



Cairo University
Institute of Statistical Studies &
Research

Master of Computer Science
Program Handbook
Computer Science Department

ISSR Established 1947
Computer and Information Sciences Department Established 1973



Computer Science Master Program Handbook

Handbook Teamwork

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TO WHOM IT MAY CONCERN

This is an approved copy of the courses specifications of the computer science Master program offered by Computer Sciences Department of the Institute of statistical studies and research, Cairo University, during the academic year 2015-2016.

Vice Dean
For Teaching and studies Affairs

Dean

Prof. Hesham Hefny

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Master of Computer Sciences

Program Specification
Cairo University
Institute of Statistical Studies and Research (ISSR)

A. Basic Information

- Program title: *Master of Computer Sciences*
- Program type: *single (Pure)*
- Department: *Computer And Information Sciences.*
- Coordinator: *Head of Department*
- External Evaluator(s): *N/A*
- Last date of program specifications approval: ٢٠١٦/٢/٢٨

B. Professional Information:

1. Program Aims

Prepare qualified persons to perform researches in computer sciences to enhance the national research's share among other countries as well as to have a role in the development of our society.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- a1-*Knowledge of advances in database systems.*
- a2-*Knowledge of advances in software engineering.*
- a3-*Knowledge of different aspects of intelligent systems.*
- a4-*Knowledge and understanding of neural networks computational technique.*
- a5-*Understanding and Knowledge of theory of computation.*
- a6-*Knowledge and understanding of data mining methodologies.*
- a7-*Understanding of fuzzy logic and fuzzy systems.*

b. Intellectual Skills

- b1-*Advanced analytical skills in database Design.*
- b2-*Advanced intellectual skills in adapting and integrating problem solving methodologies in software design.*
- b3- *Analytical skills in data and knowledge representation.*
- b4-*Design of neural network models for real life problem.*
- b5-*Design of fuzzy rule-based models for real life problems.*
- b6-*Differentiate among different grammars.*

c. Professional and Practical Skills

- c1-*Applying computational models inspired from nature in real life problems..*
- c2-*Practical skills in data analysis and data mining.*
- c3- *The ability to evaluate the efficiencies of designs of databases.*
- c4- *The ability to construct a grammar for a given language.*

c5-Practical skills in research through both electronic media and libraries.

d- General and Transferable Skills

d1- The ability to analyze and solve problems.

d2- The ability of self learning of new computational methodologies.

d3- The ability to perform research in new topics.

d4- The ability to apply and integrate the learned methodologies in various fields of applications.

3. Academic Standards

3a External References for Standards: N/A

3b Comparison of Provision to External References: N/A

4. Curriculum Structure and Contents

4.a- Program duration: 2 semesters (One Academic Years)

4.b- Program Structure:

4.b.i- No. of hours / week: Lectures...15. Lab/Exercise N/A TotalN/A

4.b.ii- No. of credit hours: **Compulsory**...18.**Elective**...12

4.b.iii- No. of credit hours of **basic** courses: 18 60 %.

4.b.iv- No. of credit hours of **specialized** courses: 9 30 %

4.b.v- No. of credit hours of **other** courses: 3 10 %.

4.b.vi- Practical / Field Training: N/A

4.b.vii- Program Levels (in credit-hours system): N/A

5. Program Courses

5.1- Level / Year of Program: 1 Semester: 1

a-Compulsory

Code No.	Course Title	PRE.	No. of Units	No. of hours/week			Program ILOs covered (By No.)
				Lec.	Lab.	Exe.	
CS601	Advanced Topics in Software Engineering		3	3			a2, b2,d1-d4
CS602	Intelligent systems		3	3			a3,b3,c3,d1-d4
CS603	Artificial Neural Networks		3	3			a4,b4,c1,c5, d1 d4
CS604	Advanced Topics in Database Design & Implementation		3	3			a1,b1,c5,d1-d4

b. Elective (*only one course is selected*)

Code No.	Course Title	PRE.	No. of Units	No. of hours/week			Program ILOs covered (By No.)
				Lec.	Lab.	Exe.	
CS610	Intelligent Educational Systems		3	3			d1-d4
CS606	Advanced Graphics & Visualization		3	3			d1-d4
CS615	Advanced Computer Architecture		3	3			d1-d4
CS631	E-Learning		3	3			d1-d4
CS633	Advanced Operating Systems		3	3			d1-d4
CS635	Natural Language Processing		3	3			d1-d4
IS603	Geographic Information System						d1-d4

5.2- Level / Year of Program: 1

Semester: 2

a. Compulsory

Code No.	Course Title	PRE.	No. of Units	No. of hours/week			Program ILOs covered (By No.)
				Lec.	Lab.	Exe.	
CS600	Theory of Computation		3	3			a5,b6,c4,c5,d1-d4
CS605	Advanced Topics in Computer Science		3	3			d1-d4
	project		3	3			d1-d4

b. Elective (*only two courses are selected*)

Elective courses include those of semester 3 (if needed) in addition to the following list.

Code No.	Course Title	PRE.	No. of Units	No. of hours/week			Program ILOs covered (By No.)
				Lec.	Lab.	Exe.	
CS606	Advanced Graphics & Visualization		3	3			d1-d4
CS607	Logic & Declarative Programming		3	3			d1-d4
CS609	Distributed Systems		3	3			d1-d4
CS612	Machine Learning		3	3			d1-d4
CS613	Data Mining		3	3			a6,c2,c5,d1-d4

CS614	<i>Fuzzy-Logic Based Systems</i>		3	3			<i>a6,b5,c1,c5,d1-d4</i>
CS616	<i>Parallel Processing</i>		3	3			<i>d1-d4</i>
CS617	<i>Computer Vision</i>		3	3			<i>d1-d4</i>
CS618	<i>Automated Reasoning</i>		3	3			<i>d1-d4</i>
CS619	<i>Multi-Agent Systems</i>		3	3			<i>d1-d4</i>
CS632	<i>Image Processing</i>		3	3			<i>d1-d4</i>
CS634	<i>Network Security</i>		3	3			<i>d1-d4</i>
CS636	<i>Introduction to Bioinformatics</i>		3	3			<i>d1-d4</i>
CS637	<i>Grid Computing</i>		3	3			<i>d1-d4</i>
CS638	<i>Selected Topics in Computer Sciences</i>		3	3			<i>d1-d4</i>

6. Program Admission Requirements

1. Students having the ISSR's Diploma in CS with grade "good" at least.
2. Students having Bachelor degree in CS from other universities with grade "good" at least.

7. Regulations for Progression and Program Completion

Student must successfully complete (30) credit hours structured as follows: (18) compulsory, (9) specialized elective, and (3) for a project.

8. Evaluation Program Intended Learning Outcomes

Evaluator	Tool	Sample
1- Senior students	<i>Questionnaire</i>	<i>N/A</i>
2- Alumni	<i>Annual Department Conference</i>	<i>N/A</i>
3- Stakeholders (Employers)	<i>Annual Department Conference</i>	<i>N/A</i>
4-External Evaluators(s) External Examiner(s)	<i>Prof. Said Seliem</i> <i>Prof. Abdel Aziz Khamis</i>	<i>N/A</i>
5- others		

Core requirements**Course Specifications****A. Basic Information**

- Program(s) on which the course is given: CS, Pre-Master
- Major or Minor element of program: Major
- Department offering the program: Computer and Information Sciences
- Department offering the course: Computer and Information Sciences
- Academic year / level: Pre-master
- Date of Specification approval: 2017/2/28
- Title: Formal Verification of Computer Programs Code: CS601
- Credit Hours: Three Lecture: 1.5 hours(Two/week)
- Tutorial: N/A Practical: N/A Total: Three

B. Professional Information**1. Overall Aims of Course**

The objective of the course is to introduce the students to language-independent systematic methods of program verification, analyzing, testing and debugging. The course consists of two main parts: Formal methods for verifying Computer programs and Static and Dynamic Program Analysis. These topics represent software engineering approach to program verification.

2. Intended Learning Outcomes (ILOs)**a. Knowledge and Understanding**

- a1- Understanding of formal Logic, first and Second Order Logic.
- a2- Understanding program faults and error, static and Dynamic analysis of computer program and program flow graph.
- a3- Understanding of the Verification Conditions axioms, and its application in computer programs.
- a4- Understanding of test case synthesis for various of test types
- a5- Understanding of test coverage monitors and its significance.

b. Intellectual Skills

- b1- The application of formal method in verifying computer programs.
- b2- The application of both theoretical/formal and graphical methods in detecting and correcting program bugs/errors
- b3- The ability to design and write a verified program
- b4- The ability to design and generate test suits of the various types for program testing.

c. Professional and Practical Skills

- c1- Application of formal Logic in computer Systems
- c2- Design of test suites, to test software modules/packages

c3- Skills of designing verified computer programs.

d- General and Transferable Skills

d1- Improves the analytical and logical skills

d2- Improves the Ability to design a verified system

d3- Improves and speeds up the testing and debugging activities.

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/ Practical
First and second order Logic	4.5	3	N/A
Formal Verification axioms	12	8	N/A
Testing: types and methods	9	6	N/A
Projects: Discussion and ideas	6	4	N/A

4. Teaching and Learning Methods

4.1- Lectures

4.2- Examples

4.3- Discussions

4.4- Projects Discussion

5. Student Assessment Methods

5.1 Homework 1 and 2 to assess b1

5.3 Homework 3, 4 and 5 to assess b2-b3

5.3 Project discussion

5.4 Final Exam to assess b1-to-b4

Assessment Schedule

Assessment 1 Homework 1 and 2 Week 5

Assessment 2 Homework 3, 4 and 5 Weeks 6-11

Assessment 3 Project oral Exam Week 13

Assessment 4 Final Exam Week 14

Weighting of Assessment

Semester Work (Homeworks) 10%

Oral Examination and Presentation 20%

Final- Term Examination 70%

Total 100 %

6. List of References

6.1 Essential Books (Text Books):

[1] Boris Beizer, "Software Testing Techniques," Second Edition,

Published by dreamtech, 2003.

[2] Shari Lawrence Pfleeger, " Software Engineering, Theory and Practice, Second Edition, Prentice Hall International, 2001.

6.2 Course Notes:

Lectures Posted in The net, with sample problems, quizzes, projects, Exams and model solutions

7. Facilities Required for Teaching and Learning

- Notebook/labtop computer
 - Data Show and appropriate screen
 - Copy Machine
-

Course Coordinator: Dr. Fatma El-licy

Head Department: Dr. Hesham A. Hefny

Date :2015/2016

Course Specifications

A. Basic Information

Program(s) on which the course is given : Master of Computer Sciences

- Major or Minor element of program : Major
- Department offering the program : Computer and Information Sciences
- Department offering the course : Computer and Information Sciences
- Academic year / level : Pre-Master

Date of Specification approval : 2017/2/24

- | | |
|-------------------------------------|--------------------------------|
| • Title: Artificial Neural Networks | Code: CS603 |
| • Credit Hours : Three | Lectures: 1.5 Hours (Two/Week) |
| • Tutorial: N/A Practical: N/A | Total: N/A |

B. Professional Information

1. Overall Aims of Course

The aim of this course is to introduce students to the concepts of artificial neural networks and their computational capabilities in modeling of real life problems.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- a1- Identify various types of intelligence.
- a2- Understanding the concepts of perception and cognition.
- a3- Understanding the computational capability of single layer perceptron model.
- a4- Understanding the computational capability of multi layer perceptron model.

b. Intellectual Skills

- b1- Compute the output of single layer perceptron model..
- b2- Compute the output of multi layer perceptron model.
- b3- Design a neural network model for solving a given problem..

c. Professional and Practical Skills

- c1- Apply the delta-rule learning technique to perceptrons with different activation functions.
- c2- Using Back propagation learning technique to build neural models.
- c3- Apply Back propagation learning technique to totally layered ntworks.

d. General and Transferable Skills

- d1- The ability to apply neural network approach to model nonlinear

phenomena.

d2- The ability of self learning

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/Practical
Introduction to Computational Intelligence	3	2	N/A
Basic Concepts	3	2	N/A
Neural Networks: Biological Background, Artificial Models, & Neurocomputing Methodology	3	2	N/A
Types of Activation Functions: ANNs as directed graphs, & Different classes of NN architectures	3	2	N/A
Perceptron Model: Perceptron as a Discriminant Function, Perceptron as a threshold Logic Device, & Design Example	3	2	N/A
Perceptron Learning Techniques.	3	2	N/A
Multilayer Perceptron Network	3	2	N/A
Backpropagation Learning Technique	3	2	N/A
Variations of Standard Bkp	3	2	N/A
Computational capabilities of BKp nets	3	2	N/A
Radial Basis Functions nets	3	2	

4. Teaching and Learning Methods

4.1- Lectures

4.2- Examples

4.3- Discussions.

4.4- Discussions of Quizzes thereafter.

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b)

5.2. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1: Quiz I	Week 4
Assessment 2: Quiz II	Week 8
Assessment 3: End of term Exam	Week 13

Weighting of Assessment

Semester Work	30 %
<u>Final- Term Examination:</u>	<u>70 %</u>
Total	100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Essential Books (Text Books)

1. Andries P. Engolbrecht, "Computational Intelligence: An Introduction", 2nd edition, John Wiley & Sons, Ltd, England, 2007.
2. SandhyaSamarasinghe, "Neural Networks for Applied Sciences and Engineering", Auerbach Publications, Taylor & Francis Group, 2007.
3. Simon. Haykin , "Neural Networks: A Comprehensive Foundation", Prentice-Hall, NJ, 1999.

7. Facilities Required for Teaching and Learning

Printed Materials / Whiteboards / Overhead Projectors / Data shows

Course Coordinator: Dr. Hesham A. Hefny

Head Department: Dr. Hesham A. Hefny

Date: 2015/2016

Course Specifications

A. Basic Information

- Program(s) on which the course is given:
Pre master of: CS, IS
- Major or Minor element of program:
Major: CS, IS
- Department offering the program: Computer and Information Sciences
- Department offering the course: Computer and Information Sciences
- Academic year / level: Pre-Master
- Date of Specification approval 2017/2/28
- Title: Advanced Topics in Database Design & Implementation
- Code: CS604
- Credit Hours: Three Lecture: 1.5 Hours (Two/week)
- Tutorial: N/A Practical: N/A Total: N/A

B. Professional Information

1. Overall Aims of Course

The objective of this course is to introduce students to database design theory (functional dependencies and normalization), data storage, indexing, query processing and optimization, transaction processing and concurrency control, and one or two new database implementation such as distributed databases, data mining, web databases and object oriented databases.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- a1- Functional dependencies concepts.
- a2- Database design theory: first to fifth normal forms including Boyce-Codd normal form.
- a3- Data storage, hashing, indexing structures for files.
- a4- Algorithms for query processing and optimization.
- a5- Transaction processing concepts and theory.
- a6- Concurrency control techniques.
- a7- Database recovery techniques.
- a8- New implementations of databases such as distributed databases, data mining, data warehouses, web databases, etc.

b. Intellectual Skills

- b1- Analyze a database schema to identify its normal form.
- b2- Normalize a database schema to specific normal form.
- b3- Identify functional dependencies for a database schema.
- b4- Choose best algorithm for processing specific types of query.

c. Professional and Practical Skills

- c1- Design a database to a specific normal form.
- c2- Apply normalization techniques for database design.
- c3- Choose best indexing and file structure for a given database situation.
- c4- Choose best optimization technique for a given database state.
- c5- Choose best concurrency control technique a given situation.
- c6- Choose best recovery technique for a given situation.

d- General and Transferable Skills

- d1- Design databases by functional dependency analysis and normalization.
- d2- Evaluate databases according to normal forms.

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/ Practical
Functional Dependencies and Normalization	12	8	N/A
Data Storage, Indexing, Query Processing and Optimization	9	6	N/A
Transaction Processing, Concurrency Control and Database Recovery Techniques	6	4	N/A
Distributed Databases	3	2	N/A
Data Mining Concepts	3	2	N/A

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Examples
- 4.3- Discussions

5. Student Assessment Methods

- 5.1 Quiz I to assess a1, a2, b1-b2, c1, c2
- 5.2 Quiz II to assess a4, b4, c3, c4
- 5.3 Research to assess a8
- 5.4 Final Exam to assess All ILOs

Assessment Schedule

Assessment 1 Quiz I	Week 4
Assessment 2 Quiz II	Week 7
Assessment 3 Research presentation	Week 11
Assessment 4 Final Exam	Week 14

Weighting of Assessment

Quiz I	10%
Quiz II	10%

Research	10%
<u>Final- Term Examination</u>	<u>70%</u>
Total	100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Essential Books (Text Books)

Fundamentals of Database Systems, Elmasri R., Navathe B., Fourth Edition, Addison Wesley, 2004

7. Facilities Required for Teaching and Learning

- Projector and appropriate screen
- Copy Machine
- White board

Course Coordinator: Dr. WaleedArafa

Head Department: Dr. Hesham A. Hefny

Date 2015/2016

Course Specifications

A. Basic Information

Program(s) on which the course is given: Master of Computer Sciences

- Major or Minor element of program: Major
- Department offering the program: Computer and Information Sciences
- Department offering the course: Computer and Information Sciences
- Academic year / level: Pre-Master
- Date of Specification approval: 2017/2/28
- Title: Advanced Topics in Computer Science
- Code: CS605
- Credit Hours: Three Lecture: 1.5 Hours (Two/week)
- Tutorial: N/A Practical: N/A Total: N/A

B. Professional Information

1. Overall Aims of Course

Topics are determined at the time of course offering. The course may be repeated with change of subtitles.

Selected Topic for 2008/2009 2nd semester:

Information Retrieval and Extraction

The objective of this course is to introduce basic and advanced techniques for text-based information retrieval (IR) systems: efficient text indexing; Boolean and vector space retrieval models; evaluation and interface issues; Web search including crawling, link-based algorithms, and Web metadata; text/Web clustering, classification; text mining; introduction to XML and multimedia retrieval and information extraction (IE).

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- a1. Information Retrieval Concepts and Architecture
- a2. Boolean Retrieval
- a3. Vector Space Model
- a4. Dictionaries and Tolerant Retrieval
- a5. Evaluation of IR Systems
- a6. Relevance Feedback and Query Expansion
- a7. XML Retrieval
- a8. Multimedia Information Retrieval
- a9. Classification & Clustering
- a10. Web Mining & Information Extraction

b. Intellectual Skills

- b1. Evaluate IR systems
- b2. Compare and rank different IR systems
- b3. Distinguish between methods used for text, XML and multi-media IR
- b4. Distinguish between classification and clustering
- b5. Compare different classification and clustering algorithms
- b6. Distinguish between IR and IE

c. Professional and Practical Skills

- c1. Build the basic components of text IR systems
- c2. Implement classification and clustering algorithms

d- General and Transferable Skills

- d1. Use IR, classification, clustering and IE techniques for solving similar problems in computer system development

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/ Practical
Information Retrieval (by course teacher) <ul style="list-style-type: none"> • Boolean Retrieval • Scoring and Term Weighting • Dictionaries and Tolerant Retrieval • Vector Space Model • Evaluation of IR Systems • Relevance Feedback and Query Expansion 	15	10	N/A
Topics presented by groups of students			
• XML Retrieval	3	2	N/A
• Multimedia Retrieval	3	2	N/A
• Text Classification	3	2	N/A
• Text Clustering	3	2	N/A
• Web Mining	3	2	N/A
• Information Extraction	3	2	N/A
Total	33	22	

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Examples
- 4.3- Discussions

5. Student Assessment Methods

- 5.1 Quizzes to assess ILOs (a1-a2)
- 5.2 Group Presentation to assess one of ILOs (a7-a10)
- 5.3 Final Exam to assess all ILOs

Assessment Schedule

Assessment 1 Quiz	Week 6
Assessment 2 Presentations	Weeks 7-12
Assessment 3 Final Exam	Week 14

Weighting of Assessment

Quiz	10%
Presentation	20%
<u>Final- Term Examination</u>	<u>70%</u>
Total	100%

6. List of References

6.1- Essential Books (Text Books)

- Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze (2008). "An Introduction to Information Retrieval"
- R.B.Yates, B.R.Neto (1999). "Modern Information Retrieval"

6.2- Papers and Presentations

- Toni Giorgino (2004). "An Introduction to Text Classification"
- SukomalPal andMandarMitra, (2007). "XML Retrieval: A Survey"
- Michael S. Lew, NicuSebe, ChabaneDjeraba, Ramesh Jain, (2006). "Content-Based Multimedia Information Retrieval: State of the Art and Challenges"
- Hamish Cunningham, (2005) "An Introduction to Information Extraction". Encyclopedia of Language and Linguistics, Second Edition, 2005
- Ronen Feldman, (2006). "Information Extraction, Theory and Practice". ICML 2006 Tutorial Slides

7. Facilities Required for Teaching and Learning

- Projector and appropriate screen
- Copy Machine
- White board

Course Coordinator: Dr. WaleedArafa
Head Department: Dr. Hesham A. Hefny

Date: 2015/2016

Course Specifications

A. Basic Information

- Program(s) on which the course is given: *CS, Pre-Master*
- Major or Minor element of program: *Major*
- Department offering the program: *Computer and Information Sciences*
- Department offering the course: *Computer and Information Sciences*
- Academic year / level: *Pre-master*
- Date of Specification approval: 2017/2/28
- Title: *Theory of Computation* Code: *CS600*
- Credit Hours: *Three* Lecture: *1.5 hours(Two/week)*
- Tutorial: *N/A* Practical: *N/A* Total: *Three*

B. Professional Information

1. Overall Aims of Course

Upon completing this course the student will have learned, through appropriate classroom and laboratory experiences, the following.

- Basic concepts of Computation.
- Machine-independent notions of resource (time and space) analysis.
- Properly understand computers computability.
- Design efficient solution algorithms for computer problems.
- Developing the notions of undesirability and completeness.
- Categorizing problems into appropriate complexity classes.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

On successful completion of the course, graduates should be able to:

- a1. Describe characteristics of a Turing machine and computational complexity.
- a2. Define Church-Turing Thesis and other computational models.
- a3. Demonstrate computability or non-computability using a Turing machine.
- a4. Identify the essential mathematics relevant to computer science.
- a5. Discuss the notions of undesirability and completeness.
- a6. Identify complexity classes and the methodology of complexity theory
- a7. Categorize the problems into appropriate complexity classes.

b. Intellectual Skills

On successful completion of this course, graduates should be able to:

- b1. Identify the properties and differences between various computational models.
- b2. Differentiate between P and NP classes.
- b3. Classify a given problem into its complexity class using methods such as reduction and polynomial transformations.
- b4. Perform comparisons between (algorithms, methods, techniques...etc.).
- b5. Perform classifications of decidability and undesirability problems
- b6. Identify attributes of complexity classes
- b7. Restrict solution methodologies upon their results.
- b8. Establish time and space bounds for selected problems.

c. Professional and Practical Skills

On successful completion of this course, graduates should be able to:

- c1. Systematically apply appropriate methods to develop an appropriate algorithm.
- c2. Design Turing machine to solve simple problems.
- c3. Specify and design computer-based systems.
- c4. Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.

d- General and Transferable Skills

On successful completion of this course, graduates should be able to:

- d1. Manage tasks effectively.
- d2. Manage one's own learning and development, including time management.
- d3. Search for information and adopt life-long self-learning.
- d4. Communicate effectively by oral, written and visual means.
- d5. Work effectively as an individual and as a member of a team.

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/ Practical
	4.5	3	N/A
	12	8	N/A
	9	6	N/A
	6	4	N/A

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Examples
- 4.3- Discussions

4.4- *Projects Discussion***5. Student Assessment Methods**

- 5.1 *Homework 1 and 2* to assess *b1*
 5.3 *Homework 3, 4 and 5* to assess *b2-b3*
 5.3 *Project discussion*
 5.4 *Final Exam* to assess *b1-to-b4*

Assessment Schedule

Assessment 1 <i>Homework 1 and 2</i>	Week 5
Assessment 2 <i>Homework 3, 4 and 5</i>	Weeks 6-11
Assessment 3 <i>Project oral Exam</i>	Week 13
Assessment 4 <i>Final Exam</i>	Week 14

Weighting of Assessment

Semester Work (Homeworks)	10%
Oral Examination and Presentation	20%
<u>Final- Term Examination</u>	<u>70%</u>
Total	100 %

6. List of References

6.1 Essential Books (Text Books):

- [1] Boris Beizer, "Software Testing Techniques," Second Edition, Published by dreamtech, 2003.
 [2] Shari Lawrence Pfleeger, " Software Engineering, Theory and Practice, Second Edition, Prentice Hall International, 2001.

6.2 Course Notes:

Lectures Posted in The net, with sample problems, quizzes, projects, Exams and model solutions

7. Facilities Required for Teaching and Learning

- *Notebook/labtop computer*
- *Data Show and appropriate screen*
- *Copy Machine*

 Course Coordinator: Dr. Fatma El-licy
 Head Department: Dr. Hesham A. Hefny
 Date : 2015/2016

Course Specifications

A. Basic Information

- Program(s) on which the course is given: *CS, Pre-Master*
- Major or Minor element of program: *Major*
- Department offering the program: *Computer and Information Sciences*
- Department offering the course: *Computer and Information Sciences*
- Academic year / level: *Pre-master*
- Date of Specification approval: *2017/2/28*
- Title: *Intelligent Systems* Code: *CS602*
- Credit Hours: *Three* Lecture: *1.5 hours(Two/week)*
- Tutorial: *N/A* Practical: *N/A* Total: *Three*

B. Professional Information

1. Overall Aims of Course

- 1) The goal of this course to study the foundations of Artificial Intelligence in today's environment and to instill an understanding of representations and external constraints with the idea of enabling a student to think creatively.
- 2) This course will include a great deal of cooperative and group learning during class with lectures kept to a minimum. Students will be required to read before class and to give presentations during class periods.
- 3) This course will include a large number of short programs and several longer programs will be required as part of the homework assignments.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

After completing the course, the student should be able to:

- a1) Explain the basic concepts of knowledge representation (facts, rules, etc.).
- a2) Explain the relation between Prolog and formal logic.
- a3) Introduce the concept of backtracking.
- a4) Build intermediate-level programs in Prolog using simple and structured objects.

b. Intellectual Skills

At the end of the course, the student will be able to:

- b1) Discuss the representation and processing of list structures.
- b2) Construct Prolog programs using different data structures and databases.
- b3) Control the backtracking, using the cut, and negation as failure.

c. Professional and Practical Skills

At the end of the course, the student will be able to:

- c1) Develop good Prolog programs using good programming styles.
- c2) Debug and improving efficiency of Prolog programs.
- c3) Use of tail recursion and accumulators.
- c4) Improve efficiency by asserting derived facts.

d- General and Transferable Skills

At the end of the course, the student will :

- d1) Discuss, define, explain and use the two pivotal search strategies: depth-first and breadth-first.
- d2) Use the A* algorithm for solving some problems and Introduce some advanced versions of A*; IDA*, RBFS.
- d3) Represent a problem using an AND/OR graph.
- d4) Represent a problem using constraint logic programming.

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/ Practical
	4.5	3	N/A
	12	8	N/A
	9	6	N/A
	6	4	N/A

4. Teaching and Learning Methods

- 4.1- *Lectures*
- 4.2- *Examples*
- 4.3- *Discussions*
- 4.4- *Projects Discussion*

5. Student Assessment Methods

- 5.1 *Homework 1 and 2* to assess *b1*
- 5.3 *Homework 3, 4 and 5* to assess *b2-b3*
- 5.3 *Project discussion*
- 5.4 *Final Exam* to assess *b1-to-b4*

Assessment Schedule

- Assessment 1 *Homework 1 and 2* Week 5
- Assessment 2 *Homework 3, 4 and 5* Weeks 6-11
- Assessment 3 *Project oral Exam* Week 13
- Assessment 4 *Final Exam* Week 14

Weighting of Assessment	
Semester Work (Homeworks)	10%
Oral Examination and Presentation	20%
<u>Final- Term Examination</u>	<u>70%</u>
Total	100 %

6. List of References

6.1 Essential Books (Text Books):

- [1] Boris Beizer, "Software Testing Techniques," Second Edition, Published by dreamtech, 2003.
- [2] Shari Lawrence Pfleeger, " Software Engineering, Theory and Practice, Second Edition, Prentice Hall International, 2001.

6.2 Course Notes:

Lectures Posted in The net, with sample problems, quizzes, projects, Exams and model solutions

7. Facilities Required for Teaching and Learning

- *Notebook/labtop computer*
 - *Data Show and appropriate screen*
 - *Copy Machine*
-

Course Coordinator: Dr. Fatma El-licy

Head Department: Dr. Hesham A. Hefny

Date : 2015/2016

مواصفات مقرر (PP 601)
معهد الدراسات والبحوث الإحصائية

جامعة القاهرة

البرنامج الذي يقدم من خلاله المقرر: برنامج الماجستير في علوم الحاسب
المقرر يمثل عنصرا رئيسيا أو ثانويا بالنسبة للبرنامج: رئيسيا.
القسم العلمي المسئول عن البرنامج: قسم علوم الحاسب
القسم العلمي المسئول عن تدريس المقرر: قسم علوم الحاسب
المستوي الأكاديمي: المستوى الأول
متطلب: لا يوجد

تاريخ اعتماد توصيف البرنامج: ٢٠١٦/٢/٢٨

(أ) البيانات الأساسية

اسم المقرر: طرق ومناهج البحث العلمي

الكود: (PP 601)

عدد الساعات المعتمدة: ٣ ساعات أسبوعيا

عدد المحاضرات: ٢ أسبوعيا

عدد الدروس العملية: ١ أسبوعيا (بواقع ساعة أسبوعيا)

عدد ساعات الإرشاد الأكاديمي: ٢ ساعة أسبوعيا

المجموع في الأسبوع: ٦ ساعات أسبوعيا

(ب) البيانات المهنية

(١) الأهداف العامة للمقرر

- معرفة وإدراك بأهم الأساليب الإحصائية المستخدمة في تحليل البيانات.
- إكساب الطالب مهارة استخدام البرامج الإحصائية الجاهزة في تحليل البيانات.
- إكساب الطالب مهارة عرض نتائج البحث العلمي وتفسيرها بشكل دقيق.

(٢) النتائج التعليمية المستهدفة للمقرر

أ- المعرفة والفهم

- ١- إكساب الطالب الفهم الدقيق لكيفية تحديد الأسلوب الإحصائي المناسب لطبيعة البيانات المراد تحليلها.
- ٢- تعريف الطالب ببعض الأساليب الإحصائية المتقدمة مثل التحليل العاملي وتحليل التمايز ونماذج الانحدار.
- ٣- تعريف الطالب كيفية استخدام البرامج الإحصائية وتفسير نتائجها.

ب- المهارات الذهنية

- ١- تدريب الطالب على كيفية التفكير في التخطيط للدراسة وضبط أدواتها وكيفية تدقيق البيانات.
- ٢- تدريب الطالب على كيفية اختيار الأسلوب الإحصائي المناسب.
- ٣- إكساب الطالب المهارة في تفسير النتائج في ضوء فروض الدراسة وكيفية صياغة التوصيات.

ج- المهارات المهنية والعلمية

- ١- إكساب الطالب مهارة صياغة الفروض الإحصائية والتعامل مع الحزم الإحصائية الجاهزة في اختبار هذه الفروض.

ج ٢ إكساب الطالب مهارة صياغة البحث في شكل البحث العلمي الاكاديمي بكامل اركانه الاساسية.

د- المهارات العامة والمنقولة

- ١د- تعريف الطالب علي المصادر المختلفة للبيانات.
٢د- إكساب الطالب القدرة على التعامل في مجموعات عمل.

٣) محتوى المقرر

Subject	Total Hours	Lecture Hours	Lab Hours
1. Revise the basic components of scientific research.	3	3	0
2. Defining variables of interest: response variable and explanatory variables	3	3	0
3. SPSS: Data preparation and assigning appropriate scales of measurement for variables and recoding and computing variables.	5	1	4
4. Relationships between variables. Correlation: Bivariate. Testing the significance of associations.	5	1	4
5. Simple and Multiple Regression: OLS, Testing model's Validity.	5	1	4
6. Categorical data analysis, Modeling Categorical Variable; Logistic Regression: Binary.	4	1	3
7. Discriminant Analysis: General Purpose and Description, Limitations of Discriminant Analysis, Fundamental Equation for Discriminant Analysis, Types of discriminant function analysis , Example 1: Dependent with Two Classes	4	1	3
8. Introducing STATA as an alternative statistical package.	5	1	4
9. How to show results in the most suitable presentation.	3	3	0
10. Forming conclusions and recommendation on the light of the research's objectives and results.	3	3	0
Total	40	18	22

٤) أساليب التعليم والتعلم

٤-١ المحاضرات.

٤-٢ التدريبات

٤-٣ المناقشات

(٥) أساليب تقييم الطلبة

٥-١ مدى المشاركة في المناقشات أثناء المحاضرة

٥-٢ الواجبات

٥-٣ امتحان نصف الفصل الدراسي

٥-٤ إعداد تقارير عن بعض موضوعات المقرر

٥-٥ امتحان نهاية الفصل الدراسي

جدول التقييم

التقييم ١	الاسبوع.....(٣)
التقييم ٢	الاسبوع.....(٦)
التقييم ٣	الاسبوع.....(٩)
التقييم ٤	الإمتحان النهائي

النسبة المئوية لكل تقييم

تقسم درجات تقييم الطالب إلى :

- الامتحان النهائي: %٧٠
- الجزء العملي خلال الفصل الدراسي: %٣٠ ويشمل
 - حل الواجبات %١٠
 - حضور المحاضرات %١٠
 - امتحان منتصف الفصل %١٠

(٦) قائمة المراجع

- (1) Bernard Rosner (2010) "Fundamentals of Biostatistics" PWS Publishers.
- (2) Kupper , A. W. Kleinbaum , David G. Kleinbaum (1988) "Applied Regression Analysis and other Multivariate Methods". Wadsworth publishing company, inc., Belmont, California.
- (3) Carl J. Huberty, Stephen Olejnik (2004) " Applied MANOVA and Discriminant analysis".

(7) الإمكانيات المطلوبة لتدريس المقرر:

- Data Show
- Overhead Projector

- تصوير نسخ من الرسوم البيانية والجداول وال Handouts
- توفير اجهزة الحاسب والبرامج الاحصائية اللازمة
- شبكة الإنترنت
- اتاحة مجلدات التعداد والإحصاءات الحيوية ومجلدات الأمم المتحدة والنشرات وتقارير المسوح المختلفة.

منسق المقرر: د.ايمان فهمى
رئيس القسم: أ.د.هشام حبنى

التاريخ : 2015/2016

Core Electives

Course Specifications

B. Basic Information

Program(s) on which the course is given : Master of Computer Sciences

- Major or Minor element of program : Major
- Department offering the program : Computer and Information Sciences
- Department offering the course : Computer and Information Sciences
- Academic year / level : Pre-Master

Date of Specification approval : ۲۰۱۶/۲/۲۸

- | | |
|--------------------------------|-----------------------------|
| • Title: Data Mining | Code: CS613 |
| • Credit Hours : Three | Lectures: 3Hours (One/Week) |
| • Tutorial: N/A Practical: N/A | Total: N/A |

B. Professional Information

1. Overall Aims of Course

The aim of this course is to introduce students to data mining basics, techniques and applications.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- a1- Understanding concepts of Data mining.
- a2- Categorize different techniques of data mining.
- a3- Illustrate the benefits of different data mining techniques.

b. Intellectual Skills

- b1- The ability to analyze data.
- b2- Perform different methods of data mining.
- b3- The ability to analyze data cube computation.

c. Professional and Practical Skills

- c1- Applying statistical methods to understand the impact of data.
- c2- Using association and prediction to uncover hidden information.
- c3- Applying data mining in real life applications.

d. General and Transferable Skills

- d1- The ability to apply data mining in decision support systems.
- d2- The ability of self learning

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/Practical
Introduction To Data Mining	3	1	N/A
Data Pre-processing	3	1	N/A
Data Warehouse and OLAP Technology	3	1	N/A
Data Cube Computation & Data Generalization	3	1	N/A
Mining Frequent Patterns: associations and correlations	3	1	N/A
Classification and Prediction	6	2	N/A
Cluster Analysis	3	1	N/A
Mining Stream, Time Series, and Sequence Data	3	1	N/A
Mining Object, Spatial, Multimedia, Text and Web data.	3	1	N/A

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Examples
- 4.3- Discussions.
- 4.4- Discussions of Quizzes thereafter.

5. Student Assessment Methods

- 5.1. Technical Reports to assess ILOs (a)
- 5.2. Quizzes to assess ILOs (b&c)
- 5.3. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

- Assessment 1: Quiz I Week 4
- Assessment 2: Quiz II Week 8
- Assessment 3: End of term Exam Week 13

Weighting of Assessment

Semester Work	30 %
Final- Term Examination:	70 %
Total	100%

6. List of References

6.1- Course Notes
Lectures Notes

6.2- Essential Books (Text Books)

1. Jiawei Han & Micheline Kamber, "Data Mining: Concepts and Techniques", 2nd ed.

6.3- Recommended Books

1. Pang-Ming Tan & Michal Eteinbacl, "Introduction to Data Mining:

6.4- Periodicals

- ACM Digital Library
- IEEE Computer Society

7. Facilities Required for Teaching and Learning

Printed Materials / Whiteboards / Overhead Projectors / Data shows

Software packages: Data Mining pkg. & MS SQL Server Analysis Services

Course Coordinator: Prof. Osman Hegazy

Head Department: Dr. Hesham A. Hefny

Date: 2015/2016

Cairo University Institute of Statistical Studies and Research

C. Basic Information

Program(s) on which the course is given : *Master of Computer Sciences*

- Major or Minor element of program : *Major*
- Department offering the program : *Computer and Information Sciences*
- Department offering the course : *Computer and Information Sciences*
- Academic year / level : *Pre-Master*

Date of Specification approval : ٢٠١٦/٢/٢٨

- Title: *Fuzzy-Logic Based Systems* Code: *CS614*
- Credit Hours : *Three* Lectures: *1.5 Hours (Two/Week)*
- Tutorial: *N/A* Practical: *N/A* Total: *N/A*

B. Professional Information

1. Overall Aims of Course

The aim of this course is to introduce students to the fuzzy logic approach for handling inherently imprecise concepts. Fuzzy logic represents the mathematical form of the human decision making approach based on common sense. Understanding of fuzzy sets and fuzzy logic is essential for building fuzzy models real life phenomena. The course covers the following topics: Fuzzy logic vs. Standard logic, Crisp Sets vs. Fuzzy Sets, Operations on Fuzzy Set, Fuzzy Membership Functions, Linguistic variables and linguistic Hedges, Possibility Measure, Fuzzy Relations, Projection and Cylindrical Extension Operations, Fuzzy Rule-Based Model, Mamdani Fuzzy Model, Fuzzy Arithmetic, and adaptive fuzzy systems.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- a1-Identify various types of uncertainty.
- a2-State the limitations of classical logic.
- a3-Understanding the concepts of fuzzy set and fuzzy membership function.
- a4-Understanding the concepts of linguistic variables and linguistic values.
- a7-Illustrate the effect of linguistic modifiers on fuzzy sets.
- a8-Understanding the concept of fuzzy relations
- a9-Understanding the reasoning mechanism in fuzzy logic based system.

b. Intellectual Skills

b1-Perform fuzzy set operations on compound linguistic expressions.

b2-Perform operations on fuzzy relations.

b3-Compute the output of fuzzy rule.

b4-Compute the output of a fuzzy rule based model.

b5-Perform arithmetic operations on fuzzy numbers.

b6-Design of an adaptive fuzzy model.

c. Professional and Practical Skills

c1-Apply the concepts of fuzzy sets and fuzzy logic in real life problems.

c2-Using Mamdani model to construct fuzzy systems.

c3-Apply the concept of alpha-cut to perform fuzzy arithmetic operations.

d- General and Transferable Skills

d1- The ability to apply fuzzy approach to manipulate uncertainties.

d2- The ability of self learning

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/Practical
<i>Basic concepts: precision and imprecision - exact and inexact knowledge - fuzzy logic vs. crisp logic</i>	3	2	N/A
<i>Crisp sets vs. fuzzy sets - fuzzy logic for system modeling - fuzziness vs. randomness</i>	3	2	N/A
<i>Fuzzy sets representations and properties.</i>	3	2	N/A
<i>Operations on fuzzy sets – computing T-norm and S-norm pairs- Examples</i>	3	2	N/A
<i>Features of fuzzy membership Functions – Linguistic hedges</i>	3	2	N/A
<i>Possibility measure-Fuzzy relations</i>	3	2	N/A
<i>Operations on fuzzy relations</i>	3	2	N/A
<i>Fuzzy IF-THEN rule – Defuzzification techniques.</i>	3	2	N/A
<i>Fuzzy Graph model-Mamdani model</i>	3	2	N/A
<i>Fuzzy arithmetic</i>	4.5	3	N/A
<i>Adaptive Fuzzy Modeling</i>	3	2	

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Examples
- 4.3- Discussions.
- 4.4- Discussions of Quizzes thereafter.

5. Student Assessment Methods

- 5.1. Quizzes to assess ILOs (b)
- 5.2. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

- Assessment 1: Quiz I Week 4
- Assessment 2: Quiz II Week 8
- Assessment 3: End of term Exam Week 13

Weighting of Assessment

Semester Work	30 %
Final- Term Examination:	70 %
Total	100%

6. List of References

6.1- Course Notes
Lectures Notes

6.2- Essential Books (Text Books)

1. Kwang H. Lee, "First Course on Fuzzy Theory and Applications", Springer-Verlag Berlin Heidelberg , 2005
2. John Yen and Reza Langari , "Fuzzy Logic : Intelligence, control , and Information", Prentice hall, 1998
3. Timothy J. Ross, "Fuzzy Logic With Engineering Applications", McGraw-Hill, Inc., 1995.

7. Facilities Required for Teaching and Learning

Printed Materials / Whiteboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. Hesham A. Hefny*

Head Department: *Dr. Hesham A. Hefny*

Date: 2015/2016

Course Specifications

D. Basic Information

Program(s) on which the course is given : Master of Computer Sciences

- Major or Minor element of program : Major
- Department offering the program : Computer and Information Sciences
- Department offering the course : Computer and Information Sciences
- Academic year / level : Pre-Master

Date of Specification approval : 2017/2/21

- | | |
|--------------------------------------|--------------------------------|
| • Title: Multi- agent systems | Code: CS619 |
| • Credit Hours : Three | Lectures: 1.5 Hours (Two/Week) |
| • Tutorial: N/A Practical: N/A | Total: N/A |

B. Professional Information

1. Overall Aims of Course

Multi-agent systems have emerged as one of the most important areas of research and development in information technology. A multi-agent system is one composed of multiple interacting software components known as agents which are typically capable of cooperating to solve problems that are beyond the abilities of any individual member. Multi-agent systems are important primarily because they have been found to have very wide applicability, in areas as diverse as industrial process control and electronic commerce. This module will begin by introducing the student to the notion of an agent, and will lead them to an understanding of what an agent is, how they can be constructed, how agents can be made to cooperate effectively with one- another to solve problems, and approaches to decision making in multiagent contexts.

Aims

The aims of this course are threefold:

1. To introduce the student to the concept of an agent and multi-agent system, and the main applications for which they are appropriate;
2. to introduce the main issues surrounding the design of intelligent autonomous agents, and the main approaches and techniques for the implementation of such agents
3. to introduce the main issues surrounding the design of multi-agent systems, and the main approaches and techniques for enabling communication and cooperation in such systems;
4. to introduce the main issues surrounding the design of a multi-agent society, and in particular, techniques for automated decision making in multi agent contexts

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- a1- understand the notion of an agent and understand the characteristics of applications that lend themselves to an agent-oriented solution
- a2- understand the key issues associated with constructing agents capable of intelligent autonomous action
- a3- understand the key issues in designing societies of agents that can effectively cooperate in order to solve problems
- a4- understand the main application areas of agent-based solutions, and be able to develop a meaningful agent-based system.

b. Intellectual Skills

B1- design of intelligent autonomous agents, and the main approaches and techniques for the implementation of such agents

B2-design of a multi-agent society, and in particular, techniques for automated decision making in multi agent contexts

B3 -characterizes DS problems formally and informally and motivates the potential role of multiagent DS architectures in this domain.

c. Professional and Practical Skills

c1- construct agents can be made to cooperate effectively with one- another to solve problems, and approaches to decision making in multiagent contexts.

c2- Using several search algorithms that are useful for problem solving by multiple agents.

d- General and Transferable Skills

D1- realizes "intelligent processes" such as problem solving, planning, and decision making, and learning in multiagent contexts.

D2- design search algorithms for agents

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/Practical
Intelligent Agents	3	2	N/A
Multiagent Systems and Societies of Agents	3	2	N/A
Distributed Problem Solving and Planning	3	2	N/A
Search Algorithms for Agents	3	2	N/A
Learning in Multiagent Systems	3	2	N/A
Distributed Rational Decision Making	3	2	N/A
Industrial and Practical Applications of DAIH	3	2	N/A
Formal Methods in DAI: Logic-Based Representation and Reasoning	3	2	N/A
Distributed Models for Decision Support	3	2	N/A

Concurrent Programming for DAI	3	2	N/A
Distributed Control Algorithms for AI	3	2	

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Examples
- 4.3- Discussions.
- 4.4- Discussions of Quizzes thereafter.

5. Student Assessment Methods

- 5.1. Quizzes to assess ILOs (b)
- 5.2. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

- Assessment 1: Quiz I Week 4
- Assessment 2: Quiz II Week 8
- Assessment 3: End of term Exam Week 13

Weighting of Assessment

Semester Work	30 %
<u>Final- Term Examination:</u>	<u>70 %</u>
Total	100%

6. List of References

- 6.1- Course Notes
Lectures Notes
- 6.2- Essential Books (Text Books)
 1. M. Wooldridge: An Introduction to MultiAgent Systems. John Wiley & Sons, 2002: ISBN-10: 047149691X
 2. G. Weiss, editor: Multi-Agent Systems, A Modern Approach to Distributed Artificial Intelligence. The MIT Press, 1999: ISBN-10: 0262232030
 3. J. Ferber: Multi-Agent Systems. Addison-Wesley, 1999: ISBN-10: 0201360489
 4. M. Singh and M. Huhns: Readings in Agents. Morgan-Kaufmann Publishers, 1997: ISBN-10: 1558604952

7. Facilities Required for Teaching and Learning

Printed Materials / Whiteboards / Overhead Projectors / Data shows
 Course Coordinator: Dr. Mohamed AbdElfattah
 Head Department: Dr. Hesham A. Hefny
 Date: 2015/2016

Course Specifications

E. Basic Information

- Programme(s) on which the course is given : Pre-master of CS
(PURE and COMPOUND/JOINED)
- Major or Minor element of program : Major-General
- Department offering the program : CS
- Department offering the course : Computer and Information Sciences
- Academic year / level : Fifth Level
- Date of Specification approval : 2017/2/28
- Title: Selected Topics in Computer Sciences Code: CS 638
- Credit Hours : 3 Lectures: 3Hours /Week
- Tutorial: None Practical: 1.5 Hours/Week Total: 4.5 Hours/Week

F. Professional Information

1. Overall Aims of Course

This course provides some advanced topics related to upper three layers of the Internet protocol stack. It emphasizes the design principles and theoretical aspects of network, transport and application layers of TCP/IP model.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- a1- Identify basic components of the Internet Protocol Stack.
- a2- Describe the different types of IP addresses
- a3- Understanding basic concepts of routing protocols
- a4- Describe the different types of service models.
- a5- Describe major network applications.
- a6- Understanding basic concepts of network management.
- a7- Understanding basic concepts of network security.

b. Intellectual Skills

- b1- Perform basic routing algorithms.
- b2- Compute the network performance.
- b3- Analyze and design simple networks
- b4- Analyze and design security requirements.

c. Professional and Practical Skills

- c1- Compare the different protocols of TCP/IP.
- c2- Using evaluation criteria to compare different performance metrics.
- c3- Differentiate among different types of network security solutions.

d- General and Transferable Skills

- d1- The ability to evaluate and analyze network performance.
- d2- The ability to secure different components of networks

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/Practical
Introduction (computer networks, Internet)	3	2	P
Internet addressing: classful, classless	3	2	P
Internet Protocols: IPv4, IPv6	3	2	P
Address mapping: ARP, RARP, DHCP	3	2	P
Error reporting: ICMP Group Management: IGMP	3	2	P
Unicast Routing: distance vector	3	2	P
Unicast Routing: link state Performance Issues	3	2	P
Multicast Routing	3	2	P
Transport layer: UDP	3	2	P
Transport layer: TCP	3	2	P
Congestion control and quality of service	3	2	P
Application layer protocols: DNS, Telenet, SMTP, FTP, WWW , HTTP	3	2	P
Network Management : SNMP	3	2	P
Network Security: security services, cryptography	3	2	P
New Trends in networking	3	2	P

4. Teaching and Learning Methods

- 4.1- Lectures
- 4.2- Lab
- 4.3- Discussions.
- 4.4- Discussions of Quizzes thereafter.

5. Student Assessment Methods

- 5.1. Quizzes to assess ILOs (b)
- 5.2 Lab assignments
- 5.3 Lab Project
- 5.4. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1:	Quiz I	Week 5
Assessment 2:	Quiz II	Week 10
Assessment 3:	Lab Project	Week 10
Assessment 4:	End of term Exam	Week 15

Weighting of Assessment

Semester Work	30 %
<u>Final- Term Examination:</u>	<u>70 %</u>
Total	100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Behrouz A .Forouzan, "Data Communications and Networking",
Fourth Edition, McGraw Hill, 2007, ISBN 007-12542-0-2

6.3 Essential Books

1. S. Tanenbaum" "Computer Networks", Fourth Edition, Prentice-Hall, 2003.
2. Douglas E. Comer, "Computer Networks and Internets with Internet Applications", fourth edition, Pearson- Prentice Hall, 2004.
3. Computer Networking - A Top Down Approach Featuring the Internet 3rd edition by James F. Kurose and Keith W. Ross, Addison Wesley, 2007.
4. W. Stallings, Data and Computer Communications, 8th edition, Prentice-Hall, 2007.

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows/ Lab

Course Coordinator: Dr. lailaNassef

Head Department: Dr. Hesham A. Hefny

Date 2015/2016

Course Specifications

Cairo University Institute of Statistical Studies and Research

A. Basic Information

Program(s) on which the course is given: *Master of CS*

- Major or Minor element of program: *Major*
- Department offering the program: *Computer and Information Sciences*
- Department offering the course: *Computer and Information Sciences*
- Academic year / level: *Prep. year*
- Date of Specification approval: ٢٠١٦/٢/٢٨
- Title: *Natural Language Processing* Code: *CS635*
- Credit Hours: *Three* Lecture: *1.5 hours (Two/week)*
- Tutorial: *N/A* Practical: *N/A* Total: *Three*

B. Professional Information

1. Overall Aims of Course

This course provides students with the Methodologies for designing systems that comprehend natural language. Topics include lexical analysis, parsing, interpretation of sentences, semantic representation, organization of knowledge, and inference mechanisms. Arabic Language is taken into consideration.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- a1- Understanding of the concepts, processes, and tools of Natural Language Processing*
- a2- Understanding of Speech and Language Processing.*
- a3- Understanding of formal methods of Language Processing.*
- a4- Understanding of Text Parsing.*
- a5- Understanding of Classification and Summarization.*
- a6- Understanding of Machine Translation.*

b. Intellectual Skills

- b1- The ability to identify the basic concepts and terminology related to Natural Language Processing.*
- b3- The ability to provide Algorithms for different Natural Language Processing fields: Classification, Summarization, Spelling Correction, Text Tagging, and Summarization.*
- b4- Ability to evaluate algorithms related to Natural Language Processing and Computational Linguistics.*

c. Professional and Practical Skills

c1- Provide working Algorithms and applications for the different Natural Language Processing fields.

c2- Evaluate Algorithms and applications for the different Natural Language Processing fields.

c3- Improve Algorithms and applications for the different Natural Language Processing fields.

d. General and Transferable Skills

d1- Improve the analytical and logical skills

d2- The ability to evaluate the different Natural Language Processing Algorithms and Applications.

d3-Improve The ability of self learning

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/ Practical
<i>Introduction, Regular Expressions and Automata</i>	3	2	N/A
<i>N-grams</i>	3	2	N/A
<i>Part-of-Speech Tagging</i>	3	2	N/A
<i>Hidden Markov and Maximum Entropy Models</i>	3	2	N/A
<i>Phonetics</i>	3	2	N/A
<i>Automatic Speech Recognition</i>	6	4	N/A
<i>Formal Grammars of English</i>	3	2	N/A
<i>Statistical Parsing</i>	3	2	N/A
<i>Information Extraction</i>	3	2	N/A
<i>Question Answering and Summarization</i>	4.5	3	N/A
<i>Machine Translation</i>	4.5	3	N/A

4. Teaching and Learning Methods

4.1- Lectures

4.2- Examples

4.3- Discussions

4.4- Discussion of Quizzes thereafter

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b&c)

5.2. *End of term Exam* to assess *ILOs (a, b, c &d)*.

Assessment Schedule

Assessment 1: *Quiz I* Week 5
Assessment 2: *Quiz II* Week 10
Assessment 3: *End of term Exam* Week 15

Weighting of Assessment

Semester Work	30 %
Final- Term Examination	70 %
Total	100 %

6. List of References

6.1- Course Notes
Lectures Notes

6.2- Essential Books (Text Books)

Speech and Language Processing: An introduction to natural language processing, computational linguistics, and speech recognition. Daniel Jurafsky & James H. Martin, 2006.

7. Facilities Required for Teaching and Learning

Printed Materials / Whiteboard / Projector / Data show

Course Coordinator: *Dr. Tarek Elghazaly*

Head Department: *Dr. Hesham A. Hefny*

Date: 2015/2016

Course Specifications

Cairo University Institute of Statistical Studies and Research

G. Basic Information

- Programme(s) on which the course is given : *Pre-master of CS*
- Major or Minor element of program : *Major-General*
- Department offering the program : *CS*
- Department offering the course : *CS*
- Academic year / level : *second Level*
- Date of Specification approval : ٢٠١٦/٢/٢٨
- Title: *Advanced Graphics & Visualization* Code: *CS 606*
- Credit Hours : 3 Lectures: *34.5 Hours*
- Tutorial: *3 Hours* Practical: *4.5 Hours* Total: *42 Hours*

H. Professional Information

1. Overall Aims of Course

This optional module provides the students with an understanding of the techniques necessary to produce highly realistic computer imagery.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

1. Theoretical knowledge of the computer algorithms for high fidelity graphics
2. Theoretical knowledge of computer algorithms for modeling natural phenomena.
3. Theoretical knowledge of the human visual system and visual perception

b. Intellectual Skills

1. Develop an appreciation for the perceived realism of computer imagery

c. Professional and Practical Skills

1. Practical knowledge of high dynamic range imagery
2. Practical knowledge of Radiance light simulation system

d- General and Transferable Skills

1. Ability to design and implement high fidelity graphics
2. Ability to capture high dynamic range images and tone map for display on a low dynamic range display.

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/ Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P
	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1-Lectures

4.2-Discussions.

4.4-Discussions of Quizzes thereafter.

4.5-Discussions for building a simple expert system

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b)

5.2 Mid of term Exam to assess ILOs (a, b, c &d).

5.3 Lecture Assignments (steps for building a simple expert system)

to assess ILOs (a, b, c &d).

5.4. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1: Quiz I	Week 4	
Assessment 2: Mid of term Exam		Week 7
Assessment 3: Quiz II	Week 10	
Assessment 4: Simple System Design and implementation		Week 14
Assessment 5: End of term Exam		Week 15

Weighting of Assessment

Semester Work	30 %
<u>Final- Term Examination:</u>	<u>70 %</u>
Total	100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

*Peter Jackson, “Introduction to expert systems”, Third Edition
Pearson Addison Wesley, 1999*

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. AmiraIdrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

Course Specifications

Cairo University Institute of Statistical Studies and Research

I. Basic Information

- Programme(s) on which the course is given : *Pre-master of CS*
- Major or Minor element of program : *Major-General*
- Department offering the program : *CS*
- Department offering the course : *CS*
- Academic year / level : *second Level*
- Date of Specification approval : *٢٠١٦/٢/٢٨*
- Title: *Advanced Topics in Logic & Declarative Programming*
- Code: *CS 607*
- Credit Hours : 3 Lectures: *34.5 Hours*
- Tutorial: *3 Hours* Practical: *4.5 Hours* Total:*42 Hours*

J. Professional Information

1. Overall Aims of Course

Teaching different possible models behind programming languages, each with its advantages and drawbacks (limitations in expressivity, difficulties to describe it,...). Teaching how to describe these models formally using a "kernel language model"..

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

1. Identifying important programming concepts (eager or lazy execution, use of 1 dataflow, iterative and recurrent programming, determinism or nondeterminism, 1 concurrency, etc.).

b. Intellectual Skills

1. Distinguishing important programming models (declarative, stateful, etc.).

c. Professional and Practical Skills

1. Understanding the impact of programming model choice on the ease of 1 programming.
2. Understanding the impact of programming model choice on the ease of formal 1 reasoning about a program.

d- General and Transferable Skills

1. Reasoning formally about common concepts in programming languages.

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/ Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P
	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1-Lectures

4.2-Discussions.

4.4-Discussions of Quizzes thereafter.

4.5-Discussions for building a simple expert system

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b)

5.2 Mid of term Exam to assess ILOs (a, b, c &d).

5.3 Lecture Assignments (steps for building a simple expert system)

to assess ILOs (a, b, c &d).

5.4. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1: Quiz I	Week 4	
Assessment 2: Mid of term Exam		Week 7
Assessment 3: Quiz II	Week 10	
Assessment 4: Simple System Design and implementation		Week 14
Assessment 5: End of term Exam		Week 15

Weighting of Assessment

Semester Work	30 %
<u>Final- Term Examination:</u>	<u>70 %</u>
Total	100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

*Peter Jackson, “Introduction to expert systems”, Third Edition
Pearson Addison Wesley, 1999*

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. AmiraIdrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

Course Specifications

Cairo University Institute of Statistical Studies and Research

K. Basic Information

- Programme(s) on which the course is given : *Pre-master of CS*
- Major or Minor element of program : *Major-General*
- Department offering the program : *CS*
- Department offering the course : *CS*
- Academic year / level : *second Level*
- Date of Specification approval : *٢٠١٦/٢/٢٨*
- Title: Machine Learning Code: *CS 612*
- Credit Hours : 3 Lectures: *34.5 Hours*
- Tutorial: *3 Hours* Practical: *4.5 Hours* Total: *42 Hours*

L. Professional Information

1. Overall Aims of Course

The objective of this course is to provide theoretical and practical insights into the use of machine learning in engineering applications. First, the fundamental principles of machine learning are introduced in the context of linear models. Next, the major historical families of machine learning techniques are addressed. The last part of the course focuses on selected state-of-the-art advanced methods. The theoretical background is given, but the emphasis of the course is on the practical use of the different techniques. This is achieved through a number of PC-labs as well as a project in the form of a machine learning competition.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

1. Informatics. Mathematics: calculus and linear algebra. Probability theory and statistics.

b. Intellectual Skills

1 Understand the fundamental principles and challenges of machine learning.

2 Understand the mathematical background of common and advanced machine learning models.

3 Understand and critically evaluate the techniques presented in scientific literature on machine learning.

c. Professional and Practical Skills

1. Implement basis machine learning models and correctly apply machine learning 1 libraries for more advanced techniques

d- General and Transferable Skills

1. Analyse a new machine learning problem and address it using suitable common 1 machine learning models.

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P
	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1-Lectures

4.2-Discussions.

4.4-Discussions of Quizzes thereafter.

4.5-Discussions for building a simple expert system

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b)

5.2 Mid of term Exam to assess ILOs (a, b, c &d).

5.3 Lecture Assignments (steps for building a simple expert system) to assess ILOs (a, b, c &d).

5.4. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1:	Quiz I	Week 4	
Assessment 2:	Mid of term Exam		Week 7
Assessment 3:	Quiz II	Week 10	
Assessment 4:	Simple System Design and implementation		Week 14
Assessment 5:	End of term Exam		Week 15

Weighting of Assessment

Semester Work	30 %
<u>Final- Term Examination:</u>	<u>70 %</u>
Total	100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

*Peter Jackson, “Introduction to expert systems”, Third Edition
Pearson Addison Wesley, 1999*

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. AmiraIdrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

Course Specifications

Cairo University Institute of Statistical Studies and Research

M. Basic Information

- Programme(s) on which the course is given : *Pre-master of CS*
- Major or Minor element of program : *Major-General*
- Department offering the program : *CS*
- Department offering the course : *CS*
- Academic year / level : *second Level*
- Date of Specification approval : ٢٠١٦/٢/٢٨
- Title: Advanced Computer Architecture Code: CS 615
- Credit Hours : 3 Lectures: *34.5 Hours*
- Tutorial: *3 Hours* Practical: *4.5 Hours* Total: *42 Hours*

N. Professional Information

1. Overall Aims of Course

This course continues on the courses 'Computer Architecture' and 'Operating Systems'.

This course describes modern high-performance microarchitectural techniques implemented in contemporary microprocessors for exploiting instruction-level parallelism and thread-level parallelism, and for bridging the memory wall. In addition, the course also covers topics in performance modeling of contemporary microprocessors, and the impact of technology on architecture.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

It is expected that the contents of the courses 'Computer Architecture' (obligatory) and 'Operating Systems' (not obligatory, but recommended) is well understood.

b. Intellectual Skills

1 Understand superscalar and multi-threaded processor architectures, as well as 1 shared-memory multiprocessors.

c. Professional and Practical Skills

1. Being able to evaluate computer architecture research in terms of relevance and 1 scientific method.

d- General and Transferable Skills

1. Being able to evaluate computer architecture research in terms of relevance and 1 scientific method.

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P
	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1-Lectures

4.2-Discussions.

4.4-Discussions of Quizzes thereafter.

4.5-Discussions for building a simple expert system

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b)

5.2 Mid of term Exam to assess ILOs (a, b, c &d).

5.3 Lecture Assignments (steps for building a simple expert system)

to assess ILOs (a, b, c &d).

5.4. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1: Quiz I Week 4

Assessment 2: Mid of term Exam Week 7

Assessment 3: Quiz II Week 10

Assessment 4: Simple System Design and implementation Week 14

Assessment 5: End of term Exam Week 15

Weighting of Assessment

Semester Work 30 %

Final- Term Examination: 70 %

Total 100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

*Peter Jackson, “Introduction to expert systems”, Third Edition
Pearson Addison Wesley, 1999*

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. AmiraIdrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

Course Specifications

O. Basic Information

- Programme(s) on which the course is given : *Pre-master of CS*
- Major or Minor element of program : *Major-General*
- Department offering the program : *CS*
- Department offering the course : *CS*
- Academic year / level : *second Level*
- Date of Specification approval : 2017/2/28
- Title: Parallel Processing Code: CS 616
- Credit Hours : 3 Lectures: 34.5 Hours
- Tutorial: 3 Hours Practical: 4.5 Hours Total:42 Hours

P. Professional Information

1. Overall Aims of Course

Acquainting the students with principles and concepts of parallel processing including parallel computer architectures, performance metrics, the scheduling problem and parallel algorithms.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

A7. Define the basics of Computer Systems.

A12. Demonstrate the basics of Computer Components.

b. Intellectual Skills

B1. Recognize and assemble components.

B3. Develop Analytical Skills.

B22. Compare methods with data.

c. Professional and Practical Skills

C2. Choose the appropriate Operating system.

C10. Develop computer-based systems.

C11. Evaluate systems in terms of quality attributes.

d- General and Transferable Skills

D3. Use different Problem Solving techniques.

D4. Follow Analytical Thinking.

D5. Follow Creative Thinking.

D13. Practice Designing skills in software projects.

D14. Practice Engineering skills for software development

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/ Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P
	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1-Lectures

4.2-Discussions.

4.4-Discussions of Quizzes thereafter.

4.5-Discussions for building a simple expert system

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b)

5.2 Mid of term Exam to assess ILOs (a, b, c &d).

5.3 Lecture Assignments (steps for building a simple expert system)

to assess ILOs (a, b, c &d).

5.4. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1: Quiz I

Week 4

Assessment 2: Mid of term Exam

Week 7

Assessment 3:	<i>Quiz II</i>	Week 10
Assessment 4:	<i>Simple System Design and implementation</i>	Week 14
Assessment 5:	<i>End of term Exam</i>	Week 15

Weighting of Assessment

Semester Work	30 %
<u>Final- Term Examination:</u>	<u>70 %</u>
Total	100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

*Peter Jackson, “Introduction to expert systems”, Third Edition
Pearson Addison Wesley, 1999*

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. AmiraIdrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

Course Specifications

Cairo University Institute of Statistical Studies and Research

Q. Basic Information

- Programme(s) on which the course is given : *Pre-master of CS*
- Major or Minor element of program : *Major-General*
- Department offering the program : *CS*
- Department offering the course : *CS*
- Academic year / level : *second Level*
- Date of Specification approval ٢٠١٦/٢/٢٨
- Title: Computer Vision Code: CS 617
- Credit Hours : 3 Lectures: 34.5 Hours
- Tutorial: 3 Hours Practical: 4.5 Hours Total:42 Hours

R. Professional Information

1. Overall Aims of Course

- Understanding cameras and projection models
- Low-level image processing methods such as edge detection
- Mid-level vision topics such as segmentation
- High-level vision tasks such as object recognition and 3D shape reconstruction.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- a1. Understand the essential mathematics relevant to computer vision.
- a2. Use high-level programming languages.
- a3. Show a critical understanding of the principles of image and object recognition.

b. Intellectual Skills

- b1. Define traditional and nontraditional computer vision problems, set goals towards solving them, and observe results.
- b2. Perform comparisons between (algorithms, methods, techniques...etc).
- b3. Identify attributes, components, relationships, patterns, main ideas, and errors.

b4. Solve computer vision problems with pressing commercial or industrial constraints.

c. Professional and Practical Skills

- c1. Use appropriate programming languages.
- c2. Evaluate computer vision systems in terms of general quality attributes and possible tradeoffs presented within the given problem.
- c3. Apply the principles of human-computer interaction to the evaluation and construction of computer vision systems.

d- General and Transferable Skills

- d1. Manage tasks effectively.
- d2. Manage one's own learning and development, including time management.
- d3. Search for information and adopt life-long self-learning.
- d4. Communicate effectively by oral, written and visual means.
- d5. Work effectively as an individual and as a member of a team.

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/ Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P
	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1-Lectures

4.2-Discussions.

4.4-Discussions of Quizzes thereafter.

4.5-Discussions for building a simple expert system

5. Student Assessment Methods

- 5.1. *Quizzes* to assess *ILOs (b)*
 5.2 *Mid of term Exam* to assess *ILOs (a, b, c &d).*
 5.3 *Lecture Assignments (steps for building a simple expert system)*
 to assess *ILOs (a, b, c &d).*
 5.4. *End of term Exam* to assess *ILOs (a, b, c &d).*

Assessment Schedule

Assessment 1:	<i>Quiz I</i>	Week 4	
Assessment 2:	<i>Mid of term Exam</i>		Week 7
Assessment 3:	<i>Quiz II</i>	Week 10	
Assessment 4:	<i>Simple System Design and implementation</i>		Week 14
Assessment 5:	<i>End of term Exam</i>		Week 15

Weighting of Assessment

Semester Work	30 %
<u>Final- Term Examination:</u>	<u>70 %</u>
Total	100%

6. List of References

6.1- Course Notes
Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

Peter Jackson, “Introduction to expert systems”, Third Edition Pearson Addison Wesley, 1999

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. AmiraIdrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

Course Specifications

Cairo University Institute of Statistical Studies and Research

S. Basic Information

- Programme(s) on which the course is given : *Pre-master of CS*
- Major or Minor element of program : *Major-General*
- Department offering the program : *CS*
- Department offering the course : *CS*
- Academic year / level : *second Level*
- Date of Specification approval : *٢٠١٦/٢/٢٨*
- Title: Pattern Recognition Code: *CS 620*
- Credit Hours : 3 Lectures: *34.5 Hours*
- Tutorial: *3 Hours* Practical: *4.5 Hours* Total: *42 Hours*

T. Professional Information

1. Overall Aims of Course

This course presents fundamental concepts of patter recognition includes:

- Fundamentals of pattern recognition.
- The emphasis is on Bayes decision theory.
- Parametric and non-parametric classifiers.
- Statistical classifications: supervised and unsupervised learning.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- Recognize the pattern recognition methods.
- Explain and contrast the common neural network architecture and learning algorithms used in pattern recognition.

b. Intellectual Skills

- Differentiate between the common neural networks architectures and learning algorithms used in pattern recognition.

c. Professional and Practical Skills

- Use the various neural architectures and learning algorithms to solve simple problems.

d- General and Transferable Skills

- Use the text books for reading the given topics.
- Prepare short reports in certain topics of the course using internet.
- Work in groups to develop a project.

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P
	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1-Lectures

4.2-Discussions.

4.4-Discussions of Quizzes thereafter.

4.5-Discussions for building a simple expert system

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b)

5.2 Mid of term Exam to assess ILOs (a, b, c &d).

5.3 Lecture Assignments (steps for building a simple expert system)

to assess ILOs (a, b, c &d).

5.4. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1: Quiz I	Week 4	
Assessment 2: Mid of term Exam		Week 7
Assessment 3: Quiz II	Week 10	
Assessment 4: Simple System Design and implementation		Week 14
Assessment 5: End of term Exam		Week 15

Weighting of Assessment

Semester Work	30 %
<u>Final- Term Examination:</u>	<u>70 %</u>
Total	100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

*Peter Jackson, “Introduction to expert systems”, Third Edition
Pearson Addison Wesley, 1999*

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. AmiraIdrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

Course Specifications

A. Basic Information

- Program(s) on which the course is given: *CS, Pre-Master*
- Major or Minor element of program: *Major*
- Department offering the program: *Computer and Information Sciences*
- Department offering the course: *Computer and Information Sciences*
- Academic year / level: *Pre-master*
- Date of Specification approval: *2016/2/28*
- Title: *Software Verification* Code: *CS621*
- Credit Hours: *Three* Lecture: *1.5 hours(Two/week)*
- Tutorial: *N/A* Practical: *N/A* Total: *Three*

B. Professional Information

1. Overall Aims of Course

The objective of the course is to introduce the students to language-independent systematic methods of program verification, analyzing, testing and debugging. The course consists of two main parts: Formal methods for verifying Computer programs and Static and Dynamic Program Analysis. These topics represent software engineering approach to program verification.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- a1-*Understanding of formal Logic, first and Second Order Logic.*
- a2-*Understanding program faults and error, static and Dynamic analysis of computer program and program flow graph.*
- a3-*Understanding of the Verification Conditions axioms, and its application in computer programs.*
- a4-*Understanding of test case synthesis for various of test types*
- a5-*Understanding of test coverage monitors and its significance.*

b. Intellectual Skills

- b1- *The application of formal method in verifying computer programs.*
- b2- *The application of both theoretical/formal and graphical methods in detecting and correcting program bugs/errors*
- b3- *The ability to design and write a verified program*
- b4- *The ability to design and generate test suits of the various types for program testing.*

c. Professional and Practical Skills

- c1- *Application of formal Logic in computer Systems*
- c2- *Design of test suites, to test software modules/packages*
- c3- *Skills of designing verified computer programs.*

d- General and Transferable Skills

d1-Improves the analytical and logical skills

d2-Improves the Ability to design a verified system

d3-Improves and speeds up the testing and debugging activities.

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/ Practical
<i>First and second order Logic</i>	4.5	3	N/A
<i>Formal Verification axioms</i>	12	8	N/A
<i>Testing: types and methods</i>	9	6	N/A
<i>Projects: Discussion and ideas</i>	6	4	N/A

4. Teaching and Learning Methods

4.1- Lectures

4.2- Examples

4.3- Discussions

4.4- Projects Discussion

5. Student Assessment Methods

5.1 Homework 1 and 2 to assess b1

5.3 Homework 3, 4 and 5 to assess b2-b3

5.3 Project discussion

5.4 Final Exam to assess b1-to-b4

Assessment Schedule

Assessment 1 Homework 1 and 2 Week 5

Assessment 2 Homework 3, 4 and 5 Weeks 6-11

Assessment 3 Project oral Exam Week 13

Assessment 4 Final Exam Week 14

Weighting of Assessment

Semester Work (Homeworks) 10%

Oral Examination and Presentation 20%

Final- Term Examination 70%

 Total 100 %
6. List of References

6.1 Essential Books (Text Books):

[1] Boris Beizer, "Software Testing Techniques," Second Edition, Published by dreamtech, 2003.

[2] Shari Lawrence Pfleeger, " Software Engineering, Theory and Practice, Second Edition, Prentice Hall International, 2001.

6.2 Course Notes:

Lectures Posted in The net, with sample problems, quizzes, projects, Exams and model solutions

7. Facilities Required for Teaching and Learning

- *Notebook/labtop computer*
 - *Data Show and appropriate screen*
 - *Copy Machine*
-

Course Coordinator: Dr. Fatma El-licy

Head Department: Dr. Hesham A. Hefny

Date : 2015/2016

- To be able to report in a clear, formal and structured manner about applied or proposed solution strategies
- To be able to independently digest scientific literature on soft computing

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P
	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1-Lectures

4.2-Discussions.

4.4-Discussions of Quizzes thereafter.

4.5-Discussions for building a simple expert system

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b)

5.2 Mid of term Exam to assess ILOs (a, b, c &d).

5.3 Lecture Assignments (steps for building a simple expert system)

to assess ILOs (a, b, c &d).

5.4. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1:	Quiz I	Week 4	
Assessment 2:	Mid of term Exam		Week 7
Assessment 3:	Quiz II	Week 10	
Assessment 4:	Simple System Design and implementation		Week 14
Assessment 5:	End of term Exam		Week 15

Weighting of Assessment

Semester Work 30 %

<u>Final- Term Examination: 70 %</u>	
Total	100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

*Peter Jackson, “Introduction to expert systems”, Third Edition
Pearson Addison Wesley, 1999*

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. Amira Idrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

Course Specifications

A. Basic Information

- Program(s) on which the course is given: *Pre-Master for IS*
- Major or Minor element of program: *Major*
- Department offering the program: *Computer and Information Sciences*
- Department offering the course: *Computer and Information Sciences*
- Academic year / level: *Second Level*
- Date of Specification approval: *2016*
- Title: *Cloud Computing* Code: *2017/2/28*
- Credit Hours: *Three* Lecture: *1.5 hours (Two/week)*
- Tutorial: *N/A* Practical: *N/A* Total: *Three*

B. Professional Information

1. Overall Aims of Course

1. To prepare students for careers in advanced research and/or development environments by extending their knowledge and skills in the specialisation of cloud computing
2. To develop the students' ability to make a critical evaluation of the theories, techniques, tools and systems used in cloud computing
3. To enable students to contribute to future developments in their field by providing them with an understanding of recent advances and current research activity
4. To develop the students' ability to undertake research by providing appropriate resources and guidance in their use
5. To develop the students' ability to make an effective contribution to team-based activity to encourage students to adopt an investigative approach and develop autonomous study skills in order to assist their continuing professional development □

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

A1 Theory : current and emerging concepts, principles and theories relevant to cloud computing and the supporting areas of computer science
 Theory : current and emerging concepts, principles and theories relevant to cloud computing and the supporting areas of computer science
 Theory : current and emerging concepts, principles and theories relevant to cloud computing and the supporting areas of computer science

A2 Techniques : methods, tools and enabling technologies used in, or arising from, cloud computing and the supporting areas of computer science

A3 Applications : established and potential applications of techniques developed within cloud computing and the supporting areas of computer science

A4 Professional Issues : legal and ethical issues relating to the present and future use of technology developed within cloud computing and the supporting areas of computer sc

b. Intellectual Skills

B1 Evaluate and apply critical judgement to the theories and techniques that relate to cloud computing and the supporting areas of computer science

B2 Analyse problems and recognise opportunities to apply advanced specialised techniques to their solution

B3 Construct informed and reasoned arguments, descriptions and proposals that incorporate advanced specialised knowledge.

B4 Interpret the contents of articles and other sources, and form a critical judgement of their relative importance and relevance to an area of study

c. Professional and Practical Skills

C1 Make effective use of a range of theories, techniques, programming languages, operating systems, design support tools and development environments.

C2 Specify, design, implement, test and document a cloud-based system

C3 Work as a member of a development team, contributing to the planning and execution of a shared design and implementation task of a cloud-based system

C4 Propose, plan, undertake and report a self-directed individual programme of investigation, design and implementation in the area of cloud computing

d- General and Transferable Skills

D1 Communicate effectively in written reports and oral presentations using appropriate terminology and technical language

D2 Retrieve information using search engines, browsers and catalogues; use appropriate IT facilities to prepare and present technical reports in various formats (documents, oral presentations)

D3 Use mathematical techniques in the processes of analysis and design

D4 Analyse complex problems and design effective solution

D5 Organise activity and manage time in a programme of self-directed study

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/ Practical
	3	2	N/A
	3	2	N/A
	6	4	N/A
	3	2	N/A
	3	2	N/A
	6	4	N/A
	4.5	3	N/A
	4.5	3	N/A
	3	2	N/A
	6	4	N/A

4. Teaching and Learning Methods

4.1- Lectures

4.2- Examples

4.3- Discussions

4.4- Discussion of Quizzes thereafter

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b&c)

5.2. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1: Quiz I Week 5

Assessment 2: Quiz II Week 10

Assessment 3: End of term Exam Week 15

Weighting of Assessment

Semester Work 25 %

Final- Term Examination 75 %

Total 100 %

6. List of References6.1- Course Notes*Lectures Notes*6.2- Essential Books (Text Books)6.3- Recommend Books**7. Facilities Required for Teaching and Learning***Printed Materials / Whiteboard / Projector / Data show*

CourseCoordinator: dr .tarek ghazaly

Head Department: Dr. Hesham A. Hefny Date 2015/2016

Course Specifications

Cairo University Institute of Statistical Studies and Research

W. Basic Information

- Programme(s) on which the course is given : *Pre-master of CS*
- Major or Minor element of program : *Major-General*
- Department offering the program : *CS*
- Department offering the course : *CS*
- Academic year / level : *second Level*
- Date of Specification approval : *2012*
- Title: E-Learning Code: *CS 631*
- Credit Hours : 3 Lectures: *34.5 Hours*
- Tutorial: *3 Hours* Practical: *4.5 Hours* Total: *42 Hours*

X. Professional Information

1. Overall Aims of Course

This is a practical course which is aimed at creative and dynamic individuals with an interest in digital technology and passion for modern media trends. Teaching and learning takes place on vibrant Headingly Campus which is set within 100 acres of parkland and equipped with modern, state-of-the-art labs and flexible learning spaces.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- Systematically understand the key aspects of creative, technical and professional practice in the creative media industries.

b. Intellectual Skills

- Develop and research original ideas, then communicate and manage production workflow and responsibilities to translate these creative ideas into final products, services or content

c. Professional and Practical Skills

- Use the various neural architectures and learning algorithms to solve simple problems.
- Encourage professional development and personal growth through regular engagement with critical reflection on professional practice, including the contributions and performance of self and others when team-working.

- Develop a portfolio of practical work demonstrating practical skills and employability that facilitates appropriate transition between academic study and the industrial workplace.

d- General and Transferable Skills

- Critically review established techniques of analysis and design that encompass creative industry standards and practices
- Independently undertake research and critically evaluate arguments, assumptions, abstract concepts and data (that may be incomplete) and to frame appropriate questions to achieve a solution, or identify a range of solutions, to problems.

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/ Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P
	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1-Lectures

4.2-Discussions.

4.4-Discussions of Quizzes thereafter.

4.5-Discussions for building a simple expert system

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b)

5.2 Mid of term Exam to assess ILOs (a, b, c &d).

5.3 Lecture Assignments (steps for building a simple expert system)
to assess ILOs (a, b, c &d).

5.4. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1:	<i>Quiz I</i>	Week 4	
Assessment 2:	<i>Mid of term Exam</i>		Week 7
Assessment 3:	<i>Quiz II</i>	Week 10	
Assessment 4:	<i>Simple System Design and implementation</i>		Week 14
Assessment 5:	<i>End of term Exam</i>		Week 15

Weighting of Assessment

Semester Work	30 %
<u>Final- Term Examination:</u>	<u>70 %</u>
Total	100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

Peter Jackson, “Introduction to expert systems”, Third Edition Pearson Addison Wesley, 1999

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. AmiraIdrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

Course Specifications

Cairo University Institute of Statistical Studies and Research

Y. Basic Information

- Programme(s) on which the course is given : *Pre-master of CS*
- Major or Minor element of program : *Major-General*
- Department offering the program : *CS*
- Department offering the course : *CS*
- Academic year / level : *second Level*
- Date of Specification approval : *2017/2/28*
- Title: Advanced Operating Systems Code: *CS 633*
- Credit Hours : 3 Lectures: *34.5 Hours*
- Tutorial: *3 Hours* Practical: *4.5 Hours* Total:*42 Hours*

Z. Professional Information

1. Overall Aims of Course

- Understating the main concepts of Concurrency, transactions, multimedia operating systems, real- time operating systems and mobile computing.
- Using principles gained in this class to understand problems in distributed systems.
- Developing practical skills needed for designing, augmenting and configuring an OS to be suitable for a particular deployment.
- To feel competent to design, augment and configure; distributed OS, Multimedia OS and mobile computing.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- a1. Study and explore the internals of different types of operating system.
- a2. Explain advanced concepts in distributed operating systems.
- a3. Identify advanced topics such as multimedia operating systems, real-time operating systems and mobile computing.
- a4. Identify the methods used in defining and assessing criteria for measuring the extent to which a computer system is appropriate for its current deployment and future evolution

b. Intellectual Skills

- b1. Identify bottlenecks lie in the different types of operating systems.
- b2. Recognize the differences between various types of operating systems.
- b3. Perform comparisons between (algorithms, methods, techniques...etc).
- b4. Identify attributes, components, relationships, patterns, main ideas, and errors.

b5. Assess criteria to measure the appropriateness of a computer system for its current deployment and future evolution, and to interpret the results thereof

c. Professional and Practical Skills

c1. Use different types of operating systems.

c2. Specify, design, and implement some components of distributed operating systems.

c3. Evaluate operating systems in terms of general quality attributes and possible tradeoffs.

c4. Apply the principles of effective information management, information organization, and information-retrieval skills to distribute file systems.

c5. Identify any risks or safety aspects that may be involved in the operation of distributed systems.

d- General and Transferable Skills

d1. Collaborate effectively within multidisciplinary team.

d2. Work in stressful environment and within constraints.

d3. Communicate effectively.

d4. Demonstrate efficient OS capabilities.

d5. Lead and motivate individuals.

d6. Manage tasks and resources.

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/ Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P
	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1-Lectures

4.2-Discussions.

4.4-Discussions of Quizzes thereafter.

4.5-Discussions for building a simple expert system

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b)

5.2 Mid of term Exam to assess ILOs (a, b, c &d).

5.3 Lecture Assignments (steps for building a simple expert system)

to assess ILOs (a, b, c &d).

5.4. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1:	<i>Quiz I</i>	Week 4	
Assessment 2:	<i>Mid of term Exam</i>		Week 7
Assessment 3:	<i>Quiz II</i>	Week 10	
Assessment 4:	<i>Simple System Design and implementation</i>		Week 14
Assessment 5:	<i>End of term Exam</i>		Week 15

Weighting of Assessment

Semester Work	30 %
<u>Final- Term Examination:</u>	<u>70 %</u>
Total	100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

Peter Jackson, “Introduction to expert systems”, Third Edition Pearson Addison Wesley, 1999

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. AmiralDrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

Course Specifications

Cairo University Institute of Statistical Studies and Research

AA. Basic Information

- Programme(s) on which the course is given : *Pre-master of CS*
- Major or Minor element of program : *Major-General*
- Department offering the program : *CS*
- Department offering the course : *CS*
- Academic year / level : *second Level*
- Date of Specification approval : ٢٠١٦/٢/٢٨
- Title: Network Security Code: CS 634
- Credit Hours : 3 Lectures: 34.5 Hours
- Tutorial: 3 Hours Practical: 4.5 Hours Total:42 Hours

BB. Professional Information**1. Overall Aims of Course**

- consider information networks and their operation;
- examine the security threats and risks arising in particular types of networks;
- identify and evaluate countermeasures that can be used to enhance the security of networks.

2. Intended Learning Outcomes (ILOs)**a. Knowledge and Understanding**

- have a systematic understanding of information networks and their operation;
- have a clear understanding of the components of the TCP/IP protocol stack, the OSI 7 layer model, and the associated security architecture as specified in ISO/IEC 7498-2, and be able to analyse the benefits and drawbacks of applying security controls at different network layers;
- have a critical awareness of key security threats and risks faced in network environments, and be able to specify appropriate countermeasures;
- have a comprehensive understanding of the methods by which strong authentication protocols and key exchange mechanisms suitable for use on open networks can be constructed;
- have a comprehensive understanding of the security architecture and design rationale of selected protocols, such as Kerberos, SSL/TLS and the IPSec protocol suite, and how they can be

applied in single-sign on, e-commerce, virtual private networking and remote access applications;

b. Intellectual Skills

- understand the design rationale for the security architecture in GSM and UMTS systems and
- understand the value of Intrusion Detection Systems and related network security technologies.

c. Professional and Practical Skills

- be able to compare and evaluate the security in the two systems;
- be able to evaluate the security threats in wireless LANs and the strength of security countermeasures offered by current standards;

d- General and Transferable Skills

- be able to assess the security offered by different firewall technologies as well as their limitations;

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P
	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1-Lectures

4.2-Discussions.

4.4-Discussions of Quizzes thereafter.

4.5-Discussions for building a simple expert system

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b)

5.2 Mid of term Exam to assess ILOs (a, b, c &d).

5.3 Lecture Assignments (steps for building a simple expert system)

to assess ILOs (a, b, c &d).

5.4. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1:	<i>Quiz I</i>	Week 4	
Assessment 2:	<i>Mid of term Exam</i>		Week 7
Assessment 3:	<i>Quiz II</i>	Week 10	
Assessment 4:	<i>Simple System Design and implementation</i>		Week 14
Assessment 5:	<i>End of term Exam</i>		Week 15

Weighting of Assessment

Semester Work	30 %
<u>Final- Term Examination:</u>	<u>70 %</u>
Total	100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

*Peter Jackson, “Introduction to expert systems”, Third Edition
Pearson Addison Wesley, 1999*

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. AmiraIdrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

- It is primordial to have an certain interest in the biological aspects of the problem domain.

b. Intellectual Skills

1. The student understands statistical and algorithmic approaches to sequence and 1 gene expression analysis
2. The student understands why and how mathematics and computer science can play 1 a role in modern biology
3. The student can read and understand recent articles on genomic topics, and in 1 particular assess the data-analysis aspects of them

c. Professional and Practical Skills

1. The student is familiar with the standard tools
2. The student is familiar with problems and current and future goals of the research 1 domain of computational biology
3. Access and manipulate real genomic data

d- General and Transferable Skills

1. The student can report the results of an analysis

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/ Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P
	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1-Lectures

4.2-Discussions.

4.4-Discussions of Quizzes thereafter.

4.5-Discussions for building a simple expert system

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b)

5.2 Mid of term Exam to assess ILOs (a, b, c &d).

5.3 Lecture Assignments (steps for building a simple expert system)

5.4. *End of term Exam* to assess *ILOs (a, b, c &d).*
to assess *ILOs (a, b, c &d).*

Assessment Schedule

Assessment 1:	<i>Quiz I</i>	Week 4	
Assessment 2:	<i>Mid of term Exam</i>		Week 7
Assessment 3:	<i>Quiz II</i>	Week 10	
Assessment 4:	<i>Simple System Design and implementation</i>		Week 14
Assessment 5:	<i>End of term Exam</i>		Week 15

Weighting of Assessment

Semester Work	30 %
<u>Final- Term Examination:</u>	<u>70 %</u>
Total	100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

Peter Jackson, “Introduction to expert systems”, Third Edition Pearson Addison Wesley, 1999

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. AmiraIdrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

Course Specifications**Cairo University Institute of Statistical Studies and Research****EE. Basic Information**

- Programme(s) on which the course is given : *Pre-master of CS*
- Major or Minor element of program : *Major-General*
- Department offering the program : *CS*
- Department offering the course : *CS*
- Academic year / level : *second Level*
- Date of Specification approval : *٢٠١٦/٢/٢٨*
- Title: Grid Computing Code: *CS 637*
- Credit Hours : 3 Lectures: *34.5 Hours*
- Tutorial: *3 Hours* Practical: *4.5 Hours* Total:*42 Hours*

FF. Professional Information**1. Overall Aims of Course**

1. To understand the genesis of grid computing
2. To know the application of grid computing
3. To understand the technology and tool kits for facilitating grid computing

2. Intended Learning Outcomes (ILOs)**a. Knowledge and Understanding**

- To understand the genesis of grid computing

b. Intellectual Skills

- To learn the technology and tool kits for facilitating grid computing\

c. Professional and Practical Skills

- To know the application of grid computing

d- General and Transferable Skills

- The student can report the results of an analysis

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/ Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P

	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1-Lectures

4.2-Discussions.

4.4-Discussions of Quizzes thereafter.

4.5-Discussions for building a simple expert system

5. Student Assessment Methods

5.1. Quizzes to assess ILOs (b)

5.2 Mid of term Exam to assess ILOs (a, b, c &d).

5.3 Lecture Assignments (steps for building a simple expert system)

to assess ILOs (a, b, c &d).

5.4. End of term Exam to assess ILOs (a, b, c &d).

Assessment Schedule

Assessment 1:	Quiz I	Week 4	
Assessment 2:	Mid of term Exam		Week 7
Assessment 3:	Quiz II	Week 10	
Assessment 4:	Simple System Design and implementation		Week 14
Assessment 5:	End of term Exam		Week 15

Weighting of Assessment

Semester Work 30 %

Final- Term Examination: 70 %

Total 100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

*Peter Jackson, “Introduction to expert systems”, Third Edition
Pearson Addison Wesley, 1999*

7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. Amira Idrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

Course Specifications

A. Basic Information

- Program(s) on which the course is given: *Pre-Master for IS*
- Major or Minor element of program: *Major*
- Department offering the program: *Computer and Information Sciences*
- Department offering the course: *Computer and Information Sciences*
- Academic year / level: *Second Level*
- Date of Specification approval: 2017/2/28
- Title: *Geographical Information Systems* Code: *IT603*
- Credit Hours: *Three* Lecture: *1.5 hours (Two/week)*
- Tutorial: *N/A* Practical: *N/A* Total: *Three*

B. Professional Information

1. Overall Aims of Course

- To develop detailed knowledge and understanding of the theory and practice of GIS, together with recent advances in computing technology relevant to the GIS field.
- To build up practical experience in the use of high quality hardware and software tools for automated mapping and database management.
- To encourage sound judgement of project feasibility and a structured approach to problem solving through extended project work.
- To develop abilities in assimilating and communicating technical topics in the GIS field through library study, project reports and the MSc Dissertation.
- To foster the adoption of GIS methods in government and industry, through the development of collaborative projects involving the MSc Students.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

A1. Understand the fundamental concepts of GIS, including the roles of database management and spatial analytical methods. They will appreciate the difference between data models and data structures, the nature of spatial data and objects and appropriate use of GIS operations. They will also understand the processes of GIS automation and the

interrelationships between different components of hardware / software systems.

A2. Appreciate a range of technical issues, including coordinate systems and projections, problems of map accuracy, data quality and error propagation.

A3. Understand the application domains of GIS and the nature of interfaces with other related technologies such as remote sensing and digital photogrammetry. They will also be familiar with the problems of data exchange standards and large databases in major organisations.

A4. Appreciate spatial distributions in both physical and human phenomena.

A5. Develop critical awareness of the significance of spatial and temporal scale.

A6. Understand principles, theory, philosophy and practice of Geographical Information Science.

b. Intellectual Skills

B1. Assessing the merits of contrasting theories, explanations, policies and methodologies.

B2. Analysing and problem solving.

B3. Decision making.

B4. Critically judging and evaluating the influence of spatial context and evidence.

B5. Critically interpreting data, graphical and cartographical representations and text.

B6. Abstracting, synthesising and visualising information.

c. Professional and Practical Skills

C1. Combine and interpret different types of geographical evidence.

C2. Apply a range of techniques for the analysis geographical data and interpret the outcomes.

C3. Employ a variety of field and laboratory-based methods for the collection and analysis of geographical information.

C4. Effectively present geographical information.

C5. Design a research project, apply an appropriate methodology, and present the findings in an appropriate format.

C6. Have the flexibility to adapt to technical changes in the work place environment.

d- General and Transferable Skills

D1. Communicate ideas, principles and theories effectively by oral, written and visual means

D2. Work effectively both in teams and independently on given projects or tasks.

D3. Apply basic statistical and numerical skills to geographical information.

D4. Use Information Technology (eg. Web & Internet, databases, & spreadsheets).

D5. Independent learning and study.

D6. Information handling and retrieval (including use of online computer searches).

3. Contents

Topic	No. of hours	No. of Lectures	Tutorial/ Practical
	3	2	N/A
	3	2	N/A
	6	4	N/A
	3	2	N/A
	3	2	N/A
	6	4	N/A
	4.5	3	N/A

	4.5	3	N/A
	3	2	N/A
	6	4	N/A

4. Teaching and Learning Methods

4.1- *Lectures*

4.2- *Examples*

4.3- *Discussions*

4.4- *Discussion of Quizzes thereafter*

5. Student Assessment Methods

5.1. *Quizzes* to assess *ILOs (b&c)*

5.2. *End of term Exam* to assess *ILOs (a, b, c &d).*

Assessment Schedule

Assessment 1: *Quiz I* Week 5

Assessment 2: *Quiz II* Week 10

Assessment 3: *End of term Exam* Week 15

Weighting of Assessment

Semester Work	25 %
Final- Term Examination	75 %
Total	100 %

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Essential Books (Text Books)

6.3- Recommend Books

7. Facilities Required for Teaching and Learning

Printed Materials / Whiteboard / Projector / Data show

Course Coordinator: *Dr.mouhmoud abdelmoneam*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016

Course Specifications

Cairo University Institute of Statistical Studies and Research

GG. Basic Information

- Programme(s) on which the course is given : *Pre-master of CS*
- Major or Minor element of program : *Major-General*
- Department offering the program : *CS*
- Department offering the course : *CS*
- Academic year / level : *second Level*
- Date of Specification approval : *2012*
- Title: Image Processing Code: *CS 632*
- Credit Hours : 3 Lectures: *34.5 Hours*
- Tutorial: *3 Hours* Practical: *4.5 Hours* Total: *42 Hours*

HH. Professional Information

1. Overall Aims of Course

The course is designed to introduce students to advanced theoretical concepts and practical issues associated with image processing. A special effort will be made to develop students' problem solving skills. New concepts are integrated with students' previous experience through use of systems theory. Topics to be covered include: image acquisition and display using digital devices, properties of human visual perception, morphological operations, noise removal, image deblurring, edge detection, image registration and geometric transformation, image/video compression, video communication standards, object recognition and image understanding.

2. Intended Learning Outcomes (ILOs)

a. Knowledge and Understanding

- a1) Understand the concepts of image processing techniques.
- a2) Explain the advanced textbooks and research literature in the subject area.

b. Intellectual Skills

- b1) Deal with the basics of analog and digital video: video representation and transmission.
- b2) Solve a wide range of problems related to various image processing techniques.
- b3) Create solutions of problems, develop designs, and be aware of the context of computer developments.

c. Professional and Practical Skills

- c1) Represent and process image/video signals.
- c2) Use the fundamental techniques for image processing, video processing, and computer vision.
- c3) Acquire the basic skill of designing image/video compression.
- c4) Familiarize him/her with image/video compression standards.

d- General and Transferable Skills

d1) Apply the foundations for specialized study in image understanding, video communications, multimedia or medical imaging.

d2) Carry out a wide range of principles and tools available to the image processing.

3. Contents

Topic	No. of hours	No. of Lectures	Lecture/ Tutorial/Practical
	3	1	L
	6	2	L
	3	1	L
	3	1	L
	1.5	0.5	P
	3	1	L
	3	1	T
	3	1	L
	4.5	1.5	L
	3	1	P
	3	1	L
	6	2	L

4. Teaching and Learning Methods

4.1- *Lectures*

4.2- *Discussions.*

4.4- *Discussions of Quizzes thereafter.*

4.5- *Discussions for building a simple expert system*

5. Student Assessment Methods

5.1. *Quizzes* to assess *ILOs (b)*

5.2 *Mid of term Exam* to assess *ILOs (a, b, c &d).*

5.3 *Lecture Assignments (steps for building a simple expert system)*

to assess *ILOs (a, b, c &d).*

5.4. *End of term Exam* to assess *ILOs (a, b, c &d).*

Assessment Schedule

Assessment 1: *Quiz I* Week 4

Assessment 2: *Mid of term Exam* Week 7

Assessment 3: *Quiz II* Week 10

Assessment 4: *Simple System Design and implementation* Week 14

Assessment 5: *End of term Exam* Week 15

Weighting of Assessment

Semester Work 30 %

Final- Term Examination: 70 %

Total 100%

6. List of References

6.1- Course Notes

Lectures Notes

6.2- Text Book

Joseph Gerratano, Gary Riley, “ Expert system Principles and programming”, Third Edition, PWS company, 1998

6.3 Essential Books

*Peter Jackson, “Introduction to expert systems”, Third Edition
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7. Facilities Required for Teaching and Learning

Printed Materials / Blackboards / Overhead Projectors / Data shows

Course Coordinator: *Dr. Amira Idrees*

Head Department: *Dr. Hesham A. Hefny*

Date 2015/2016