	10
Written Exams	2	Mid-term exam	7	10
Practical Exam	3	Small Project	10	10
Oral Exam	4	Oral questions	12	10
Written Exams	5	Final Exam	14	60

5- List of references

5.1 Course Notes

- Lecture handouts delivered to students at the end of each lecture.

5.2 Essential Books (Text Books)

- Introduction to Logic Design

6- Facilities Required for Teaching and Learning

- Data show.
- Speakers for audio and video files used to practice listening.

Course Content /ILOs Matrix

Course Content	a1	a6	a7	b2	b3	b5	c3	c5	c9	c10	d2	d4
Number system	•						•			•		
Boolean operation and gates	•		•	•		•	•					
Boolean Algebra		•			•	•				•		
Simplification and K-map	•		•					•		•		•
Combinational logic circuits	•				•				•		•	•
Sequential logic circuits	•										•	•

Learning Method /ILOs Matrix

Course Content	a1	a6	a7	b2	b3	b5	c3	c5	c9	c10	d2	d4
Lectures	•	•			•		•			•	•	
Tutorials	•		•	•		•	•	•	•			•

Assessment Methods/ILO Matrix

Assessment	a1	a6	a7	b2	b3	b5	c3	c5	c9	c10	d2	d4
Assignment	•	•	•		•		•			•	•	
Midterm	•	•	•	•		•						•
Practical Exam	•	•	•		•		•	•			•	•
Oral Exam	•	•	•									
Final Exam	•	•	•	•		•	•		•			

Course Coordinator: **Dr. Ahmed Atwan**
Head of Department: **Dr. Ahmed Atwan**
Date: **16/8/2017**

Mansoura University

Faculty of Computers and Information Sciences

Course Specification of

Computer Networks – IT311P – 2016/2017

University: Mansoura University **Faculty**: Computers and Information Sciences

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Program on which the course is given: General

Department offering the course: Information Technology

Academic Year/Level: third Year

Date: 16/8/2017

E- Basic Information

1- Title : Computer Networks **Code :** IT311P

2- Credit Hours : 3 **Lectures :** 2 **Tutorial :** 0 **Practical :** 2

F- Professional Information

1- Overall Aims of the Course

This course aims to:

- This course introduces principles and current trends in computer networks
- Give students a broad oversight of the discipline of network design using a variety of modeling paradigms such as simulation, queuing theory, switching and routing methods/protocols.
- The OSI and TCP/IP reference model will be used as a framework with the course processing through physical, data link, network, transport, and application layers

2- Intended Learning Outcomes of the course (ILOs)

By completing this course successfully, the student will be able to:

a- Knowledge and Understanding

a1. Understand the essential professional standards relevant to Computer Science.

a2. Modeling and design of computer-based systems bearing in mind the trade-offs.

a6. Understand the fundamental topics in Computers, including hardware and software architectures, operating systems, parallel and distributed computing, systems and software tools.

a13. Demonstrate strong knowledge of fundamentals of programming and the construction of computer-based systems, data structures and algorithms, software engineering techniques and information retrieval.

a16. Know the role of human factors in the design of Information Technology systems.

b- Intellectual Skills

b2. Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.

b3. Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.

b16. Solve information technology problems with pressing commercial or industrial constraints.

b17. Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.

c- Professional and Practical Skills

c1. Operate computing equipment, recognizing its logical and physical properties, capabilities and limitations.

c3. Summarize the proposed solutions and their results.

c16. Effectively employ information-retrieval skills, (including the use of browsers, search engines, and on-line library catalogues), communicate effectively using a variety of communication methods, communicate effectively with team members, managers and customers.

c17. Make effective use of general IT facilities, plan and manage a project to complete within budget and schedule.

d- Transferable Skills

D7. Show the use of general computing facilities.

D8. Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.

3- Contents

No	Course Content	Lecture	Practical	Total
1	Physical Layer communication (Cables, signals) and Network Topologies	3	3	6
2	Packet Communication and Network Types	3	3	6
3	Reference models	4	4	8
4	IP addressing (Internetworking)	6	6	12
5	Network Applications	4	4	8
6	Routing and Switching Techniques	4	4	8
Total Hours		**24**	**24**	**48**

4- Assessment Schedule

Assessment Method	No	Description	Week no	Weight (%)
Written Exams	1	Mid-term exam	7	20
Practical Exam	2	Practical Exam	10	10
Oral Exam	3	Oral questions	12	10
Written Exams	4	Final Exam	14	60

5- List of references

5.1 Course Notes

- Lecture handouts delivered to students at the end of each lecture.

5.2 Essential Books (Text Books)

- Fundamental of Networks

6- Facilities Required for Teaching and Learning

- Data show.
- Speakers for audio and video files used to practice listening.

Course Content /ILOs Matrix

	a1	a2	a6	a13	a16	B2	B3	B16	B17	C1	C3	C16	C17	D7	D8
Network Topologies	•						•			•	•				
Network Types	•		•	•		•	•						•		•
Reference models		•			•	•				•				•	•
IP addressing	•		•					•		•		•	•		
Network Applications	•				•				•		•	•	•	•	
Routing and Switching	•										•	•			

Learning Method /ILOs Matrix

	a1	a2	a6	a13	a16	B2	B3	B16	B17	C1	C3	C16	C17	D7	D8
Lectures	•	•	•	•	•		•			•	•			•	
Tutorials	•	•	•	•		•	•		•			•	•		•

Assessment Methods/ILO Matrix

	a1	a2	a6	a13	a16	B2	B3	B16	B17	C1	C3	C16	C17	D7	D8
Assignment	•	•		•			•			•	•				
Midterm	•	•	•	•		•	•		•			•	•		•
Practical	•	•	•	•	•	•				•				•	•

Exam															
Oral Exam	●	●	●	●				●		●		●	●		
Final Exam	●	●		●	●		●		●		●	●	●	●	●

Course Coordinator: **Dr. Ahmed Atwan**
Head of Department: **Dr. Ahmed Atwan**
Date: **16/8/2017**

Mansoura University

Faculty of Computers and Information Sciences

Course Specifications of

Pattern Recognition – IT413P – 2017/2018

University: Mansoura University **Faculty**: Computer and Information Sciences

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Program on which the course is given: Information Technology

Department offering the course: Department of Information Technology

Academic year/ Level: Fourth Year

Date of specification approval:

A- Basic Information

Title : Pattern Recognition **Code :** IT413P

Credit Hours : 3 **Lecture :** 2 **Tutorial :** --- **Practical :** 3

B- Professional Information

1- Overall Aims of the Course

This course concentrates on statistical pattern recognition techniques. We will talk about Bayesian decision theory, parametric and non-parametric density estimation, probabilistic graphical models, feature reduction and selection, and non-Bayesian classifiers.

2- Intended Learning Outcomes of the course (ILOs)

By completing this course successfully, the student will be able to:

a- Knowledge and Understanding

The student should acquire the knowledge and understanding of:

a1. Essential facts, concepts, principles and theories relating to computing and information and computer applications as appropriate to the program of study.
a2. Modeling and design of computer-based systems bearing in mind the trade-offs.
a4. Criteria and specifications appropriate to specific problems, and plan strategies for their solution.
a12. Demonstrate basic knowledge and understanding of fundamental principles of core computing.
a14. Provide a deeper understanding of some aspects of the subject, such as multimedia, computer and communication network, data mining and knowledge discovery, information storage and retrieval systems, mobile Communication Systems, pattern recognition, artificial Intelligence, cryptography and network security.
a15. Show the understanding of technologies for the design, development and management of database systems, systems analysis and design and of information retrieval systems.
a16. Know the role of human factors in the design of Information Technology systems.
a17. Apply tools and techniques for the design and development of applications.

b- Intellectual Skills

The student should be able to:

b1. Analyze computing problems and provide solutions related to the design and construction of computing systems.
b2. Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.
b3. Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.
b4. Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.
b5. Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.
b6. Evaluate the results of tests to investigate the functionality of computer systems.
b7. Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact.
b10. Information technology systems problems, set goals towards solving them, observe results, reason and apply judgment.
b11. Identify attributes, components, relationships, patterns, main ideas, and errors.
b13. Restrict solution methodologies upon their results.
b14. Establish criteria, and verify solutions**.**
b19. Create and/or justify designs to satisfy given requirements (synthesis, evaluation, application).

c- Professional and Practical Skills

The student should be able to:

c2. Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.
c6. Design, implement, maintain, and manage software systems.
c7. Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.
c9. Specify, investigate, analyze, design and develop computer-based systems using appropriate tools and techniques.
c11. Recognize risks or safety aspects involved in the operation of computer-based systems.
c13. Work as part of a development team and to recognize the different roles of its members.
c14. Operate computing equipment efficiently, taking into account its logical and physical properties.
c17. Make effective use of general IT facilities, plan and manage a project to complete within budget and schedule
c19. Present their work in the form of reports, oral presentations or an internet web site.

d- General and Transferable Skills

The student should be able to:

d7. Show the use of general computing facilities.

3- Contents

No	Course Content	Lecture	Practical	Total
1	Introduction to Pattern Recognition - Pattern recognition systems - The design cycle - An example	**2**	**---**	**2**
2	Bayesian Decision Theory - Modeling using continuous and discrete features - Discriminant functions - The Gaussian density - Error estimation	**2**	**---**	**2**
3	Parametric Models - Maximum-likelihood estimation - Bayesian estimation - Expectation-Maximization and mixture density estimation - Hidden Markov Models	**6**	**---**	**6**

No	Course Content	Lecture	Practical	Total
4	Non-parametric Methods - Density estimation - Histogram-based estimation - Parzen windows estimation - Nearest neighbor estimation	**2**	**---**	**2**
5	Probabilistic Graphical Models - Directed graphical models - Undirected graphical models - Inference using graphical models - Learning graphical models	**4**	**---**	**4**
6	Feature Reduction and Selection - Problems of dimensionality - Principal components analysis (PCA) - Linear discriminant analysis (LDA) - Manifold learning - Feature selection	**2**	**---**	**2**
7	Non-Bayesian Classifiers - k-nearest neighbor classifier - Linear discriminant functions - Support vector machines	**2**	**---**	**2**
8	Project to enable the students to get some hands-on experience in the design, implementation and evaluation of pattern recognition algorithms by applying them to real-world problems.	**2**	**---**	**2**
9	(Lab sessions)	**---**	**20**	**20**
	Total Hours	**22**	**20**	**42**

4- Assessment Schedule

Assessment Method	No.	Description	Week No.	Weight (%)
Assignment	1	Report	4	5
Written Exams	2	Midterm Exam	7	5
Lab exam	3	Project evaluation	11	20
Oral Exam	4	Oral questions	11	10
Written Exams	5	Final Exam	14	60
Total				100

5- List of references

5.3 Course Notes

- Lecture handouts delivered to students at the end of each lecture.

5.4 Essential Books (Text Books)

- K. P. Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012.

- C. M. Bishop, Pattern Recognition and Machine Learning, Springer, 2006.
- R. O. Duda, P. E. Hart, D. G. Stork, Pattern Classification, 2nd edition, John Wiley & Sons, Inc., 2000.
- S. Theodoridis, K. Koutroumbas, Pattern Recognition, 3rd edition, Academic Press, 2006.
- D. Koller, N. Friedman, Probabilistic Graphical Models: Principals and Techniques, MIT Press, 2009.
- A. Webb, Statistical Pattern Recognition, 2nd edition, John Wiley & Sons, Inc., 2002.
- T. Hastie, R. Tibshirani, J. Friedman, The Elements of Statistical Learning, Springer, 2003.
- K. Fukunaga, *Introduction to Statistical Pattern Recognition*, Academic Press, 1990.
- R. Schalkoff, *Pattern Recognition: Statistical, Structural and Neural Approaches*, John Wiley & Sons, Inc., 1992.
- A. K. Jain, R. C. Dubes, Algorithms for Clustering Data, Prentice Hall, 1988.

6- Facilities Required for Teaching and Learning

- Data show.

Course Content/ILO Matrix

Course Content	a1	a2	a4	a12	a14	a15	a16	b1	b2	b3	b4	b5	b6	b7	b10	b11	b13	b14	b19	c2	c6	c7	c9	c11	c13	c14	c17	c19	d7
Introduction to Pattern Recognition	●			●		●		●		●		●	●										●						
Bayesian Decision Theory	●	●	●	●	●	●	●	●	●		●	●	●	●								●	●	●					●
Parametric Models	●		●	●								●	●								●	●	●						
Non-parametric Methods	●	●	●	●		●		●	●	●		●	●		●		●	●	●	●		●	●						
Probabilistic Graphical Models	●	●	●	●		●		●	●	●		●	●		●		●	●				●	●	●					
Feature Reduction and Selection	●	●	●		●					●	●	●		●		●						●	●						●
Non-Bayesian Classifiers	●	●		●	●				●	●	●	●	●	●	●	●	●	●				●	●						●

Project		●		●	●	●		●	●		●		●	●	●			●	●	●	●		●		●		●		

Learning Method/ILO Matrix

Course Content	a1	a2	a4	a12	a14	a15	a16	b1	b2	b3	b4	b5	b6	b7	b10	b11	b13	b14	b19	c2	c6	c7	c9	c11	c13	c14	c17	c19	d7
Lectures	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●		●
Practical			●	●				●	●					●	●	●	●	●			●	●	●	●	●	●	●	●	●

Assessment Methods/ILO Matrix

Course Content	a1	a2	a4	a12	a14	a15	a16	b1	b2	b3	b4	b5	b6	b7	b10	b11	b13	b14	b19	c2	c6	c7	c9	c11	c13	c14	c17	c19	d7
Assignment			●	●				●	●					●	●	●	●	●			●	●	●		●		●	●	
Midterm		●		●	●		●		●	●	●	●	●																
Oral Exam		●		●		●	●	●	●					●	●	●	●	●					●						
Lab Exam				●			●				●					●	●	●	●	●						●		●	
Final Exam	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				●	●	●					●

Course Coordinator: Osama Ouda
Head of Department: Prof. Ahmed Atwan
Date: 30/7/2017

Mansoura University

Faculty of Computers and Information Sciences

Course Specifications of

Mobile Computing – IT411P – 2016/2017

University: Mansoura University **Faculty**: Computer and Information Sciences

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Program on which the course is given: General

Department offering the course: Department of Information Technology

Academic year/ Level: Fourth Year

Date of specification approval:

A- Basic Information

Title : Mobile Computing **Code :** IT411P

Credit Hours : 3 **Lecture :** 2 **Tutorial :** --- **Practical :** 2

B- Professional Information

1- Overall Aims of the Course

Upon completing this course, the student should understand the best practices and standards of mobile networking paradigms and respective mobile applications. The student should be able to identify and analyze the problems and organization/user needs related to mobility, define the mobile networking requirements appropriate to provide mobile applications, then design and evaluate application solutions that meet organization/user mobility needs within computing and energy constraints. The student should be able to use critical thinking and problem solving techniques as well as apply current technical concepts, practices, and

techniques of mobile networking paradigms to develop mobile computing solutions that can be effectively integrated into the user's environment.

2- Intended Learning Outcomes of the course (ILOs)

By completing this course successfully, the student will be able to:

a- Knowledge and Understanding

The student should acquire the knowledge and understanding of:

a1 - Essential facts, concepts, principles and theories relating to mobile computing and applications.

a4 - Criteria and specifications appropriate to mobile networks and applications, and plan strategies for their solution.

a6 - The current and underlying technologies that support inter-mobile communication.

a11 - Requirements, practical constraints and mobile networks and systems.

a14 - Provide a deeper understanding of cellular networks, ad hoc networks, and sensor networks.

a16 - Know the role of human factors in the design of mobile systems.

a17 - Apply tools and techniques for the design and development of mobile applications.

a19 - Provide an understanding of legal, professional and moral aspects of the exploitation of mobile systems.

a20 - Understand the broad context within computer information technology such as quality, reliability, and enterprise.

a21 - Understand the challenges inherent in the maintenance and evolution of mobile systems, and the techniques and best practices currently available for dealing with them.

b- Intellectual Skills

The student should be able to:

b1 - Analyze computing problems and provide solutions related to the design and construction of mobile computing systems.

b2 - Realize the concepts, principles, theories and practices behind mobile computing and information as an academic discipline.

b3 - Identify criteria to measure and interpret the appropriateness of a mobile system for its current deployment and future evolution.

b4 - Analyze, propose and evaluate alternative mobile systems and processes, taking into account limitations, and quality constraints.

b5 - Make ideas, proposals and designs using rational and reasoned arguments for presentation of mobile computing systems.

b6 - Evaluate the results of tests to investigate the functionality of mobile systems.

b17 - Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.

b19 - Create and/or justify designs to satisfy given requirements (synthesis, evaluation, application).

c- Professional and Practical Skills

The student should be able to:

c1 - Operate mobile computing equipment, recognizing its logical and physical properties, capabilities and limitations.

c3 - Deploy the equipment and tools used for the construction, maintenance and documentation of computer applications.

c4 - Apply computing information retrieval skills in computing community environment and industry.

c7 - Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.

c10 - Evaluate systems in terms of their quality and possible trade-offs, evaluate appropriate hardware and mobile software solutions for given scenarios.

c11 - Recognize risks or safety aspects involved in the operation of mobile systems.

c13 - Work as part of a development team and to recognize the different roles of its members.

c14 - Operate mobile computing equipment efficiently, taking into account its logical and physical properties.

c16 - Effectively employ information-retrieval skills, (including the use of browsers, search engines, and on-line library catalogues), communicate effectively using a variety of communication methods, and communicate effectively with team members, managers and customers.

c17 - Make effective use of general IT facilities, plan and manage a project to complete within budget and schedule.

d- General and Transferable Skills

The student should be able to:

d5 - Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.

3- Contents

No	Course Content	Lecture	Practical	Total
1	Introduction to mobile computing • Dimensions of mobility • Condition of the mobile user • Architecture of mobile applications	**2**	**---**	**2**
2	Cellular concepts • Cell area, cell splitting • Forming cell	**6**	**---**	**6**

No	Course Content	Lecture	Practical	Total
	clusters • Typical call setup • Cell planning and cell capacity • Frequency reuse • Mobility models • Location management • Registration • Handoff parameters • Channel allocation • Handoff prioritization			
3	Satellite systems • Characteristics • Global Positioning Systems (GPS) Wireless LANs • Overview of WiFi – IEEE 802.11 • Wireless mesh networks	**2**	**---**	**2**
4	Wireless sensor networks (WSNs) • Network characteristics • Sensor deployment • Design issues Radio Frequency Identification networks (RFIDs) • Characteristics • Design issues	**2**	**---**	**2**
5	Mobile Ad hoc Networks (MANETs) • Characteristics • Applications • MANET routing Vehicular Ad hoc Networks (VANETs) • Architecture • Technologies – WAVE • Vehicular communication paradigms • Characteristics • Applications	**2**	**---**	**2**
6	Multiple Radio Access – Data channels • FDMA • TDMA • CDMA – Control channels • Pure ALOHA • Slotted ALOHA • CSMA, CSMA/CD, CSMA/CA • Hidden Terminal problem • RTS/CTS	**4**	**---**	**4**
7	Wireless routing • Multi-hop communication • Routing process • Routing metrics • Proactive versus reactive routing • DSDV protocol • DSR protocol • GSR protocol	**2**	**---**	**2**
8	Student Activity – Analyzing the features of 10 mobile applications	**2**	**---**	**2**
9	Mobile Application Development using Android (Lab sessions)	**---**	**20**	**20**
	Total Hours	**22**	**20**	**42**

4- Assessment Schedule

Assessment Method	No.	Description	Week No.	Weight (%)
Assignment	1	Report	4	5
Written Exams	2	Midterm Exam	7	5
Lab exam	3	mobile app evaluation	11	20
Oral Exam	4	Oral questions	11	10
Written Exams	5	Final Exam	14	60
Total				100

5- List of references

5.5 Course Notes

- Lecture handouts delivered to students at the end of each lecture.

5.6 Essential Books (Text Books)

- Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML, R. B'Far, ISBN10: 0521817331, ISBN13: 978-0521817332, Cambridge University Press, 2005.
- Introduction to Wireless and Mobile Systems, 3rd Edition, D.P. Agrawal and Q-An Zeng, ISBN10: 1439062056, ISBN13: 978-1439062050, CL Engineering, 2011.
- Handbook of wireless networks and mobile computing, J. Zhang, ISBN13: 978-0471419020, John Wiley & Sons, Inc., 2002.
- Android Tutorial book.

6- Facilities Required for Teaching and Learning

- Data show.

Course Content/ILO Matrix

Course Content	a1	a4	a6	a11	a14	a16	a17	a19	a20	a21	b1	b2	b3	b4	b5	b6	b17	b19	c1	c3	c4	c7	c10	c11	c13	c14	c16	c17	d5
Introduction to mobile computing	●			●		●		●		●		●	●										●						
Cellular concepts	●	●	●	●	●	●	●	●	●		●	●	●	●								●	●	●					●
Satellite systems & Wireless LANs	●		●	●								●	●								●	●	●						
WSNs & RFIDs	●	●	●	●		●		●	●	●		●	●		●		●	●	●	●		●	●						
MANETs & VANETs	●	●	●	●		●		●	●	●		●	●		●		●	●				●	●	●					
Multiple Radio Access	●	●	●		●					●	●	●		●		●						●	●						●
Wireless routing	●	●		●	●				●	●	●	●	●	●	●	●	●	●				●	●						●
Student Activity		●		●	●	●		●	●		●		●	●	●			●	●	●	●		●			●		●		

Learning Method/ILO Matrix

Course Content	a1	a4	a6	a11	a14	a16	a17	a19	a20	a21	b1	b2	b3	b4	b5	b6	b17	b19	c1	c3	c4	c7	c10	c11	c13	c14	c16	c17	d5

Lectures	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●		●
Practical			●	●				●	●					●	●	●	●	●			●	●	●	●	●	●	●	●

Assessment Methods/ILO Matrix

Course Content	a1	a4	a6	a11	a14	a16	a17	a19	a20	a21	b1	b2	b3	b4	b5	b6	b17	b19	c1	c3	c4	c7	c10	c11	c13	c14	c16	c17	d5
Assignment			●	●				●	●					●	●	●	●	●			●	●	●		●		●	●	
Midterm		●		●	●		●		●	●	●	●	●																
Oral Exam		●		●		●	●	●	●					●	●	●	●	●					●						
Lab Exam				●			●				●					●	●	●	●	●						●		●	
Final Exam	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				●	●	●					●

Course Coordinator: Mervat Abu-Elkheir
Head of Department: Prof. Ahmed Atwan
Date: 6/2/2017

Mansoura University

Faculty of Computers and Information Sciences

Course Specifications of

Biometrics – IT432P – 2016/2017

University: Mansoura University **Faculty**: Computer and Information Sciences

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Program on which the course is given: General

Department offering the course: Department of Information Technology

Academic year/ Level: Fourth Year

Date of specification approval:

A- Basic Information

Title : Biometrics. **Code :** IT432P

Credit Hours : 3 **Lecture :** 2 **Tutorial :** --- **Practical :** 2

B- Professional Information

1- Overall Aims of the Course

Upon completing this course, the student should understand the best practices and standards of biometrics paradigms. The student should be able to identify and analyze the problems and organization/user needs related to biometrics, define the biometrics requirements appropriate to provide secure applications, then design and evaluate application solutions that meet organization/user needs within. The student should be able to use critical thinking and problem solving techniques as well as apply current technical concepts, practices, and techniques to develop solutions that can be effectively integrated into the user's environment.

Course Description

Biometrics has emerged from relatively specialized use in the criminal forensics domain to more mainstream use for computer authentication, identification document security, and surveillance for public safety. This emergence has been accompanied by an expansion in biometric modality from mainly fingerprints to face, iris, hand, voice, and other novel biometrics.

This course concentrates on the unique advantages that biometrics brings to computer security, but also addresses challenging issues such as security strength, recognition rates, and privacy, as well as alternatives of passwords and smart cards. Students will gain knowledge in the building blocks of this field: image and signal processing, pattern recognition, security and privacy, and secure systems design. By the end of the course students will be able to evaluate and design security systems that include biometrics.

Course Objectives

In this course, students will learn to answer the following:

- What are the methods of biometrics?
- What are the devices of biometrics?
- How are these used for computer security?
- How do we design and build a secure system?

Three academic fields of concentration are taught in this course as related to biometrics: image processing, pattern recognition, and security and privacy. Students will learn how biometrics fits into these through lectures and assignments.

Successful completion of this course will prepare the student to do any of the following:

- Perform R&D on biometrics methods and systems
- Evaluate and design security systems incorporating biometrics
- Understand the technology of biometrics for public policy matters involving security and privacy.

2- Intended Learning Outcomes of the course (ILOs)

By completing this course successfully, the student will be able to:

a- Knowledge and Understanding

The student should acquire the knowledge and understanding of:

a1 - Essential facts, concepts, principles and theories relating to biometrics and applications.

a3- Tools, practices and methodologies used in the specification, design, implementation and evaluation of computer software systems.

a4 - Criteria and specifications appropriate to biometrics and applications, and plan strategies for their solution.

a14 - Provide a deeper understanding of some aspects of the subject, such as computer and communication network, information storage and retrieval systems, pattern recognition, artificial Intelligence, cryptography and network security.

a15- Show the understanding of technologies for the design, development and management of database systems, systems analysis and design and of information retrieval systems.

a17 - Apply tools and techniques for the design and development of biometrics applications.

a19 - Provide an understanding of legal, professional and moral aspects of the exploitation of mobile systems.

a20 - Understand the broad context within computer information technology such as quality, reliability, and enterprise.

a21 - Understand the challenges inherent in the maintenance and evolution of biometric systems, and the techniques and best practices currently available for dealing with them.

b- Intellectual Skills

The student should be able to:

b1 - Analyze biometrics problems and provide solutions related to the design and construction of systems.

b3 - Identify criteria to measure and interpret the appropriateness of a biometric system for its current deployment and future evolution.

b4 - Analyze, propose and evaluate alternative biometric systems and processes, taking into account limitations, and quality constraints.

b6 - Evaluate the results of tests to investigate the functionality of biometric systems.

b7 - Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

b8- Familiar with the professional, legal, moral and ethical issues relevant to the computing industry.

b15- Identify a range of solutions and critically evaluate and justify proposed design solutions.

b17 - Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.

b19 - Create and/or justify designs to satisfy given requirements (synthesis, evaluation, application).

c- Professional and Practical Skills

The student should be able to:

c1 - Operate biometric equipment, recognizing its logical and physical properties, capabilities and limitations.

c3 - Deploy the equipment and tools used for the construction, maintenance and documentation of the needed applications.

c6 - Design, implement, maintain, and manage software systems.

c7 - Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.

c8- Handle a mass of diverse data, assess risk and draw conclusions.

c10 - Evaluate systems in terms of their quality and possible trade-offs, evaluate appropriate hardware and biometric software solutions for given scenarios.

c11 - Recognize risks or safety aspects involved in the operation of biometric systems.

c13 - Work as part of a development team and to recognize the different roles of its members.

c17 - Make effective use of general IT facilities, plan and manage a project to complete within budget and schedule.

d- General and Transferable Skills

The student should be able to:

d5 - Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.

d7-show the use of general computing facilities.

d8-Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.

3- Course Outline

Lecture 1	Introduction to Biometrics
Lecture 2	Everything about Fingerprints
Lecture 3	Image and Signal Processing
Assignment 1	**Biometric Signal Processing**
Lecture 4	Other Biometric Modalities
Lecture 5	Pattern Recognition
Lecture 6	Recognition Measurement, Errors, and Statistics
Assignment 2	**Recognition measurement and testing**
Lecture 7	Identification System Errors and Performance Testing

Mid-Term Exam	**Material to date**
Lecture 8	Multimodal Biometrics
NO CLASS	SPRING BREAK
Lecture 9	Computer Security
Lecture 10	Comparing Biometrics, Passwords, and Tokens
Assignment 3	**Secure biometric design project**
Lecture 11	Biometric Resources and Standards
Lecture 12	Large Scale Biometrics and Systems Case Studies
Lecture 13	Advanced Topics: Issues and Proposals
Lecture 14	Secure Biometric Design Project Presentations
Final Exam	**sometime during exam week**

4- Assessment Schedule

Assessment Method	No.	Description	Week No.	Weight (%)
Assignments	1	Report	4	5
Written Exams	2	Midterm Exam	7	5
Lab exam	3	mobile app evaluation	11	20
Oral Exam	4	Oral questions	11	10
Written Exams	5	Final Exam	14	60
Total				100

5- List of references

5.7 Course Notes

- Lecture handouts delivered to students at the end of each lecture.

5.8 Essential Books

Course Textbook

Guide to Biometrics (Springer Professional Computing) by R. Bolle, J. Connell, S. Pankanti, N. Ratha, Springer Press, 2003, ISBN0387400893

References

Biometrics:

Biometrics Personal Identification in Networked Society, Jain, Bolle, Pankanti (ed.s) 1999 Handbook of Fingerprint Recognition, Maltoni, Maio, Jain, Prabhakar, 2005 Automatic Fingerprint Recognition Systems, Ratha and Bolle (ed.s) 2003 Biometric Systems, Wayman, Jain, Maltoni and Maio (ed.s) 2004

Image Processing:

Practical Algorithms for Image Analysis: Description, Examples, and Code, Seul, O'Gorman, Sammon, 2000 (code from this will be available for Assignment 1)
Digital Image Processing, Gonzalez, Woods, 2002

Pattern Recognition:

Pattern Classification, Duda, Hart, Stork, 2000
Pattern Recognition, Theodoridis, Koutroumbas, 2006

6- Facilities Required for Teaching and Learning

- Data show.

Course Content/ILO Matrix

Course Content	a1	a3	a4	a14	a15	a17	a19	a20	a21	b1	b3	b4	b6	b7	b8	b15	b17	b19	c1	c3	c6	c7	c8	c10	c11	c13	c17	d5	d7	d8
Introduction to Biometrics	●			●		●		●		●		●	●										●			●				
Everything about Fingerprints	●	●	●	●	●	●	●	●	●		●	●	●	●								●	●	●			●		●	
Image and Signal Processing	●		●	●								●	●								●	●	●			●				
Other Biometric Modalities	●	●	●	●		●		●	●	●		●	●		●		●	●				●	●	●		●		●		
Pattern Recognition	●	●	●		●					●	●	●		●		●						●	●		●				●	
Recognition Measurement, Errors, and Statistics	●	●		●	●				●	●	●	●	●	●	●	●	●	●				●	●					●	●	
Identification System Errors and Performance Testing	●	●		●	●	●		●	●		●		●	●	●			●	●	●	●		●		●		●	●		●
Multimodal Biometrics	●		●		●	●						●				●					●						●	●		
Computer Security									●								●				●				●		●			●
Comparing Biometrics, Passwords, and Tokens	●		●	●			●				●				●			●		●		●		●	●		●	●		
Biometric Resources and Standards	●	●		●				●			●			●		●			●			●			●					
Large Scale Biometrics and Systems Case Studies	●			●		●			●		●		●			●		●			●			●	●			●		●

Advanced Topics: Issues and Proposals	●	●			●		●		●				●		●				●				●		●			●	●	●
Secure Biometric Design Project Presentations		●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●			●		●		●		●	●	●	●

Learning Method/ILO Matrix

Course Content	a1	a3	a4	a14	a15	a17	a19	a20	a21	b1	b3	b4	b6	b7	b8	b15	b17	b19	c1	c3	c6	c7	c8	c10	c11	c13	c17	d5	d7	d8
Lectures	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●		●	●
Practical			●	●				●	●					●	●	●	●	●			●	●	●	●	●	●	●	●	●	●

Assessment Methods/ILO Matrix

Course Content	a1	a3	a4	a14	a15	a17	a19	a20	a21	b1	b3	b4	b6	b7	b8	b15	b17	b19	c1	c3	c6	c7	c8	c10	c11	c13	c17	d5	d7	d8
Assignment			●	●				●	●					●	●	●	●	●			●	●	●		●		●	●		
Midterm		●		●	●		●		●	●	●	●	●																	
Oral Exam		●		●		●	●	●	●					●	●	●	●	●					●							
Lab Exam				●			●				●					●	●	●	●	●						●		●		●
Final Exam	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				●	●	●				●		

Course Coordinator: Dr. Eman Eldaidamony
Head of Department: Prof. Ahmed Atwan
Date: 6/2/2017

Mansoura University

Faculty of Computers and Information Sciences

Course Specifications of

Human Computer Interaction – IT326P – 2016/2017

University: Mansoura University **Faculty**: Computer and Information Sciences

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Program on which the course is given: General

Department offering the course: Department of Information Technology

Academic year/ Level: Third Year

Date of specification approval:

A- Basic Information

Title : Human Computer Interaction **Code :** IT326P

Credit Hours : 3 **Lecture :** 2 **Tutorial :** --- **Practical :** 2

B- Professional Information

1- Overall Aims of the Course

Upon completing this course, the student should understand the best practices and standards of Human – computer interaction paradigms. The student should be able to identify and analyze the problems and organization/user needs related to user interface, define the user requirements appropriate to provide required applications, then design and evaluate application solutions that meet user's needs within HCI constraints.

2- Intended Learning Outcomes of the course (ILOs)

By completing this course successfully, the student will be able to:

a- Knowledge and Understanding

The student should acquire the knowledge and understanding of:

a1 - Essential facts, concepts, principles and theories relating to mobile computing and applications.

a2 - Modeling and design of computer-based systems bearing in mind the trade-offs..

a7 - Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.

a11 - Requirements, practical constraints and mobile networks and systems.

a13 - Demonstrate strong knowledge of fundamentals of programming and the construction of computer-based systems, data structures and algorithms, software engineering techniques and information retrieval.

a16 - Know the role of human factors in the design of mobile systems.

a17 - Apply tools and techniques for the design and development of mobile applications.

a18 - Know methods for the construction of web-based materials and systems, design of internet-based systems.

a20 - Understand the broad context within computer information technology such as quality, reliability, and enterprise.

a21 - Understand the challenges inherent in the maintenance and evolution of mobile systems, and the techniques and best practices currently available for dealing with them.

b- Intellectual Skills

The student should be able to:

b1 - Analyze computing problems and provide solutions related to the design and construction of mobile computing systems.

b2 - Realize the concepts, principles, theories and practices behind mobile computing and information as an academic discipline.

b7 - Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

b11 - Identify attributes, components, relationships, patterns, main ideas, and errors.

b14 - Establish criteria, and verify solutions..

b15 - Evaluate the results of tests to investigate the functionality of mobile systems.

b16 - Solve information technology problems with pressing commercial or industrial constraints.

b17 - Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.

b19 - Create and/or justify designs to satisfy given requirements (synthesis, evaluation, application).

b20 - Recognize the professional, moral and ethical issues of involved in the exploitation of Information Technology and be guided by their adoption, reflect on issues of professional practice within the discipline.

c- Professional and Practical Skills

The student should be able to:

c2 -Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.

c3 - Deploy the equipment and tools used for the construction, maintenance and documentation of computer applications.

c8 - Handle a mass of diverse data, assess risk and draw conclusions.

c12 - Deploy tools for the implementation and documentation of computer-based systems.

c13 - Work as part of a development team and to recognize the different roles of its members.

c16 - Effectively employ information-retrieval skills, (including the use of browsers, search engines, and on-line library catalogues), communicate effectively using a variety of communication methods, and communicate effectively with team members, managers and customers.

c19 - Create and/or justify designs to satisfy given requirements (synthesis, evaluation, application).

d- General and Transferable Skills

The student should be able to:

d5 - Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.

3- Contents

No	Course Content	Lecture	Practical	Total
1	Introduction to Human-computer interaction • Changes and trends • Dialogue with the world • Discussion Forum	**2**	**---**	**2**
2	The Interaction Design Process - Design and Layout - User Action and Control- Appropriate Appearance - Exercise: Analysing Website Navigation and Screen Design - Interaction and Prototyping: getting better and starting well	**6**	**---**	**6**
3	The Human: Perception and Cognition , The Five Senses and Some More, Eye and Vision, Ear and	**2**	**---**	**2**

No	Course Content	Lecture	Practical	Total
	Sound			
4	Selective attention test- Memory - Part 1 - Types of Memory - Part 2 - Short-Term Memory - Exercise: Using Memory	**2**	**---**	**2**
5	Thinking - Into Action and Into the World.	**2**	**---**	**2**
6	Emotion and Experience (Introduction) - Why UX Now? - Emotions in Systems	**2**	**---**	**4**
7	Introduction: Implementation Support - Screen and Resource Management- Management and Architecture - Toolkits	**4**	**---**	**2**
8	Types of Evaluation - Studies and Experiments - Numbers and Statistics - From Data to Knowledge	**2**	**---**	**2**
9	From Evaluation to Validation - Exercise: Analysing and Interpreting Wason Card Test Data	**---**	**20**	**20**
	Total Hours	**22**	**20**	**42**

4- Assessment Schedule

Assessment Method	No.	Description	Week No.	Weight (%)
Assignment	1	Report	4	5
Written Exams	2	Midterm Exam	7	5
Lab exam	3	website evaluation	11	20
Oral Exam	4	Oral questions	11	10
Written Exams	5	Final Exam	14	60
Total				100

5- List of references

5.9 Course Notes

- Lecture handouts delivered to students at the end of each lecture.

5.10 Essential Book (Text Book)

- Human – computer interaction, 3rd Edition, Alan DIX ,Janet Finlay, GREGORY D.ABOWD, RUSSELL BEALE.2004

6- Facilities Required for Teaching and Learning

- Data show.

Course Content/ILO Matrix

Course Content	a1	a4	a6	a11	a14	a16	a17	a19	a20	a21	b1	b2	b3	b4	b5	b6	b17	b19	c1	c3	c4	c7	c10	c11	c13	c14	c16	c17	d5
Introduction to HCI	●			●		●		●		●		●	●										●						
The Interaction Design Process	●	●	●	●	●	●	●	●	●		●	●	●	●								●	●	●					●
The Human: Perception and Cognition	●		●	●								●	●								●	●	●						
Memory	●	●	●	●		●		●	●	●		●	●		●		●	●	●	●		●	●						
Thinking	●	●	●	●		●		●	●	●		●	●		●		●	●				●	●	●					
Emotions	●	●	●		●					●	●	●		●		●						●	●						●
Implementation	●	●		●	●				●	●	●	●	●	●	●	●	●	●				●	●						●
Evaluation		●		●	●	●		●	●		●		●	●	●			●	●	●	●		●		●		●		

Learning Method/ILO Matrix

Course Content	a1	a4	a6	a11	a14	a16	a17	a19	a20	a21	b1	b2	b3	b4	b5	b6	b17	b19	c1	c3	c4	c7	c10	c11	c13	c14	c16	c17	d5
Lectures	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●		●
Practical			●	●				●	●					●	●	●	●	●			●	●	●	●	●	●	●	●	●

Assessment Methods/ILO Matrix

Course Content	a1	a4	a6	a11	a14	a16	a17	a19	a20	a21	b1	b2	b3	b4	b5	b6	b17	b19	c1	c3	c4	c7	c10	c11	c13	c14	c16	c17	d5
Assignment			●	●				●	●					●	●	●	●	●			●	●	●		●		●	●	
Midterm		●		●	●		●		●	●	●	●	●																
Oral Exam		●		●		●	●	●	●					●	●	●	●	●					●						
Lab Exam				●			●				●					●	●	●	●	●						●		●	
Final Exam	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				●	●	●					●

Course Coordinator: Dr. Eman Eldaidamony
Head of Department: Prof. Ahmed Atwan
Date: 18/8/2017

Mansoura University

Faculty of Computers and Information Sciences

Course Specifications of

Elective 2 (Computer Vision) – IT435P – 2016/2017

University: Mansoura University **Faculty**: Computer and Information Sciences

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Program on which the course is given: Undergraduate

Department offering the course: Department of Information Technology

Academic year/ Level: Forth Year

Date of specification approval:

A- Basic Information

Title : Elective 2 (Computer Vision) **Code :** IT435P

Credit Hours : 3 **Lecture :** 2 **Tutorial :** --- **Practical :** 2

B- Professional Information

1- Overall Aims of the Course

This course aims to introduce the principles, models and applications of computer vision. At the end of the course, the student should understand the fundamental mathematical and computational techniques in computer vision and implement basic computer vision applications. The course will cover: image formation, camera imaging geometry, feature detection and matching, edge and machine learning for image analysis. Issues will be illustrated using the examples of pattern recognition, image retrieval, and face recognition.

2- Intended Learning Outcomes of the course (ILOs)

By completing this course successfully, the student will be able to gain the following skills:

a- Knowledge and Understanding

a1. Essential facts, concepts, principles and theories relating to computing and information and computer applications as appropriate to the program of study.

a2 Modeling and design of computer-based systems bearing in mind the trade-offs.

a3 Tools, practices and methodologies used in the specification, design, implementation and evaluation of computer software systems.

a5 The extent to which a computer-based system meets the criteria defined for its current use and future development.

a10 Current developments in computing and information research.

a12 Demonstrate basic knowledge and understanding of fundamental principles of core computing.

a17 Apply tools and techniques for the design and development of applications.

a٢١ Understand the challenges inherent in the maintenance and evolution of IT-based systems, and the techniques and best practices currently available for dealing with them.

b- Intellectual Skills

b1 Analyze computing problems and provide solutions related to the design and construction of computing systems.

b2 Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.

b6 Evaluate the results of tests to investigate the functionality of computer systems.

b11 Identify attributes, components, relationships, patterns, main ideas, and errors.

b12 Summarize the proposed solutions and their results.

b13 Restrict solution methodologies upon their results.

b17 Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.

c- Professional and Practical Skills

c1 Operate computing equipment, recognizing its logical and physical properties, capabilities and limitations.

c4 Apply computing information retrieval skills in computing community environment and industry.

c5 Develop a range of fundamental research skills, through the use of online resources, technical repositories and library-based material

c16 Effectively employ information-retrieval skills, (including the use of browsers, search engines, and on-line library catalogues), communicate effectively using a variety of communication methods, communicate effectively with team members, managers and customers.

c18 Manage one's own learning and development, including time management and organizational skills.

c19 Present their work in the form of reports, oral presentations or an internet web site.

d- General and Transferable Skills

d1 Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.

d2 Demonstrate skills in group working, team management, time management and organizational skills.

d3 Show the use of information-retrieval.

3- Contents

No	Course Content	Lecture	Tutorial	Total
1	**Introduction to** computer vision, Applications and challenges. **Linear Filtering**	2	2	4
2	**Edge Detection, Parametric Model e.g.** Hough transform	٤	٤	٨
3	**Features Detection**	٤	٤	٨
4	**Feature descriptor and matching :** SIFT, RANSAC	٢	٢	٤
5	**Segmentation and grouping:** k-Means, Mixture of Gaussians, EM, Mean-Shift clustering	٢	٢	٤
6	**Segmentation by Thresholding. Interactive Segmentation:** Intelligent Scissors, Dijkstra's shortest path algorithm. **Energy Minimization:** Graph Cut, Max-flow algorithm	٢	٢	٤
7	**Object recognition:** Sliding-Window based Object Detection, Global Representations, and Classifier Construction. **Classification with SVMs, H**OG Detector. **Classification with Boosting.**	٢	٢	٤
8	**Object Recognition II :** Decision tree, Radom Forest	٢	٢	٤
٩	**Image Formation:** Pinhole Camera, Perspective Projection. **Camera Model.**	٢	٢	٤
١٠	**Stereo vision. Epipolar geometry.**	٢	٢	٤
	Total Hours	24	24	48

4- Assessment Schedule

Assessment Method	No.	Description	Week No.	Weight (%)
Assignment	1	Lab no. 1	3	5
Assignment	2	Lab no. 2	4	5
Written Exams	3	Midterm Exam	6	10
Assignment	4	Lab no. 3	7	5
Assignment	5	Lab no. 4	8	5
Oral Exam	6	Oral questions	11	10
Written Exams	7	Final Exam	14	60
Total				100

5- List of references

5.11 Course Notes

- Lecture handouts delivered to students at the end of each lecture.

5.12 Essential Books (Text Books)

- Richard Szeliski: Computer Vision: Algorithms and Applications, 1st Ed., Springer-Verlag London, 2011

6- Facilities Required for Teaching and Learning

- Data show.
- Speakers for audio and video files used to practice listening.

Course Content/ILO Matrix

Course Content	a1	a2	a3	a5	a10	a12	a17	a21	b1	b2	b6	b11	b12	b13	b17	c1	c4	c5	c16	c18	c19	d1	d2	d3
Lecture 1	•	•	•		•	•	•			•		•			•	•	•	•				•	•	•
Lecture 2	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•
Lecture 3	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•
Lecture 4	•	•	•			•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•
Lecture 5	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•
Lecture 6	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Lecture 7	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Lecture 8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Lecture 9	•	•	•			•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•
Lecture 10	•	•	•			•	•	•		•		•			•	•	•	•	•	•	•	•	•	•

Learning Method/ILO Matrix

Course Content	a1	a2	a3	a5	a10	a12	a17	a21	b1	b2	b6	b11	b12	b13	b17	c1	c4	c5	c16	c18	c19	d1	d2	d3
Lectures	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				
Tutorials	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Assessment Methods/ILO Matrix

Assessment	a1	a2	a3	a5	a10	a12	a17	a21	b1	b2	b6	b11	b12	b13	b17	c1	c4	c5	c16	c18	c19	d1	d2	d3
Assignment	•	•	•	•	•	•	•	•	•	•	•				•	•	•	•	•	•	•	•	•	•
Midterm Exam	•		•			•	•		•	•		•	•	•										•
Oral exam	•		•			•	•		•	•				•				•	•						•
Final Exam	•	•	•	•	•	•	•	•	•	•		•	•	•								•		•

Course Coordinator: Dr. Mohamed Elmogy
Head of Department: Prof. Ahmed Atwan
Date: 23/4/2017

Mansoura University

Faculty of Computers and Information Sciences

Course Specifications of

Systems Integration – IT436P – 2016/2017

University: Mansoura University **Faculty**: Computer and Information Sciences

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Program on which the course is given: General

Department offering the course: Department of Information Technology

Academic year/ Level: Third Year

Date of specification approval:

A- Basic Information

Title : Systems Integration **Code :** IT436P

Credit Hours : 3 **Lecture :** 2 **Tutorial :** --- **Practical :** 2

B- Professional Information

1- Overall Aims of the Course

Upon completing this course, the student should understand the process of linking together different computing systems and software applications physically or functionally, to act as a coordinated whole. Topics to be covered include the organization needs for integration, building blocks for integration, enterprise architectures, types of integration, data domains, integration technologies, business process reengineering, data representation and XML, and Service Oriented Architectures. The student should be able to use critical thinking and problem solving techniques as well as exploring the theories and skills required for planning, developing, implementing and managing the integration of information systems.

2- Intended Learning Outcomes of the course (ILOs)

By completing this course successfully, the student will be able to:

a- Knowledge and Understanding

The student should acquire the knowledge and understanding of:

a2 - Modeling and design of computer-based systems bearing in mind the trade-offs.

a3 - Tools, practices and methodologies used in the specification, design, implementation and evaluation of computer software systems.

a7 - Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.

a10 - Current developments in computing and information research.

a13- Demonstrate strong knowledge of fundamentals of programming and the construction of computer-based systems, data structures and algorithms, software engineering techniques and information retrieval.

a14 - Provide a deeper understanding of some aspects of the subject, such as multimedia, computer and communication network, data mining and knowledge discovery, information storage and retrieval systems, mobile Communication Systems, pattern recognition, artificial Intelligence, cryptography and network security.

b- Intellectual Skills

The student should be able to:

b1 - Analyze computing problems and provide solutions related to the design and construction of mobile computing systems.

b2 - Realize the concepts, principles, theories and practices behind mobile computing and information as an academic discipline.

b4 - Analyze, propose and evaluate alternative mobile systems and processes, taking into account limitations, and quality constraints.

b7 - Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

b10 - Information technology systems problems, set goals towards solving them, observe results, reason and apply judgment.

b16- Solve information technology problems with pressing commercial or industrial constraints.

b18- Perform problem analysis from written descriptions; derive requirements specifications from an understanding of problems (analysis, synthesis).

c- Professional and Practical Skills

The student should be able to:

c1 - Operate mobile computing equipment, recognizing its logical and physical properties, capabilities and limitations.

c3 - Deploy the equipment and tools used for the construction, maintenance and documentation of computer applications.

c5 - Apply computing information retrieval skills in computing community environment and industry.

c8 - Handle a mass of diverse data, assess risk and draw conclusions.

c10 - Evaluate systems in terms of their quality and possible trade-offs, evaluate appropriate hardware and mobile software solutions for given scenarios.

c13 - Work as part of a development team and to recognize the different roles of its members.

d- General and Transferable Skills

The student should be able to:

d6 - Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.

3- Contents

No	Course Content	Lecture	Practical	Total
1	Introduction to system integration • methods of integration • Data transformation • Real application for systems integration	**2**	**---**	**2**
2	Introduction to XML technologies • overview of HTTP • What is XML language• XML parsing• Parsing methods	**2**	**---**	**2**
3	Introduction to XML schema languages • Document type declaration (DTD) schema • XML schema (XSD) • XML formatting languages • Resource description framework (RDF) • Application of RDF • Real examples for XML technologies	**4**	**---**	**4**
4	Introduction to web services technologies • XML web services • Simple object access protocol (SOAP) • Web service description language (WSDL) • REST service • Web service registries	**2**	**---**	**2**
5	Introduction in solving integration problems • the need for integration • integration challenges • integration patterns • types of integration projects • loose coupling services	**2**	**---**	**2**
6	Introduction to messaging system • messing as an integration style • Message channel • Pipe and Filter • Message Router and types • Message translator • Message endpoint • Messaging channel types • point-to-point channel • publish-subscribe channel • Datatype channel • Channel adapter • Message bus • Message construction • command message • Document message • Event message • Request-Reply message • Correlation identifier • Message sequence	**4**	**---**	**4**
7	Interlude composed messaging	**2**	**---**	**2**
8	Service Oriented Architecture (SOA) • Service roles • Service interaction • Service models • SOA for legacy integration • Fundamental components of SOA • One-way integration architectures • Point-to-point integration	**4**	**---**	**4**

No	Course Content	Lecture	Practical	Total
	architectures • SOA for enterprise integration • Hub and poke • Enterprise Service Bus • Student Activity of motivating real application of systems integrations			
9	XML technologies, We service and messaging systems Development using Microsoft Visual studio (Lab sessions)	---	**20**	**20**
	Total Hours	**22**	**20**	**42**

4- Assessment Schedule

Assessment Method	No.	Description	Week No.	Weight (%)
Assignment	1	Report	4	5
Written Exams	2	Midterm Exam	7	5
Lab exam	3	Web service app and small systems integration evaluation	11	20
Oral Exam	4	Oral questions	11	10
Written Exams	5	Final Exam	14	60
Total				100

5- List of references

5.13 Course Notes

- Lecture handouts delivered to students at the end of each lecture.

5.14 Essential Books (Text Books)

- Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions, G. Hohpe and B. Woolf, ISBN10: 0321200683, ISBN13: 978-0321200686, Addison-Wesley Professional, 2003.
- Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services, T. Erl, ISBN10: 0131428985, ISBN13: 007-6092025443, Prentice Hall, 2004.
- Systems integration and collaboration in architecture, engineering, construction, and facilities management: A review" - Article in the journal of Advanced Engineering Informatics, 2010.

6- Facilities Required for Teaching and Learning

- Data show.

Course Content/ILO Matrix

Course Content	a2	a3	a7	a10	a13	a14	b1	b2	b4	b7	b10	b16	b18	c1	c3	c5	c8	c10	c13	d6
Introduction to systems integration				●		●		●	●					●				●		
XML technologies	●	●	●	●		●	●		●	●				●		●	●	●		●
XML schema languages	●			●		●		●	●			●				●	●	●		

Web service technologies	●			●		●		●	●		●		●	●	●	●	●	●		
Solving integration problems			●	●		●		●	●		●	●	●				●	●		
Messaging system		●	●		●		●	●	●	●		●			●		●			●
Interlude composed messaging	●	●		●	●		●	●	●			●	●		●		●	●		●
Service Oriented Architecture (SOA) and Student Activity		●	●	●	●	●	●			●		●	●	●	●	●		●	●	

Learning Method/ILO Matrix

Course Content	a2	a3	a7	a10	a13	a14	b1	b2	b4	b7	b10	B16	b18	c1	c3	c5	c8	c10	c13	D6
Lectures	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Practical			●				●		●	●		●	●			●		●	●	●

Assessment Methods/ILO Matrix

Course Content	a2	a3	a7	a10	a13	a14	b1	b2	b4	b7	b10	b16	b18	c1	c3	c5	c8	c10	c13	D6
Assignment		●	●	●		●			●		●	●	●		●	●	●	●	●	
Midterm		●		●	●		●	●	●	●			●							
Oral Exam		●		●		●		●		●	●	●	●					●		
Lab Exam				●			●	●				●	●	●	●					
Final Exam	●	●	●	●	●	●	●	●	●	●	●	●	●			●	●	●		●

Course Coordinator: Mervat Abu-Elkheir
Head of Department: Prof. Ahmed Atwan
Date: 6/2/2017

Mansoura University

Faculty of Computers and Information Sciences

Course Specifications of

Computer Security – IT424P – 2016/2017

University: Mansoura University **Faculty**: Computer and Information Sciences

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Program on which the course is given: General

Department offering the course: Department of Information Technology

Academic year/ Level: Fourth Year

Date of specification approval:

A- Basic Information

Title : Computer Security **Code :** IT424P

Credit Hours : 3 **Lecture :** 2 **Tutorial :** --- **Practical :** 2

B- Professional Information

1- Overall Aims of the Course

Upon completing this course, the student will be able to:

- State the basic concepts in information security, including security policies, security models, and security mechanisms,
- Explain concepts related to applied cryptography, including plain-text, cipher-text, the four techniques for crypto-analysis, symmetric cryptography, asymmetric cryptography, digital signature, message authentication code, hash functions, and modes of encryption operations,
- Explain the concepts of malicious code, including virus, Trojan horse, and worms,
- Explain common vulnerabilities in computer programs, including buffer overflow vulnerabilities, time-of-check to time-of-use flaws, incomplete mediation,
- Outline the requirements and mechanisms for identification and authentication,

- Explain issues about password authentication, including dictionary attacks (password guessing attacks), password management policies, and one-time password mechanisms, Explain and compare security mechanisms for conventional operating systems, including memory, time, file, object protection requirements and techniques and protection in contemporary operating systems and
- Explain the requirements and techniques for security management, including security policies, risk analysis, and physical threats and controls and state the steps of ethical hacking used in saving systems nowadays.

2- Intended Learning Outcomes of the course (ILOs)

By completing this course successfully, the student will be able to:

a- Knowledge and Understanding

The student should acquire the knowledge and understanding of:

a1- Essential facts, concepts, principles and theories relating to computing and information and computer applications as appropriate to the program of study.

a4 - Criteria and specifications appropriate to specific problems, and plan strategies for their solution.

a6 - The current and underlying technologies that support computer processing and inter-computer communication.

a14 - Provide a deeper understanding of some aspects of the subject, such as multimedia, computer and communication network, data mining and knowledge discovery, information storage and retrieval systems, mobile Communication Systems, pattern recognition, artificial Intelligence, cryptography and network security.

a16- Know the role of human factors in the design of Information Technology systems.

a17 - Apply tools and techniques for the design and development of applications.

a18 - Know methods for the construction of web-based materials and systems, design of internet-based systems.

a19 - Provide an understanding of legal, professional and moral aspects of the exploitation of IT.

a20 - Understand the broad context within computer information technology such as quality, reliability, enterprise, employment law, accounting and health.

a21 - Understand the challenges inherent in the maintenance and evolution of IT-based systems, and the techniques and best practices currently available for dealing with them.

b- Intellectual Skills

The student should be able to:

b1 - Analyze computing problems and provide solutions related to the design and construction of mobile computing systems.

b2 - Realize the concepts, principles, theories and practices behind mobile computing and information as an academic discipline.

b3 - Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.

b4 - Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.

b5- Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.

b6- Evaluate the results of tests to investigate the functionality of computer systems.

b7- Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

b16- Solve information technology problems with pressing commercial or industrial constraints.

b19- Create and/or justify designs to satisfy given requirements (synthesis, evaluation, application).

b20- Recognize the professional, moral and ethical issues of involved in the exploitation of Information Technology and be guided by their adoption, reflect on issues of professional practice within the discipline.

c- Profesional and Practical Skills

The student should be able to:

c3 - Deploy the equipment and tools used for the construction, maintenance and documentation of computer applications.

c5 - Develop a range of fundamental research skills, through the use of online resources, technical repositories and library-based material

c8 - Handle a mass of diverse data, assess risk and draw conclusions.

c10 - Evaluate systems in terms of their quality and possible trade-offs, evaluate appropriate hardware and mobile software solutions for given scenarios.

c11- Recognize risks or safety aspects involved in the operation of computer based systems.

c13 - Work as part of a development team and to recognize the different roles of its members.

c14- Operate computing equipment efficiently, taking into account its logical and physical properties.

c15 - Recognize and address professional, moral and ethical issues within the discipline.

c19 - Present their work in the form of reports, oral presentations or an internet web site.

d- General and Transferable Skills

The student should be able to:

d7 - Show the use of general computing facilities.

3- Contents

No	Course Content	Lecture	Practical	Total
1	Introduction to computer security • security goals •attacks and defense • basic concepts • threats • vulnerabilities • control • risk • confidentiality •privacy • integrity • availability • security policies • security mechanisms • assurance •	**2**	**---**	**2**
2	Encryption and cryptography • basic cryptographic codes • ciphers and codes • historical background • classical encryption algorithms • public key algorithms • key distribution • digital signature • pretty good privacy • symmetric crypto primitives • modes of operation • asymmetric crypto primitives • cryptographic hash function • message authentication codes • number theory • block and stream ciphers • key management	**6**	**---**	**6**
3	Trusted systems: memory protection • access control matrix • user authentication • security models • disaster recovery • design principles • evaluation criteria • evaluation process	**2**	**---**	**2**
4	Network security • Network threats: eavesdropping • spoofing • modification • denial of service attacks Introduction to network security techniques: firewalls • Firewall configuration • virtual private networks • network layer security • secure network architecture • IPSec protocol • intrusion detection systems models and architecture • secure network protocols • Kerberos system • SSL and SSH • one-time passwords	**6**	**---**	**6**
5	Malicious code introduction • viruses • Trojan horse • worms • spyware • adware • scareware • Ransomware • Rootkit • Bots • explot • program flaws: buffer overflow • time-of-check to time-of-use flaws • incomplete mediation • intruder • OS protection policies • network attacks • session hijacking • Unwanted traffic: denial of service attacks and spam email • key-loggers	**4**	**---**	**4**
6	Penetration testing steps and tools • ethical and legal issues in computer security	**2**	**---**	**2**
7	Security tools, white hacking and penetration testing using Linux distributions and embedded tools (Lab sessions)	**---**	**20**	**20**
	Total Hours	**22**	**20**	**42**

4- Assessment Schedule

Assessment Method	No.	Description	Week No.	Weight (%)
Assignment	1	Report	3	5
Written Exams	2	Midterm Exam	7	5
Lab exam	3	Small security laps testing security issues in computer and network security	11	20
Oral Exam	4	Oral questions	11	10
Written Exams	5	Final Exam	14	60
Total				100

5- List of references

5.15 Course Notes

- Lecture handouts delivered to students at the end of each lecture.

5.16 Essential Books (Text Books)

- Charles P. Pfleeger and Shari L. Pfleeger. Security in Computing (3rd edition). Prentice-Hall. 2003. ISBN: 0-13-035548-8.
- Computer Security: Principles and Practice, by William Stallings and Lawrie Brown. Published by Pearson/Prentice Hall, © 2008. ISBN: 0-13-600424-5
- Cryptography and Network Security: Principles and Practice, 5th Edition, William Stallings (ISBN-10: 0136097049)
- David Kim. Fundamentals of Information Systems Security, Second Edition. Jones & Bartlett Learning, 2014. ISBN: 978-1-284-07445-1.

6- Facilities Required for Teaching and Learning

- Data show.

Course Content/ILO Matrix

Course Content	a1	a4	a6	a14	a16	a17	a18	a19	a20	a21	b1	b2	b3	b4	b5	b6	b7	b16	b19	b20	c3	c5	c8	c10	c11	c13	c14	c15	c19	d6
Introduction to Computer security	•		•	•		•			•		•	•	•			•		•		•		•		•	•	•			•	•
Encryption and cryptography	•	•	•	•		•			•		•		•			•		•		•			•	•			•			•
Trusted systems		•		•		•	•		•			•	•	•		•		•		•		•	•	•		•		•		•
Malicious code	•			•		•		•			•	•	•		•		•	•	•	•	•		•	•			•		•	
Penetration testing	•		•	•		•			•		•	•	•		•		•			•			•	•		•			•	•

Learning Method/ILO Matrix

Course Content	a1	a4	a6	a14	a16	a17	a18	a19	a20	a21	b1	b2	b3	b4	b5	b6	b7	b16	b19	b20	c3	c5	c8	c10	c11	c13	c14	c15	c19	d6
Lectures	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Practical	●	●	●	●		●					●		●		●	●		●		●			●	●		●	●	●		●

Assessment Methods/ILO Matrix

Course Content	a1	a4	a6	a14	a16	a17	a18	a19	a20	a21	b1	b2	b3	b4	b5	b6	b7	b16	b19	b20	c3	c5	c8	c10	c11	c13	c14	c15	c19	d6
Assignment	●	●			●	●	●		●		●	●	●			●	●		●		●	●	●		●	●		●		●
Midterm	●	●	●		●	●		●		●	●		●		●				●	●	●				●		●		●	●
Oral Exam		●		●	●						●	●		●	●		●	●		●		●	●	●		●				
Lab Exam		●					●				●	●		●		●				●	●						●				
Final Exam	●	●		●	●			●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●		

Course Coordinator: Osama Ouda
Head of Department: Prof. Ahmed Atwan
Date: 6/2/2017