



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Post Graduate Studies

COMPUTER AND CONTROL ENGINEERING

2020-2019



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

**NATIONAL ACADEMIC REFERENCE
STANDARD**

NARS – Post Graduate Studies

COMPUTER AND CONTROL ENGINEERING



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

First: Programs of Diploma Studies

1 – Specifications of Graduate

The following academic standards represent the general expectation about the qualifications attributes and capabilities that the graduates of Diploma programs in any specialization. The graduate should be able to demonstrate the following:

1. The application of specialized knowledge acquired in the exercise of professional
2. Identify problems and propose professional solutions
3. Professional skills and proficiency in the use of appropriate technological means in the exercise of professional.
4. Communication and leadership teams to work through systemic professional work
5. Decision-making in the light of available information
6. Employment of available resources efficiently
7. Awareness of its role in the development of society and the preservation of the environment
8. Act reflects commitment to integrity and credibility of the profession and the rules and accepts the accountability and Accounting
9. Awareness of the need to develop itself and to engage in continuous learning

2- General Academic Standards

2-1 Knowledge and Understanding

On completion of the study of post-graduate diploma program, the graduate should be able to demonstrate knowledge and an understanding of the following:

- A - The theories and fundamentals and specialized knowledge in the field of learning and science as well as relevant the exercise of professional
- B - The legal and ethical principles of professional practice in the area of specialization
- C - The principles and fundamentals of quality in professional practice in the area of specialization
- D - Impact of the professional practice environment and working to preserve the environment and maintenance



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

2-2 Intellectual Skills

On completion of the study post-graduate of Diploma program must be (should be) able to demonstrate the following:

- A - The identification and analysis of problems in the field and ranked according to their priorities
- B - The solution of problems in the area of specialized career
- C - Analytical reading and research topics related to specialization
- D - Risk assessment in professional practice
- E - The professional decision-making in the light of available information

2-3 Practical & Professional Skills

On completion of the study post-graduate of Diploma program must be (should be) able to demonstrate the following:

- A -The application of professional skills in the area of specialization
- B -In writing professional reports

2-4 General and Transferable Skills

On completion of the study post-graduate of Diploma program must be (should be) able to demonstrate the following:

- A - Effective communication of all kinds
- B - The use of information technology to serve the development of professional practice
- C - The self-assessment and to identify personal learning needs
- D - The use of different sources for information and knowledge
- E - Work in a team and time management
- F - The leadership team in professional contexts familiar
- G - Continuous and Self-learning



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Second: Masters Programs

1 – Specification of Graduate

The graduates of Master programs in any specialization should be able to demonstrate the following:

1. Proficiency in the basics and the application of scientific research methodologies and the use of different tools
2. The application of the analytical method and its use in the area of specialization
3. The application of specialized knowledge and combined with knowledge of the relationship in the exercise of professional
4. Demonstrate awareness of current problems and perspectives in the field of modern
5. Identify problems and find professional solutions
6. Mastery of the appropriate scope of professional skills, the use of technological means appropriate to serve the professional practice
7. Communicate effectively and the ability to lead teams
8. Decision-making in different professional contexts
9. Employment of available resources to achieve the highest benefit and preservation of
10. Show awareness of its role in the development of society and the preservation of the environment variables in the light of Global and regional
11. Act reflects commitment to integrity and credibility and abides by the rules of the profession
12. The development of the same academic and professional and capable of continuous learning

2- General Academic Standards

2-1 Knowledge and Understanding

On completion of the Master Program the graduate should be able to demonstrate knowledge and an understanding of following:

- A - The theories and fundamentals related to the area of learning, as well as in related areas
- B - Reciprocal influence between professional practice and its impacts on the environment
- C - Scientific developments in the area of specialization
- D - Legal and ethical principles of professional practice in the area of specialization
- E - The principles and fundamentals of quality in professional practice in the area of specialization
- F- The fundamentals and ethics of scientific research

2-2 Intellectual Skills

On completion of the study post-graduate of Master program should be able to demonstrate the following:

- A - An analysis and assessment of information in the field of specialization and analogies to solve problems
- B - To resolve problems with specialized non-availability of some data



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- C - The link between knowledge of different problems to solve professional
- D - A research study and / or write a scientific study on the problem of research methodology
- E - Risk assessment in professional practices in the area of specialization
- F - Planning for the development of performance in the area of specialization
- G - The decision-making career in a variety of professional contexts

2-3 Practical & Professional Skills

On completion of the study post-graduate of Master program should be able to demonstrate the following:

- A - Mastering basic professional skills and specialization in the field of modern
- B - In writing, and professional evaluation of the reports
- C - Evaluation of roads and existing tools in the area of specialization

2-4 General and Transferable Skills

On completion of the study post-graduate of Master program should be able to demonstrate the following:

- A - Effective communication of all kinds
- B - The use of information technology to serve the professional practice
- C - Self-evaluation and to identify personal learning needs
- D - The use of different sources for information and knowledge
- E - The development of rules and indicators for assessing the performance of others
- F - Work effectively as a team member, including the assuming of a leadership role.
- G - Time management efficiency
- H - Continuous and self-learning



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Third: Doctoral Programs

1 – Specification of Graduate

Graduate of the Ph.D. program in a specialization should be able to demonstrate the following:

1. Mastering the basics of scientific research and methodologies
2. Continuing work for the addition of knowledge in the area of specialization
3. The application of analytical and critical approach to knowledge in the area of specialization and related areas
4. The integration of specialized knowledge with knowledge of the relationship developed and derived relations Interfaces, including
5. Show awareness of deep and ongoing problems of modern theories in the field of specialization
6. Identify problems and find professional innovative solutions to solve
7. Proficiency in a wide range of professional skills in the area of specialization
8. Orientation towards the development of methods and tools and new methods of professional practice
9. Use appropriate technological means to serve the professional practice
10. Communicate effectively and lead the team in different professional contexts
11. Decision-making in the light of available information
12. Employment of available resources and the efficient development and work to find new resources
13. Awareness of its role in the development of society and the preservation of the environment
14. Act reflects commitment to integrity and credibility of the profession and
15. Commitment to continuing self-development and transfer of knowledge and experience of others

2- General Academic Standards

2-1 Knowledge and Understanding

On completion of the Doctoral study Program the graduate should be able to demonstrate knowledge and an understanding of the following:

- A - The theories and fundamentals and modern knowledge in the field of specialization and areas of relationship
- B – The fundamentals and methodologies and the ethics of scientific research and various tools
- C - Legal and ethical principles of professional practice in the area of specialization
- D - The principles and fundamentals of quality in professional practice in the area of specialization
- E - The knowledge on the effects on the environment of professional practice and development of roads and maintenance of the environment



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

2-2 Intellectual Skills

On completion of the study post-graduate of Doctoral program should be able to demonstrate the following:

- A - An analysis and assessment of information in the field of specialization and by the measurement and extraction, including
- B - The solution of problems based on specialized data available
- C - Conducting research studies add to the knowledge
- D - The drafting of scientific papers
- E - Risk assessment in professional practice
- F - Planning for the development of performance in the area of specialization
- G - The decision-making in professional contexts, different professional
- H - Innovation / creativity
- I - The dialogue and debate based on facts and evidence

2-3 Practical & Professional Skills

On completion of the study post-graduate of Doctoral program should be able to demonstrate the following:

- A - Mastering the basic professional skills and specialization in the field of modern
- B - Writing, and professionally evaluating the reports
- C - Evaluation and development of roads and existing tools in the area of specialization
- D - The use of technological means to serve the professional practice
- E - Planning for the development of professional practice and development of the performance of others

2-4 General and Transferable Skills

On completion of the study post-graduate of Doctoral program should be able to demonstrate the following:

- A - Effective communication of all kinds
- B - The use of information technology to serve the development of professional practice
- C - Teach others and evaluate their performance
- D - The self-assessment and continuous learning
- E - The use of different sources for information and knowledge
- F - Work effectively as a team member, including the assuming of a leadership role.
- G - Management of scientific meetings and the ability to manage time



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

ACADEMIC REFERENCE STANDARD
ARS – Post Graduate Studies
COMPUTER AND CONTROL ENGINEERING



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

MASTER PROGRAM



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

1. SPECIFICATIONS OF THE GRADUATE

The graduates of Master Program in the Computer and Control Engineering field should be able to demonstrate the following:

- a) Proficiency in the basics and the application of scientific research arch methodologies and the use of different tools.
- b) The application of the analytical methods and their use in Computer and Control.
- c) The application of Computer and Control knowledge and ability to combine it with related knowledge in the exercise of professional work.
- d) Demonstrate Awareness of current problems and perspectives in the field of modern Computer and Control.
- e) Identifying problems and find finding professional solutions.
- f) Mastery of the appropriate scope of professional skills and the use of technological means appropriate to serve the professional practice.
- g) Ability to make mathematical models for different application problems, awareness of its assumptions and limitations and ability to use professional packages to solve these models.
- h) Ability to lead teams and communicate effectively.
- i) Decision-making in different professional contexts.
- j) Employment of available resource s to achieve the highest benefits.
- k) Awareness of his role in the development of society and the preservation of the environment.
- l) Act reflects commitment to integrity and credibility of the profession.
- m) Capability of continuous self-development and continuous learning.

2. ACADEMIC REFERENCE STANDARDS FOR COMPUTER AND CONTROL ENGINEER



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

2.1 Knowledge & Understanding

On completion of the Master Program in the Computer and Control Engineering field, the graduate should be able to demonstrate knowledge and understanding of the following:

- a) The theories and fundamentals related to the Computer and Control as well as in related Areas.
- b) The international design and material standards.
- c) Different analysis and design packages of Computer and Control.
- d) Reciprocal influence between professional practice and its impacts on the environment.
- e) Scientific developments in the Computer and Control field.
- f) Legal and ethical principles of professional practice in the Computer and Control field.
- g) The principles and fundamental of quality in professional practice in the Computer and Control field.

2.2 Intellectual Skills:

On completion of the Master Program in the Computer and Control Engineering field, the graduate should be able to demonstrate the following:

- a) The ability for analysis and assessment of information in the Computer and Control and analogies to solve problems.
- b) The ability to resolve problems with specialized non-availability of some data.
- c) The link between different knowledge in different Computer and Control Engineering fields to solve professional problems.
- d) The capability of drafting of scientific reports.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- e) Risk assessment in professional practices in the Computer and Control Engineering field.
- f) Planning for the development of performance in the Computer and Control Engineering field.
- g) Capability of decision-making in a variety of professional contexts.

2.3 Practical & Professional Skills

On completion of the Master Program in the Computer and Control Engineering field, the graduate should be able to demonstrate knowledge and understanding of the following:

- a) Mastering basic professional skills and specialization in modern knowledge.
- b) Modeling of Computer and Control problems using different analysis and design.
- c) Professional in writing and evaluation of reports and/ or papers.
- d) Evaluation of current existing tools in Computer and Control.
- e) Idealize the design specifications and analysis procedures.

2.4 General & Transferable Skills

On completion of the Master Program in the Computer and Control Engineering field, the graduate should be able to demonstrate the following:

- a) Effective communication of all kinds.
- b) The use of information technology to serve the professional practice.
- c) Self-evaluation and identification of personal learning needs.
- d) The use of different sources of information and knowledge.
- e) The development of rules and indicators for assessing the performance of others.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- f) The ability to work effectively as a team member including the assumption of a leadership role.
- g) Facing and solving unexpected technical problems related to different topics.
- h) Manipulate and utilize the various tools of analysis, design and related web-sites.
- i) Time management efficiency.
- j) Continuous self-learning.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Program Specification

Master of Science (M.Sc.)

Computer and Control Department

2019 / 2020



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

University: **TANTA**

Faculty: **Engineering**

Programme Specification

A- Basic Information

- 1- Programme Title: **Master of Science in Computer and Control Engineering**
- 2- Programme Type: **Single**
- 3- Department(s): **Computer and Control Engineering**
- 4- Coordinator: **Prof. Dr. Amany Sarhan**
- 5- External Evaluator(s): **-----**
- 6- Last date of Programme specifications approval: **-----**

B- Professional Information

1- Programme Aims

This Programme aims at qualifying the student to research in all aspects related to the **Computer and Control Engineering** field considering advanced theoretical and practical points in order to:

- i) Enhance the oriented engineering thinking and support the decision making
- ii) Acquire the advanced sciences that is related to computers and automatic control engineering
- iii) Enable the implementation of new technology associated with computers and automatic control engineering
- iv) Be familiar with the analytical approach and its use in Computer hardware and computerized devices and Computer programming and software systems
- v) Enable application of knowledge of computer and engineering control concepts that gained through the professional practice
- vi) Enable awareness of the ongoing problems and modern visions in computer based control systems
- vii) Acquire the basics and methodologies of scientific research with versatile use of its variable tools
- viii) demonstrate the ability to conduct independent and original research by defining a problem, researching previous work on the problem, and defining, implementing, and documenting a solution to the problem
- ix) Enhance the general writing skills, the teamwork and self-learning

2- Intended Learning Outcomes (ILOs)

a- Knowledge and Understanding:

By the end of the programme, students will be able to understand:

- a1. Memorize the theories, concepts and computer engineering knowledge of the computer based control area and design systems for different computer applications.
- a2. Identify the recent developments and technologies in the field of computers and control engineering
- a3. List the moral and legal ethics of the professional practice in the area of computers and control engineering
- a4. Enumerate the concepts and principles of quality of computer architecture, organization, and interfacing



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- a5. Mention the impact of the nature and principles of scientific subjects in the other engineering disciplines (electrical, electronic and mechanical) that have strong relationships and impacts on computers and control engineering
- a6. Appreciate the concepts and principles of quality of the professional practice in the area of computers and control engineering

b- Intellectual Skills

By the end of the programme, students will be able to:

- b1. Analyze problems in the area of computers and control engineering with arrangement according to their priority; and identify the source of the problem
- b2. Solve specific problems in the area of computers and control engineering
- b3. Carry out a research study and/or writing a scientific methodology study on research problem.
- b4. Select the appropriate hardware and software systems for specific application
- b5. Decide technical decisions based upon available information.
- b6. Analyze and compare the current up-to-date trends in computers and control engineering
- b7. Evaluate the design and performance of systems in computers and control engineering

c- Professional and Practical Skills

By the end of the programme, students will be able to:

- c1. Apply professional skills in the area of computers and control engineering
- c2. Write technical report in the area of computers and control engineering
- c3. Assess methods and tools existing in the area of computers and control engineering
- c4. Design and implement computer-controlled systems
- c5. Solve different problems related to computers and control engineering

d- General and Transferable Skills

By the end of the programme, students will be able to:

- d1. Perform self-study using IT facilities
- d2. Make oral and written presentation
- d3. Work in groups on projects
- d4. Manage time, tasks and team
- d5. Perform self-assessment to identify learning needs and self-learning
- d6. Use different resources for information and knowledge

3- Academic Standards

3a- External References for Standards (Benchmarks)

National Academic Reference Standards (NARS)

3b- Comparison of Provision to External References

Actual Standards	Reference Standards Academic Reference Standards (ARS)
Knowledge and Understanding	
Graduates from Master of Science in computers and control engineering should be able to: a1, a2, a4	The graduates of the engineering programs should be able to demonstrate the knowledge and understanding of: a) The theories and fundamentals related to the Computer and Control as well as in related Areas.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

a2	b) The international design and material standards.
a1	c) Different analysis and design packages of Computer and Control.
a5, a6	d) Reciprocal influence between professional practice and its impacts on the environment.
a1, a2	e) Scientific developments in the Computer and Control field.
a3	f) Legal and ethical principles of professional practice in the Computer and Control field.
a6	g) The principles and fundamental of quality in professional practice in the Computer and Control field.
Intellectual Skills	
b1, b3, b5	With the completion of the postgraduate diploma program, the graduate will be able to: a) The ability for analysis and assessment of information in the Computer and Control and analogies to solve problems.
b1, b2, b4	b) The ability to resolve problems with specialized non-availability of some data.
b3, b6	c) The link between different knowledge in different Computer and Control Engineering fields to solve professional problems.
b2, b3	d) The capability of drafting of scientific reports.
b7	e) Risk assessment in the professional practices.
b7	f) Planning for the development of performance in the Computer and Control Engineering field.
b5, b7	g) Capability of decision-making in a variety of professional contexts.
Professional and Practical Skills	
c1, c3, c4, c5	With the completion of the post graduate diploma program, the graduate will be able to: a) Mastering basic professional skills and specialization in modern knowledge.
c3, c4, c5	b) Modeling of Computer and Control problems using different analysis and design.
c2	c) Professional in writing and evaluation of reports and/ or papers.
c3, c4	d) Evaluation of current existing tools in Computer and Control.
c4, c5	e) Idealize the design specifications and analysis procedures.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

General and Transferable Skills

	With the completion of the post graduate diploma program, the graduate will be able to:
d2, d3	a) Effective communication of all kinds.
d1, d6	b) The use of information technology to serve the professional practice.
d5	c) Self-evaluation and identification of personal learning needs.
d1, d6	d) Use different resources for information and knowledge.
d3, d4, d5	e) The development of rules and indicators for assessing the performance of others.
d2, d3, d4	f) The ability to work effectively as a team member including the assumption of a leadership role.
d4, d6	g) Facing and solving unexpected technical problems related to different topics.
d1, d6	h) Manipulate and utilize the various tools of analysis, design and related web-sites.
d3, d4	i) Time management efficiency.
d5	j) Continuous self-learning.

4- Curriculum Structure and Contents

4.a- Programme duration **18 credit hours + Thesis**



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

5- Programme Courses

a- (Courses from level 600)

The student takes (18 credit hours) from the following courses besides the Research thesis a2,a5(18 credit hours) if his grades in B.Sc. were more than 65%:

Code	Course Title	No. of Hours/Week			Programme ILOs Covered (By No.)
		Lecture	Tutorial	Credit Hours	
Essential Mathematical courses: (3-6 hours required)					
CCE601	Advanced Digital Signal Processing	2	2	3	a1, a2, a5, b1,b2,b3,,b6, ,c4,c5,d1,d2, d4, d6
Basic Courses: (12-15 hours required)					
CCE625	Wireless Networks	2	2	3	a2,a3,a4,b2,b3,b5, c1,c2, d1, d2,d3
CCE609	Distributed Computer Systems	2	2	3	a2,a3,a4, b1,b2,b3,b5, c1,c2, c5, d1, d2,d3, d4,d6
CCE627	Simulation Techniques	2	2	3	a1,b1,b2,b4,b5,b7,c1,c 2,c4,c5,d1,d2,d3,d4
CCE630	Seminar	2	2	3	All

Thesis requirements

- Students cannot take thesis credits before successful completion of the 12 credit hours with C+ grade.
- Students are expected to perform original and creative research and report their research results in a thesis.
- Each student needs to fulfill the publication requirement of at least 1 journal and 2 peer-reviewed conference paper submissions.
- The thesis should be concentrated in-depth, independent study of an appropriate engineering problem with considerable effort being performed in it.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- The thesis advisor and advisory committee, after approving a dissertation topic, monitor the student's progress and approve the final written dissertation after a successful oral defense.

After finishing the writing of the thesis, the student must satisfactorily complete a final oral examination conducted by the advisory



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

2.2 Template for Programme Matrix

Department: Computer and Control Engineering					Faculty: Engineering					University: Tanta				
Total # Courses: According to the students undergraduate					Total Hours per week: ---									
Lecture hrs: ---			Tutorial hrs and Practical hrs: ---							Total hrs: 18 + extra				

ILOs	a Knowledge and Understanding						b Intellectual Skills							c Professional and Practical Skills					d General and Transferable Skills					
	a1	a2	a3	a4	a5	a6	b1	b2	b3	b4	b5	b6	b7	c1	c2	c3	c4	c5	d1	d2	d3	d4	d5	d6
CCE601	X	X			X		X	X	X			X					X	X	X	X		X		X
CCE613				X			X	X	X			X	X			X	X	X	X	X				
CCE625		X	X	X				X	X		X			X	X				X	X	X			
CCE627	X	X			X		X	X		X	X		X	X	X		X	X	X	X	X			
CCE630	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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

Date: 22/9/ 2019



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Specification

Course Title	Distributed Computer Systems	
Course Code	CCE609	
Academic Year	2019-2020	
Coordinator	Prof. Dr. Amany Sarhan	
Teaching Staff	Prof. Dr. Amany Sarhan	
Level	600 - M.Sc. courses	
Semester	second term	
Pre-Requisite	NA	
Course Delivery	Lecture	14 x 2 h lectures
	Practical	14 x 2 h practical
Parent Department	Computer and Control Engineering	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introducing the student to distributed computer systems.
- Teaching the student the architectures and operating systems of distributed systems.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

- Define the meaning of distributed computer systems.
- Mention the architectures of distributed systems.
- Define the distributed operating systems for computer networks.
- Define the distributed databases.
- Define the distributed problem solving.
- List the foundations of coordinated computing models.
- Know the languages for distributed computing (ADA, Occam or other available languages examples of distributed systems).

B. Intellectual skills:

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

- Explain Architecture of distributed systems.
- Analyze Distributed operating systems for computer networks.
- Deduce Languages for distributed computing.
- Integrate Distributed databases.

C. Professional and practical skills:

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

- Code the client server and peer to peer distributed system architectures.
- Develop distributed databases.
- Design Distributed operating systems for computer networks.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

D. General and transferable skills:

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

- D1. Perform self-study.
- D2. Make oral presentation.
- D3. Work in groups on projects.
- D4. Manage time, tasks and team.

3. Course Contents

Week	Topics
1	An introduction to distributed computer systems.
2-3	Architecture of distributed systems.
4-5	Distributed operating systems for computer networks.
6-7	Distributed databases.
8-9	Distributed problem solving.
10-12	Foundations of coordinated computing models.
13-14	Languages for distributed computing (ADA, Occam or others)

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Problem solving
- 4.3- Reports
- 4.4- Case studies

5. Student Assessment

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

6. List of references

Course Notes

Essential Books:

- Maarten Van Steen, "Distributed System ", 3rd Edition, Prentice Hall, 2017.
- Andrew S. Tanenbaum and Maarten Van Steen, "Distributed Systems: Principles and Paradigms", 2nd Edition, Prentice Hall, 2007.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Recommended Books:

- Naresh Sehgal, and Pramod Chandra P. Bhatt, "Cloud Computing Concepts and Practices," Springer publisher, 2018.
- Jean Dollimore, Tim Kindberg, and George Coulouris, "Distributed Systems: Concepts and Design," 5th Edition, Addison Wesley, 2012.
- Ajay D. Kshemkalyan and Ajay D. Kshemkalyan, "Distributed Computing: Principles, Algorithms, and Systems," 1st Edition, Cambridge University Press, 2008.

Periodicals, Web sites, ...etc

<https://online.stanford.edu/courses/cs244b-distributed-systems>

<https://pdos.csail.mit.edu/6.824/>

<https://cs.brown.edu/courses/cs138/>

<https://www.journals.elsevier.com/journal-of-parallel-and-distributed-computing>

<https://link.springer.com/journal/446>

7. Facilities required for teaching and learning

- *Distributed Software lab.*

	Course Coordinator	Head of Department
Name	Prof. Dr. Amany Sarhan	Prof. Dr. Amany Sarhan
Name (Arabic)	أ.د. امانى سرحان	أ.د. امانى سرحان
Signature		
Date	22/ 9 /2019	22/ 9 /2019



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Contents - Course ILOs Matrix

Course Code / Course Title: CCE609/ Distributed Computer Systems

Course Contents	Course outcomes ILOs																		
	Knowledge and Understanding							Intellectual Skills					Professional and Practical Skills			General and Transferable Skills			
	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	D4
An introduction to distributed computer systems.	x			x		x				x		x			x	x			x
Architecture of distributed systems.		x						x						x				x	
Distributed operating systems for computer networks.			x						x				x		x		x		
Distributed databases.				x										x					
Distributed problem solving.					x					x					x			x	
Foundations of coordinated computing models.						x					x			x			x	x	
Languages for distributed computing (ADA, Occam or others)				x			x			x					x		x		x

Course coordinator: Prof. Dr. Amany Sarhan

Head of Department: Prof. Dr. Amany Sarhan



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Specification

Course Title	Seminar	
Course Code	CCE630	
Academic Year	2020-2019	
Coordinator	Prof. Dr. Talaat faheem	
Teaching Staff	Prof. Dr. Talaat faheem	
Level	600 - M.Sc. courses	
Semester	First term	
Pre-Requisite	NA	
Course Delivery	Lecture	14 x 2 h lectures
	Practical	14 x 2 h practical
Parent Department	Computer and Control Engineering	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Acquainting the student with discussion and cooperation skills.
- Introducing the student to the field of active learning environment.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

- A1. Know how to perform active learning environment
- A2. Know how to learn through study, discussion, cooperation
- A3. Realize existing research ideas in new trends.
- A4. State how to prepare a complete seminar

B. Intellectual skills:

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

- B1. Differentiate between active learning environment with research
- B2. Explain a topic a complete seminar
- B3. Analyze existing research ideas in new trends
- B4. Summarize new ideas in the research

C. Professional and practical skills:

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

- C1. Develop the ability to learn through study, discussion, cooperation
- C2. Develop a complete seminar
- C3. Apply the steps of presenting new ideas in the seminar

D. General and transferable skills:

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



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- D1. Perform self-study.
- D2. Make oral presentation.
- D3. Work in groups on projects.
- D4. Manage time, tasks and team.

3. Course Contents

Week	Topics
1	Active learning environment
2	Ability to learn through study, discussion, cooperation
3-4	Ability to collaboration
5-6	Understanding existing research ideas in new trends
7-14	Preparing a complete seminar

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Presentation
- 4.3- Reports

5. Student Assessment

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

6. List of references

Essential Books:

- Any book includes the existing research ideas in this point and new trends.

Web sites:

- www.acm.org
- www.springer.org
- www.ieee.org

7. Facilities required for teaching and learning

- Data show

	Course Coordinator	Head of Department
Name	Prof. Dr. Mohamed Talaat	Prof. Dr. Amany Sarhan
Name (Arabic)	أ. د. محمد طلعت فهميم	أ. د. امانى سرحان
Signature		
Date	22/9 /2019	22/9 /2019



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Contents - Course ILOs Matrix

Course Code / Course Title: CCE630/ Seminar

Course Contents	Course outcomes ILOs														
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills			General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4
Active learning environment	x				x				x		x	x		x	
Ability to learn through study, discussion, cooperation		x			x	x			x		x		x		
Ability to collaboration			x			x	x		x		x		x	x	x
Understanding existing research ideas in new trends				x			x	x		x	x			x	
Preparing a complete seminar				x				x		x	x		x		x

Course coordinator: Prof. Dr. Mohamed Talaat Faheem

Head of Department: Prof. Dr. Amany Sarhan



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Specification

Course Title	Advanced Digital signal Processing	
Course Code	CCE601	
Academic Year	2019-2020	
Coordinator	Prof. Dr. Mahmoud Fahmy	
Teaching Staff	Prof. Dr. Mahmoud Fahmy	
Level	600 - M.Sc. courses	
Semester	Second term	
Pre-Requisite	NA	
Course Delivery	Lecture	14 x 2 h lectures
	Practical	14 x 2 h practical
Parent Department	Computer and Control Engineering	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introducing the student to the concepts of Adaptive signal processing.
- Acquainting the student with the DSP architectures.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

- A1. Define the adaptive signal processing: Wiener filtering, Method of steepest descent, LMS algorithm, Properties, Applications, RLS family.
- A2. List the DSP architectures: DSP devices, Precision, Structures and performance.

B. Intellectual skills:

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

- B1. Explain Adaptive signal processing such as wiener filtering, method of steepest descent and LMS algorithm.
- B2. Deduce to the appropriate filter type for the application.
- B3. Analyze common algorithms of the adaptive signal processing.
- B4. Differentiate structures for DSP devices.
- B5. Explain sampling, aliasing, and reconstruction to adaptive signal processing problems.

C. Professional and practical skills:

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

- C1. Apply method of steepest descent and LMS algorithm.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- C2. Design digital filters to manipulate discrete parameter signals using adaptive signal processing algorithms and techniques.
- C3. Develop different structures for DSP devices including Precision and performance.
- C4. Code programs with MATLAB software package in studying adaptive signal processing algorithms.

D. General and transferable skills:

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

- D1. Perform self-study.
- D2. Make oral presentation.
- D3. Work in groups on projects.
- D4. Manage time, tasks and team.

3. Course Contents

Week	Topics
1-4	Wiener filtering, Method of steepest descent
5-8	LMS algorithm, Properties, Applications, RLS family
9-12	DSP architectures: DSP devices, Precision, Structures and performance.

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Problem solving
- 4.3- Reports
- 4.4- Case studies

5. Student Assessment

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

6. List of references

6.1- Course Notes

6.2- Essential Books:

- J. G. Proakis and D. G. Manolakis, "Digital signal processing: Principles, Algorithms, and Applications," 4th Edition, Pearson Education, 2007.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

6.3- Recommended Books:

- Alan V. Oppenheim and Ronald W. Schafer, "Discrete-time Signal Processing," 3rd Edition, Pearson Education, 2007.
- G .D'Antona, and A .Ferrero, ' Digital Signal Processing for Measurement Systems: Theory and Applications', Springer Science + Business Media B.V, 2006

6.4- Periodicals, Web Sites, etc

7. Facilities required for teaching and learning

- Subscribing in more periodicals.
- Buying newer books in the specialty.

	Course Coordinator	Head of Department
Name	Prof. Dr. Mahmoud Fahmy	Prof. Dr. Amany Sarhan
Name (Arabic)	أ. د. محمود فهمي	أ. د. امانى سرحان
Signature		
Date	22/9 /2019	22/9 /2019



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Contents - Course ILOs Matrix

Course Code / Course Title: CCE601/ Advanced Digital signal Processing

Course Contents					Course outcomes ILOs															
	Knowledge and Understanding						Intellectual Skills						Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4	
Wiener filtering, Method of steepest descent	x						x						x			x				
LMS algorithm, Properties, Applications, RLS family	x	x						x				x		x			x	x		
DSP architectures: DSP devices, Precision, Structures and performance.		x							x	x				x	x				x	

Course coordinator: Prof. Dr. Mahmoud Fahmy

Head of Department: Prof. Dr. Amany Sarhan



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Specification

Course Title	Simulation techniques	
Course Code	CCE627	
Academic Year	2019-2020	
Coordinator	Prof. Dr. Amany Sarhan	
Teaching Staff	Prof. Dr. Amany Sarhan + Dr. Nada Elshenawy	
Level	600 - M.Sc. courses	
Semester	Second term	
Pre-Requisite	NA	
Course Delivery	Lecture	14 x 2 h lectures
	Practical	14 x 2 h practical
Parent Department	Computer and Control Engineering	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Teaching the students basics of simulation techniques.
- Familiarizing the students with various mathematical methods required in different simulation scenarios.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

- Know Model construction and simulation languages.
- Realize the various mathematical methods required in different simulation scenarios (matrix transformations, algebra, and complex numbers).
- Recognize the discrete and continuous simulation.
- Know the use of the necessary real-world physics
- List the theory and operation of several major simulation system components.
- List some of the simulation software

B. Intellectual skills:

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

- Compare between discrete and continuous simulation.
- Explain the need for software rendering techniques.
- Deduce various mathematical methods required in different simulation scenarios.
- Compare between simulation languages.

C. Professional and practical skills:



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

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

- C1. Simulate some system components.
- C2. Apply various mathematical methods in simulation.
- C3. Use databases in simulation.
- C4. Use Matlab and other packages for several system simulations.

D. General and transferable skills:

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

- D1. Perform self-study.
- D2. Make oral presentation.
- D3. Work in groups on projects.
- D4. Manage time, tasks and team.

3. Course Contents

Week	Topics
1-4	Model construction and simulation languages, Various mathematical methods required in different simulation scenarios.
5-9	Open-loop and closed-loop system theory and discrete versus continuous simulation.
10-11	Using databases in simulations and theory and operation of several major simulation system components
12-13	Software simulation packages
14-15	Applications on simulation

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Problem solving
- 4.3- Simulation reports
- 4.4- Case studies
- 4.5- Quizzes

5. Student Assessment

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



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

6. List of references

6.1- Course Notes

6.2- Essential Books:

- Ngai Hang Chan and Hoi-Ying Wong, "Simulation Techniques in Financial Risk Management (Statistics in Practice)", 2016.
- Alexandre Muzy, Bernard P. Zeigler, and Ernesto Kofman, Discrete Event & Iterative System Computational Foundations, Elsevier, 2018.

6.3- Recommended Books:

- Jon Krohn , Grant Beyleveld , et al. Deep Learning Illustrated: A Visual, Interactive Guide to Artificial Intelligence (Addison-Wesley Data & Analytics Series), Addison-Wesley Data & Analytics Series, 2019.
- Santanu Pattanayak, Pro Deep Learning with TensorFlow: A Mathematical Approach to Advanced Artificial Intelligence in Python, 2017

6.4- Periodicals, Web Sites, etc

- <https://www.tandfonline.com/toc/tjms20/current>
- <https://www.worldscientific.com/worldscinet/ijmssc>
- <https://ocw.mit.edu/courses/materials-science-and-engineering/3-021j-introduction-to-modeling-and-simulation-spring-2012/part-i-lectures-readings>

7. Facilities required for teaching and learning

- Simulation Software lab.
- Subscribing in more periodicals.

	Course Coordinator	Head of Department
Name	Prof. Dr. Amany Sarhan	Prof. Dr. Amany Sarhan
Name (Arabic)	أ. د. امانى سرحان	أ. د. امانى سرحان
Signature		
Date	22/9 /2019	22/9 /2019



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Contents - Course ILOs Matrix

Course Code / Course Title: CCE627/ Simulation Techniques

Course Contents	Course outcomes ILOs																	
	Knowledge and Understanding						Intellectual Skills				Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
Model construction and simulation languages, Various mathematical methods required in different simulation scenarios.	X						x				x							x
Open-loop and closed-loop system theory and discrete versus continuous simulation.		x						x			x			x	x	x		
Using databases in simulations and theory and operation of several major simulation system components			x						x			x					x	
Software simulation packages				x						x			x			x		x
Applications on simulation		x	x	x	x	x				x				x		x		x

Course coordinator: Prof. Dr. Amany Sarhan

Head of Department: Prof. Dr. Amany Sarhan



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Specification

Course Title	Wireless networks	
Course Code	CCE625	
Academic Year	2019-2020	
Coordinator	Prof. Dr. El Sayed Salam	
Teaching Staff	Prof. Dr. El Sayed Salam	
Level	600 - M.Sc. courses	
Semester	Second term	
Pre-Requisite	NA	
Course Delivery	Lecture	14 x 2 h lectures
	Practical	14 x 2 h practical
Parent Department	Computer and Control Engineering	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Teaching the student different wireless networks.
- Introducing the student to wireless connections, components and security.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

- A1. Mention Wireless network fundamentals
- A2. Mention Wireless network types; WLAN, WWAN, WPAN, WDAN, Bluetooth, Wi-Fi, Ad hoc networks
- A3. Recognize IEEE 802.11b standards and families
- A4. Realize wireless technology components (cabling and hardware)
- A5. Realize Security of the wireless network, Applications
- A6. Define Routing protocols.

B. Intellectual skills:

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

- B1. Differentiate between different types and protocols of wireless networks.
- B2. Analyze the network security and routing performance of different types of wireless networks.
- B3. Explain different protocol features and metrics.
- B4. Compare different wireless networks.

C. Professional and practical skills:

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

- C1. Apply security and routing principle over wireless networks
- C2. Design wireless networks solutions.
- C3. Apply different routing protocols of wireless networks



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

C4. Simulate the security case studies for wireless routing and security using most used network simulations.

D. General and transferable skills:

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

- D1. Perform self-study.
- D2. Make oral presentation.
- D3. Work in groups on projects.
- D4. Manage time, tasks and team.

3. Course Contents

Week	Topics
1-3	Wireless network fundamentals
4-6	Wireless network types; WLAN, WWAN, WPAN, WDAN, Bluetooth, Wi-Fi, Ad hoc networks
7	IEEE 802.11b standards and families
8-10	Installing wireless technology components (cabling and hardware)
11-13	Security of the wireless network, Applications
14	Routing protocols.

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Problem solving
- 4.3- Reports
- 4.4- Case studies

5. Student Assessment

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

6. List of references

Essential Books:

- Jeffrey G. Andrews, Arunabha Ghosh, and Rias Muhamed, "Fundamentals of WiMAX: Understanding Broadband Wireless Networking," 1st Edition, Prentice Hall, 2007.

Web sites:

- www.acm.org
- www.springer.org
- www.ieee.org

7. Facilities required for teaching and learning



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- *Wireless network lab.*
- *Subscribing in more periodicals.*
- *Buying newer books in the specialty.*

	Course Coordinator	Head of Department
Name	Prof. Dr. El Sayed Salam	Prof. Dr. Amany Sarhan
Name (Arabic)	أ. د. السيد سلام	أ. د. امانى سرحان
Signature		
Date	22/9 /2019	22/9 /2019



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Contents - Course ILOs Matrix

Course Code / Course Title: CCE623/ Wireless networks

Course Contents	Course outcomes ILOs														
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills			General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4
Active learning environment	x				x				x		x	x		x	
Ability to learn through study, discussion, cooperation		x			x	x			x		x		x		
Ability to collaboration			x			x	x		x		x		x	x	x
Understanding existing research ideas in new trends				x			x	x		x	x			x	
Preparing a complete seminar				x				x		x	x		x		x

Course coordinator: Prof. Dr. El Sayed Salam

Head of Department: Prof. Dr. Amany Sarhan



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

DOCTORAL PROGRAM



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

1. SPECIFICATIONS OF THE GRADUATE

The graduates of Ph. D. Program in the Computer and Control Engineering field should be able to demonstrate the following:

- a) Mastering the basics of scientific research and methodologies.
- b) Continuing work for the addition of knowledge in the Computer and Control field.
- c) The application of analytical and critical approaches in the Computer and Control field and related area.
- d) The integration of specialized knowledge in Computer and Control with knowledge of relationship developed and derives relation interfaces.
- e) Awareness of modern theories in the Computer and Control field.
- f) Identifying problems and making professional innovative solutions to solve them.
- g) Proficiency in a wide range of professional skills in Computer and Control.
- h) Orientation towards the development of methods and tools to new methods of professional practice.
- i) The use of appropriate technological means and computer software to serve the professional practice.
- j) Effective communication and team leadership in different professional contexts.
- k) Decision-making in the light of available information.
- l) Employment of available resources and ability to develop new resources effectively.
- m) Awareness of his role in the development of society and the preservation of the environment.
- n) Act reflects commitment to integrity and credibility of the profession.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- o) Commitment to continuous self-development and transfer of knowledge and experience to others.

2. ACADEMIC REFERENCE STANDARDS FOR COMPUTER AND CONTROL ENGINEERING

2.1 Knowledge & Understanding

On completion of the Ph. D. Program in the Computer and Control Engineering, the graduate should be able to demonstrate knowledge and understanding of the following:

- a) The fundamentals, methodologies, tools and ethics of scientific research in Computer and Control Engineering.
- b) Legal and ethical principles of professional practice in Computer and Control Engineering.
- c) The principles and fundamental of quality in professional practice in Computer and Control Engineering.
- d) The knowledge on the effects on the Computer and Control Engineering and development of roads and maintenance of the environment
- e) The possible effects of the professional practice on the environment and commitment to the maintenance of the environment.

2.2 Intellectual Skills:

On completion of the Ph. D. Program in the Computer and Control Engineering, the graduate should be able to demonstrate the following:

- a) Ability for analysis and assessment of information in Computer and Control field and making simulations based on this information.
- b) The solution of problems based on available specialized data.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- c) Conducting research studies in the Computer and Control field and adding to the current knowledge.
- d) The capability of drafting of scientific papers.
- e) Risk assessment in professional practice.
- f) Planning for the development of the performance in the Computer and Control field.
- g) The decision-making in different professional contexts.
- h) Innovation and creativity.
- i) Ability to make discussions, dialogue and debate based on scientific facts and evidence.

2.3 Practical & Professional Skills

On completion of the Ph. D. Program in the Computer and Control Engineering, the graduate should be able to demonstrate the following:

- a) Modeling of Computer and Control problems using the analysis and design packages
- b) Mastering basic and modern professional skills in the Computer and Control field.
- c) Writing and/ or evaluation of papers and reports professionally.
- d) Publishing professional papers in international journals.
- e) Evaluation and development of existing tools in the Computer and Control field.
- f) The use of technological means to serve the professional practice.
- g) Planning for the development of his professional practice and the development of performance of others.

2.4 General & Transferable Skills



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

On completion of the Ph. D. Program in the Computer and Control Engineering, the graduate should be able to demonstrate the following:

- a) Effective communication of all kinds.
- b) The use of information technology to serve the professional practice.
- c) The ability to teach others and to evaluate their performance.
- d) The self-assessment and continuous learning.
- e) Facing and solving unexpected technical problems.
- f) The use of different sources of information and knowledge.
- g) Work effectively as a team member including the capability of leadership.
- h) Management of scientific meetings and the ability to manage time.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Program Specification

Doctorate of Philosophy (Ph.D.)

Computer and Control Department

2019 / 2020



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

University: **TANTA**

Faculty: **Engineering**

Program Specification

A- Basic Information

- 1- Programme Title: **Doctorate of Philosophy in Computers and Control Engineering**
2- Programme Type: **Single**
3- Department(s): **Computers and Control Engineering**
4- Coordinator: **Assoc. Prof. Dr. Amany Sarhan**
5- External Evaluator(s): **-----**
6- Last date of Programme specifications approval: **-----**

B- Professional Information

1- Programme Aims

This Programme aims at qualifying the student to research in all aspects related to the **Computers and Control Engineering** field considering advanced theoretical and practical points in order to:

- i) Enhance the oriented engineering thinking and support the decision making
- ii) Acquire the advanced sciences that is related to computers and automatic control engineering
- iii) Enable the implementation of new technology associated with computers and automatic control engineering
- iv) Be familiar with the analytical approach and its use in Computer hardware and computerized devices and Computer programming and software systems
- v) Enable application of knowledge of computer and engineering control concepts that gained through the professional practice
- vi) Enable awareness of the ongoing problems and modern visions in computer based control systems
- vii) Acquire the basics and methodologies of scientific research with versatile use of its variable tools
- viii) demonstrate the ability to conduct independent and original research by defining a problem, researching previous work on the problem, and defining, implementing, and documenting a solution to the problem
- ix) Enhance the general writing skills, the teamwork and self learning

2- Intended Learning Outcomes (ILOs)

a- Knowledge and Understanding:

By the end of the programme, students will be able to:

- a1. Memorize the theories, concepts and Computer engineering knowledge of the computer based control area and design systems for different computer applications.
- a2. Identify the recent developments and technologies in the field of computers and control engineering
- a3. List the moral and legal ethics of the professional practice in the area of computers and control engineering
- a4. Enumerate the concepts and principles of quality of computer architecture, organization, and interfacing



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- a5. Mention the impact of the nature and principles of scientific subjects in the other engineering disciplines (electrical, electronic and mechanical) that have strong relationships and impacts on computers and control engineering
- a6. Appreciate the concepts and principles of quality of the professional practice in the area of computers and control engineering

b- Intellectual Skills

By the end of the programme, students will be able to:

- b1. Analyze problems in the area of computers and control engineering with arrangement according to their priority; and identify the source of the problem
- b2. Solve specific problems in the area of computers and control engineering with innovative methods.
- b3. Carry out a research study and/or writing a scientific methodology study on research problem.
- b4. Select the appropriate hardware and software systems for specific application
- b5. Decide technical decisions based upon available information.
- b6. Analyze and compare the current up-to-date trends in computers and control engineering
- b7. Evaluate the design and performance of systems in computers and control engineering

c- Professional and Practical Skills

By the end of the programme, students will be able to:

- c1. Apply professional skills in the area of computers and control engineering
- c2. Write/evaluate/publish technical report in the area of computers and control engineering
- c3. Assess methods and tools existing in the area of computers and control engineering
- c4. Model Computer and Control problems using the analysis and design packages
- c5. Solve and Planning for the development of different problems related to computers and control engineering

d- General and Transferable Skills

By the end of the programme, students will be able to:

- d1. Perform self-study using IT facilities
- d2. Make oral and written presentation
- d3. Work in groups on projects and teach others
- d4. Manage time, tasks and team
- d5. Perform self-assessment to identify learning needs and solve unexpected problems.
- d6. Use different resources for information and knowledge

3- Academic Standards

3a- External References for Standards (Benchmarks)

National Academic Reference Standards (NARS)

3b- Comparison of Provision to External References

Actual Standards	Reference Standards Academic Reference Standards (ARS)
------------------	---



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Knowledge and Understanding

Graduates from Doctorate of Philosophy in computers and control engineering should be able to:

a1, a2, a4

The graduates of the engineering programs should be able to demonstrate the knowledge and understanding of:

h) The fundamentals, methodologies, tools and ethics of scientific research in Computer and Control Engineering.

a3

i) Legal and ethical principles of professional practice in Computer and Control Engineering.

a6

j) The principles and fundamental of quality in professional practice in Computer and Control Engineering.

a5, a6

k) The possible effects of the professional practice on the environment and commitment to the maintenance of the environment.

Intellectual Skills

b1, b3, b5

With the completion of the postgraduate diploma program, the graduate will be able to:

h) Ability for analysis and assessment of information in Computer and Control field and making simulations based on this information.

b1, b2, b4

i) The solution of problems based on available specialized data.

b3, b6

j) Conducting research studies in the Computer and Control field and adding to the current knowledge.

b3, b6

k) The capability of drafting of scientific papers.

b7

l) Risk assessment in the professional practices.

b5, b7

m) Planning for the development of the performance in the Computer and Control field.

b5

n) The decision-making in different professional contexts.

b2

o) Innovation and creativity.

b5, b6

p) Ability to make discussions, dialogue and debate based on scientific facts and evidence.

Professional and Practical Skills

c4

With the completion of the post graduate diploma program, the graduate will be able to:

a) Modeling of Computer and Control problems using the analysis and design packages

c1

b) Mastering basic and modern professional skills in the Computer and Control field.

c2

c) Writing and/ or evaluation of papers and reports professionally.

c2

d) Publishing professional papers in international journals.

c3

e) Evaluation and development of existing tools in the Computer and Control field.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

c1, c3		f) The use of technological means to serve the professional practice.
c5		g) Planning for the development of his professional practice and the development of performance of others.
General and Transferable Skills		
		With the completion of the post graduate diploma program, the graduate will be able to:
d2		a) Effective communication of all kinds.
d1, d6		b) The use of information technology to serve the professional practice.
d3		c) The ability to teach others and to evaluate their performance.
d5		d) The self-assessment and continuous learning.
d5		e) Facing and solving unexpected technical problems.
d1, d6		f) The use of different sources of information and knowledge.
d3, d4		g) Work effectively as a team member including the capability of leadership.
d2, d3, d4		h) Management of scientific meetings and the ability to manage time.

4- Curriculum Structure and Contents

4.a- Programme duration **24 credit hours + Thesis**



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

5- Programme Courses

a- (Specialized courses from level 700)

The student takes (24 credit hours) from the following courses besides the research thesis (24 credit hours):

Code	Course Title	No. of Hours/Week			Programme ILOs Covered (By No.)
		Lecture	Tutorial	Credit Hours	
Essential Mathematical courses: (3-6 hours required)					
CCE700	System Modeling and Optimization				
Basic Courses: (12-15 hours required)					
CCE601	Advanced Digital Signal Processing	2	2	3	a1, a2, a5, b1,b2,b3,,b6, ,c4,c5,d1,d2, d4, d6
CCE627	Simulation Techniques	2	2	3	a1,b1,b2,b4,b5,b7,c1,c2,c4,c5,d1,d2,d3,d4
CCE625	Wireless Networks	2	2	3	a2,a3,a4,b2,b3,b5, c1,c2, d1, d2,d3
CCE630	Seminar	2	2	3	All
CCE705	Machine Learning	2	2	3	a1,a2,a4,b1,b3,b4,b6,b7,c1,c2,c4,c5,d2,d4

Thesis requirements

- Students cannot take thesis credits before successful completion of the 18 credit hours with C grade.
- Students are expected to perform original and creative research and report their research results in a thesis.
- Each student needs to fulfill the publication requirement of at least 2 journal and 2 peer-reviewed conference paper submissions.
- The thesis should be concentrated in-depth, independent study of an appropriate engineering problem with considerable effort being performed in it.
- The thesis advisor and advisory committee, after approving a dissertation topic, monitor the student's progress and approve the final written dissertation after a successful oral defense.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- After finishing the writing of the thesis, the student must satisfactory complete of a final oral examination conducted by the advisory committee.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

2.2 Template for Programme Matrix

Department: Computer and Control Engineering	Faculty: Engineering	University: Tanta
Total # Courses: 8 per Specialization	Total Hours per week: --	
Lecture hrs: --	Tutorial hrs and Practical hrs: --	Total hrs: 24

ILOs	a Knowledge and Understanding						b Intellectual Skills							c Professional and Practical Skills					d General and Transferable Skills					
Course	a1	a2	a3	a4	a5	a6	b1	b2	b3	b4	b5	b6	b7	c1	c2	c3	c4	C5	d1	d2	d3	d4	d5	d6
CCE700	X			X	X	X		X		X	X	X	X	X	X	X	X				X		X	
CCE627	X	X			X		X	X		X	X		X	X	X		X	X	X	X	X			
CCE601	X	X			X		X	X	X			X					X	X	X	X		X		X
CCE625		X	X	X				X	X		X			X	X				X	X	X			
CCE630																								
CCE705																								

Head of Department: Prof. Dr. Amany Sarhan

Date: 22 / 9/ 2019



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Ph. D. Course Specification



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Specification

Course Title	Seminar	
Course Code	CCE630	
Academic Year	2019-2020	
Coordinator	Prof. Dr. Talaat faheem	
Teaching Staff	Prof. Dr. Talaat faheem	
Level	600 - M.Sc. courses	
Semester	First term	
Pre-Requisite	NA	
Course Delivery	Lecture	14 x 2 h lectures
	Practical	14 x 2 h practical
Parent Department	Computer and Control Engineering	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Acquainting the student with discussion and cooperation skills.
- Introducing the student to the field of active learning environment.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

- A7. Know how to perform active learning environment
- A8. Know how to learn through study, discussion, cooperation
- A9. Realize existing research ideas in new trends.
- A10. State how to prepare a complete seminar

B. Intellectual skills:

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

- B5. Differentiate between active learning environment with research
- B6. Explain a topic a complete seminar
- B7. Analyze existing research ideas in new trends
- B8. Summarize new ideas in the research

C. Professional and practical skills:

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

- C5. Develop the ability to learn through study, discussion, cooperation
- C6. Develop a complete seminar
- C7. Apply the steps of presenting new ideas in the seminar

D. General and transferable skills:

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



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- D5. Perform self-study.
- D6. Make oral presentation.
- D7. Work in groups on projects.
- D8. Manage time, tasks and team.

3. Course Contents

Week	Topics
1	Active learning environment
2	Ability to learn through study, discussion, cooperation
3-4	Ability to collaboration
5-6	Understanding existing research ideas in new trends
7-14	Preparing a complete seminar

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Presentation
- 4.3- Reports

5. Student Assessment

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

6. List of references

Essential Books:

- Any book includes the existing research ideas in this point and new trends.

Web sites:

- www.acm.org
- www.springer.org
- www.ieee.org

7. Facilities required for teaching and learning

- Data show

	Course Coordinator	Head of Department
Name	Prof. Dr. Mohamed Talaat	Prof. Dr. Amany Sarhan
Name (Arabic)	أ. د. محمد طلعت فهميم	أ. د. امانى سرحان
Signature		
Date	22/9 /2019	22/9 /2019



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Contents - Course ILOs Matrix

Course Code / Course Title: CCE630/ Seminar

Course Contents	Course outcomes ILOs														
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills			General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4
Active learning environment	x				x				x		x	x		x	
Ability to learn through study, discussion, cooperation		x			x	x			x		x		x		
Ability to collaboration			x			x	x		x		x		x	x	x
Understanding existing research ideas in new trends				x			x	x		x	x			x	
Preparing a complete seminar				x				x		x	x		x		x

Course coordinator: Prof. Dr. Mohamed Talaat Faheem

Head of Department: Prof. Dr. Amany Sarhan



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Specification

Course Title	Distributed Computer System	
Course Code	CCE609	
Academic Year	2019-2020	
Coordinator	Prof. Dr. Amany Sarhan	
Teaching Staff	Prof. Dr. Amany Sarhan	
Level	600 - M.Sc. courses	
Semester	First term	
Pre-Requisite	NA	
Course Delivery	Lecture	14 x 2 h lectures
	Practical	14 x 2 h practical
Parent Department	Computer and Control Engineering	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Introducing the student to distributed computer systems.
- Teaching the student the architectures and operating systems of distributed systems.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

- Define the meaning of distributed computer systems.
- Mention the architectures of distributed systems.
- Define the distributed operating systems for computer networks.
- Define the distributed databases.
- Define the distributed problem solving.
- List the foundations of coordinated computing models.
- Know the languages for distributed computing (ADA, Occam or other available languages examples of distributed systems).

B. Intellectual skills:

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

- Explain Architecture of distributed systems.
- Analyze Distributed operating systems for computer networks.
- Deduce Languages for distributed computing.
- Integrate Distributed databases.

C. Professional and practical skills:

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

- Code the client server and peer to peer distributed system architectures.
- Develop distributed databases.
- Design Distributed operating systems for computer networks.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

D. General and transferable skills:

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

- D5. Perform self-study.
- D6. Make oral presentation.
- D7. Work in groups on projects.
- D8. Manage time, tasks and team.

3. Course Contents

Week	Topics
1	An introduction to distributed computer systems.
2-3	Architecture of distributed systems.
4-5	Distributed operating systems for computer networks.
6-7	Distributed databases.
8-9	Distributed problem solving.
10-12	Foundations of coordinated computing models.
13-14	Languages for distributed computing (ADA, Occam or others)

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Problem solving
- 4.3- Reports
- 4.4- Case studies

5. Student Assessment

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

6. List of references

Course Notes

Essential Books:

- Maarten Van Steen, "Distributed System ", 3rd Edition, Prentice Hall, 2017.
- Andrew S. Tanenbaum and Maarten Van Steen, "Distributed Systems: Principles and Paradigms", 2nd Edition, Prentice Hall, 2007.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Recommended Books:

- Naresh Sehgal, and Pramod Chandra P. Bhatt, "Cloud Computing Concepts and Practices," Springer publisher, 2018.
- Jean Dollimore, Tim Kindberg, and George Coulouris, "Distributed Systems: Concepts and Design," 5th Edition, Addison Wesley, 2012.
- Ajay D. Kshemkalyan and Ajay D. Kshemkalyan, "Distributed Computing: Principles, Algorithms, and Systems," 1st Edition, Cambridge University Press, 2008.

Periodicals, Web sites, ...etc

<https://online.stanford.edu/courses/cs244b-distributed-systems>

<https://pdos.csail.mit.edu/6.824/>

<https://cs.brown.edu/courses/cs138/>

<https://www.journals.elsevier.com/journal-of-parallel-and-distributed-computing>

<https://link.springer.com/journal/446>

7. Facilities required for teaching and learning

- *Distributed Software lab.*

	Course Coordinator	Head of Department
Name	Prof. Dr. Amany Sarhan	Prof. Dr. Amany Sarhan
Name (Arabic)	أ.د. امانى سرحان	أ.د. امانى سرحان
Signature		
Date	22/ 9 /2019	22/ 9 /2019



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Contents - Course ILOs Matrix

Course Code / Course Title: CCE609/ Distributed Computer Systems

Course Contents	Course outcomes ILOs																		
	Knowledge and Understanding							Intellectual Skills					Professional and Practical Skills			General and Transferable Skills			
	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	D4
An introduction to distributed computer systems.	x			x		x				x		x			x	x			x
Architecture of distributed systems.		x						x						x				x	
Distributed operating systems for computer networks.			x						x				x		x		x		
Distributed databases.				x										x					
Distributed problem solving.					x					x					x			x	
Foundations of coordinated computing models.						x					x			x			x	x	
Languages for distributed computing (ADA, Occam or others)				x			x			x					x		x		x

Course coordinator: Prof. Dr. Amany Sarhan

Head of Department: Prof. Dr. Amany Sarhan



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Specification

Course Title	Machine learning	
Course Code	CCE705	
Academic Year	2019-2020	
Coordinator	Prof. Dr. Mahmoud Fahmy	
Teaching Staff	Prof. Dr. Mahmoud Fahmy	
Level	700 - Ph.D. courses	
Semester	First term	
Pre-Requisite	NA	
Course Delivery	Lecture	14 x 2 h lectures
	Practical	14 x 2 h practical
Parent Department	Computer and Control Engineering	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Familiarizing the students with the Learning Problems: Classification, regression, recognition, and prediction; Problem solving and planning; Reasoning and inference; Data mining; Web mining; Scientific discovery; Information retrieval; Natural language processing; Design and diagnosis; Vision and speech perception; Robotics and control; Game playing; Industrial, and scientific applications of all kinds.
- Recognize the students the Types of learning; Rote learning, Inductive learning, Deductive learning, Explanation learning.
- Familiarizing the students with the Learning Methods: Supervised and unsupervised learning methods (including learning decision and regression trees, probabilistic networks and other statistical pattern recognition models, learning Using neural network, case-based methods, ensemble methods, clustering, etc.); Reinforcement learning; Evolution-based methods; Explanation-based learning; Automated discovery.

2. Intended Learning outcomes (ILOs)

a) Knowledge and Understanding

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

- a1. Enumerate different Types of learning, Rote learning, Inductive learning, Deductive learning, Explanation learning.
- a2. Know how to use neural network in learning
- a3. Recognize the statistical pattern recognition with its applications to such areas as optical character recognition.
- a4. Define the automated discovery.

b) Intellectual skills

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

- b1. Explain the concept of machine learning.



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- b2. Distinguish between the types of learning, Rote learning, Inductive learning, Deductive learning, Explanation learning.
- b3. Analyze the Using of neural networks in learning.
- b4. Recognize the Statistical pattern recognition with its applications to such areas as optical character recognition..
- b5. Identify the concepts automated discovery.

c) Professional and practical skills

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

- c1. Simulate the different types of learning, Rote learning, Inductive learning, Deductive learning, Explanational learning.
- c2. Apply Statistical pattern recognition on some of its applications areas such as optical character recognition..
- c3. Simulate the neural network machine learning.

d) General and transferable skills

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

- d1. Perform self-study.
- d2. Make oral presentation.
- d3. Work in groups on projects.
- d4. Manage time, tasks and team.

3. Course Contents

Week	Topics
1-4	Types of learning, Rote learning, Inductive learning, Deductive learning, Explanational learning.
5-9	Using neural network in learning
10-12	Statistical pattern recognition with its applications to such areas as optical character recognition.
13-14	Automated discovery.

4. Teaching and Learning Methods

- 4.1) Lectures
- 4.2) Problem solving
- 4.3) Reports



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

4.4) Case studies

5. Student Assessment

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

6. List of references

6.1- Course Notes

6.2- Essential Books (Text Books)

- Christopher M.Bishop, "Pattern Recognition and Machine learning (Information Science and Statics)," Springer Science LLC , 2012

6.3- Recommended Books

- Ethem Alpaydin, "Introduction to Machine Learning," 2nd Edition (Adaptive Computation and Machine Learning), MIT Press, 2015

6.4- Periodicals, Web Sites, ... etc

- www.ieeexplore.ieee.org
- www.acm.org
- www.springer.org
- www.elsevier.org

7. Facilities required for teaching and learning

- Software lab.
- Subscribing in more periodicals.
- Buying newer books in the specialty.

Course Coordinator		Head of Department
Name	Prof. Dr. Mahmoud Fahmy	Prof. Dr. Amany Sarhan
Name (Arabic)	أ.د. محمود فهمي	أ.د. أمانى سرحان
Signature		
Date	22/ 9 /2019	22/ 9 /2019



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

5 -Course Contents - Course ILOs Matrix

Course Code / Course Title: CCE705/ Machine learning

Course Contents	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills					Professional and Practical Skills			General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	D4
Types of learning, Rote learning, Inductive learning, Deductive learning, Explanational learning.	x				x	x				x			x	x		
Using neural network in learning		x					x			x		x	x	x		
Statistical pattern recognition with its applications to such areas as optical character recognition.			x					x			x				x	x
Automated discovery.				x					x						x	x

Course coordinator: Prof. Dr. Mahmoud Fahmy

Head of Department: Prof. Dr. Amany Sarhan



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Specification

Course Title	Wireless networks	
Course Code	CCE625	
Academic Year	2019-2020	
Coordinator	Prof. Dr. El Sayed Salam	
Teaching Staff	Prof. Dr. El Sayed Salam	
Level	600 - M.Sc. courses	
Semester	Second term	
Pre-Requisite	NA	
Course Delivery	Lecture	14 x 2 h lectures
	Practical	14 x 2 h practical
Parent Department	Computer and Control Engineering	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Teaching the student different wireless networks.
- Introducing the student to wireless connections, components and security.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

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

- A11. Mention Wireless network fundamentals
- A12. Mention Wireless network types; WLAN, WWAN, WPAN, WDAN, Bluetooth, Wi-Fi, Ad hoc networks
- A13. Recognize IEEE 802.11b standards and families
- A14. Realize wireless technology components (cabling and hardware)
- A15. Realize Security of the wireless network, Applications
- A16. Define Routing protocols.

B. Intellectual skills:

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

- B9. Differentiate between different types and protocols of wireless networks.
- B10. Analyze the network security and routing performance of different types of wireless networks.
- B11. Explain different protocol features and metrics.
- B12. Compare different wireless networks.

C. Professional and practical skills:

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

- C8. Apply security and routing principle over wireless networks
- C9. Design wireless networks solutions.
- C10. Apply different routing protocols of wireless networks



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

C11. Simulate the security case studies for wireless routing and security using most used network simulations.

D. General and transferable skills:

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

- D9. Perform self-study.
- D10. Make oral presentation.
- D11. Work in groups on projects.
- D12. Manage time, tasks and team.

3. Course Contents

Week	Topics
1-3	Wireless network fundamentals
4-6	Wireless network types; WLAN, WWAN, WPAN, WDAN, Bluetooth, Wi-Fi, Ad hoc networks
7	IEEE 802.11b standards and families
8-10	Installing wireless technology components (cabling and hardware)
11-13	Security of the wireless network, Applications
14	Routing protocols.

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Problem solving
- 4.3- Reports
- 4.4- Case studies

5. Student Assessment

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

6. List of references

Essential Books:

- Jeffrey G. Andrews, Arunabha Ghosh, and Rias Muhamed, "Fundamentals of WiMAX: Understanding Broadband Wireless Networking," 1st Edition, Prentice Hall, 2007.

Web sites:

- www.acm.org
- www.springer.org
- www.ieee.org

7. Facilities required for teaching and learning



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

- *Wireless network lab.*
- *Subscribing in more periodicals.*
- *Buying newer books in the specialty.*

Course Coordinator		Head of Department
Name	Prof. Dr. El Sayed Salam	Prof. Dr. Amany Sarhan
Name (Arabic)	أ. د. السيد سلام	أ. د. امانى سرحان
Signature		
Date	22/9 /2019	22/9 /2019



Tanta University



Faculty of Engineering

Computer and Control Engineering Department

Course Contents - Course ILOs Matrix

Course Code / Course Title: CCE623/ Wireless networks

Course Contents	Course outcomes ILOs														
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills			General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4
Active learning environment	x				x				x		x	x		x	
Ability to learn through study, discussion, cooperation		x			x	x			x		x		x		
Ability to collaboration			x			x	x		x		x		x	x	x
Understanding existing research ideas in new trends				x			x	x		x	x			x	
Preparing a complete seminar				x				x		x	x		x		x

Course coordinator: **Prof. Dr. El Sayed Salam**

Head of Department: **Prof. Dr. Amany**