5- Other	-	-

Coordinator: ***Signature:*** ***Date:*** / /
University: ***Fayoum University***
Faculty: ***Computers and Information***
Department: ***Computer Science***
Master of computer Science

Course Specification

1- Basic Information		
BSC 601	**Course Title:** seminar	
Program: Master of computer Science	**Number of units: 3**	

2- Aims of Course:	1. The general aim of the seminar is to allow each student to integrate all the disciplines he has studied in a unified chunk of knowledge. 2. On the behavioral side, students are allowed to work in a team so as to practice working in a collaborative environment. 3. This emphasizes also a proper documentation and presentation procedure.

3- Intended Learning Outcomes	
A- Knowledge and Understanding:	a1) Providing all students with a culminating activity that demonstrates the skills of combining research, a2) Providing all students with writing, implementation and oral presentation/demonstration in a multidisciplinary seminar. a3) Giving students an opportunity outside the classroom to integrate their various courses of study with their individual interests.
B- Intellectual Skills:	b1) Challenge the student to go beyond his/her educational program. b2) Expand his/her personal knowledge to real life situations that will promote lifelong learning.
C- Professional and Practical Skills:	c1) Complete a project in one or more areas of concentrated study under the guidance and supervision of the faculty. c2) demonstrate self-initiative : initiate any request for support
D- General and transferable Skills	d1) Work in team to exchange data from different analytical techniques

	d2) Generate various an suitable reports d3) Prepare the student for future endeavors in post-secondary education or work. d4) Know the computing environment and installation procedure

4-Course Content:	Students are allowed to choose among a number of projects suggested by the different staff members. The main items which should be fulfilled are: 1. Selecting a topic, team and supervisor 2. Scheduling time to complete the project 3. Completing requirements on time. 4. seminar design and architecture 5. seminar documentation 6. Seeking help when needed. 7. Utilize the resources available at the Faculty

5- Teaching and Learning Methods:	1. Tutorials 2. Computer-lab Sessions 3. Practical lab work 4. Class discussions 5. Internet searches 6. Independent Work 7. Problem-based Learning

6- Teaching and Learning Methods for handicapped students :	-

7- Student Assessment	
A- Assessment Methods:	1. Year work evaluation 2. Oral exam
B- Assessment schedule:	Year work evaluation: All the year Oral Examination: At the end of the semester
C- Weighting of assessments:	Year work evaluation: 40% Oral Examination: 60%

8- Books and References	
A- Notes:	-
B- Essential Books (Text Books):	-
▪ C- Recommended Books:	-
D- Periodicals, Web sites, … etc	-

Course Professor: …… Department Head:

University: ***Fayoum University***
Faculty: ***Computers and Information***
Department: (Master) computer science

Course Specification

1- Basic Information		
Code: GN 602	**Course Title:** Basic of Scientific research	**Year/Level:**
Programme:	**Number of units:** **Lecture:** 2 **Tutorial:** 2 **Practical:**	

2- Aims of Course:	This course is designed to provide a general appreciation of workplace and communication skills pertinent to computer science. Inter-personal and personal transferable skills will be given particular emphasis in an effort to better equip the student for the workplace .This course also introduces the main tools used in information management and explores why they are of importance to the research methodology.

3- Intended Learning Outcomes	
A- Knowledge and Understanding:	a1) Recognize the importance of research. a2) Discuss types of study design. a3) Demonstrate the sampling methods.
B- Intellectual Skills:	b1) Select the proper sample for the research. b2) Differentiate between causal and no causal association. b3) Discriminate between data collection methods and techniques.
C- Professional and Practical Skills:	c1) Conduct scientific research effectively. c2) implement software tools for information management. C3) configure appropriate case study for his research
D- General and transferable Skills	d1) Use critical thinking methods in solving scientific research problems.

4-Course Content:	This course includes the following topics: • Searching for information and appraisal skills • Qualitative methods، • Quantitative assessment and questionnaire design، • Needs assessment - and tools to achieve this، Requirements analysis، • Modelling - testing hypothesis، Research statistics، and Audit. • Cases in information systems will be used to demonstrate these concepts.

5- Teaching and Learning Methods:	Lectures, direct instruction, student-teacher dialogues, and student-centered activities such as group work. Choice of teaching methods subject to instructor's decision, depending on class size, student skill base, and other relevant factors.

6- Teaching and Learning Methods for handicapped students	Lectures, direct instruction, student-teacher dialogues, and student-centered activities such as group work. Choice of teaching methods subject to instructor's decision, depending on class size, student skill base, and other relevant factors.

7- Student Assessment	
A- Assessment Methods:	3. Assignments and Quizzes 4. Midterm written exam 5. Oral exam 6. Final written exam
B- Assessment schedule:	Midterm Examination: Week 7 Oral Examination: Week 14 Final Examination: Week 15
C- Weighting of assessments:	Assignments and Quizzes: 20% Mid-Term Examination: 10% Oral Examination: 10% Final-term Examination: 60%

8- Books and References	
A- Notes:	- PowerPoint presentations for the course.
B- Essential Books (Text Books):	Creswell, J. W. Research design: Qualitative, quantitative and mixed methods approaches. 5th Ed. Thousand Oaks, CA: Sage, 2018.
C- Recommended Books:	McBurney, Donald, and Theresa L. White. Research Methods. 7th ed. Belmont, Calif.: Thomson Wadsworth, 2007. - Neuman, W.L. (2008). Social research methods: Qualitative and quantitative approaches, Pearson Education.
D- Periodicals, Web sites, … etc	-

Course Professor: …… Department Head: ……

University: ***Fayoum University***
Faculty: ***Computers and Information***
Department: (Master) ***Computer Science***

Course Specification

1- Basic Information		
Code: CS 601	**Course Title:** Parallel Algorithm	**Year/Level:**
Programme:	**Number of units:** **Lecture:** 2 **Tutorial:** 2 **Practical:**	

2- Aims of Course:	This course is about the design and analysis of parallel and distributed algorithms. We study specific algorithms for a variety of problems، as well as general design and analysis techniques. Specific topics include searching، sorting، algorithms for graph problems، efficient data structures، lower bounds and up- completeness'. Recent correlated software packages should be used through labs.

3- Intended Learning Outcomes	
A- Knowledge and Understanding:	a1. Define parallel programming principles, parallelism models, communication models, and resource limitations. a2. Describe the fundamental steps for designing and analyzing parallel algorithms. a3. Identify the fundamental of writing parallel codes. a4. Explain the main architectures in high performance computing. a5. Identify the essential mathematics relevant to the analysis of parallel algorithms. a6. Use high-level parallel programming language. a7. Identify core of analysis and applied mathematics related to parallel algorithms.
B- Intellectual Skills:	b1. Analyze and improve the performance of parallel applications. b2. Define traditional and nontraditional problems, set goals towards solving them, and. observe results. b3. Perform comparisons between (algorithms, methods, techniques...etc). b4. Identify attributes, components, relationships, patterns, main ideas,

	and errors.
C- Professional and Practical Skills:	c1. Write, debug and run simple distributed/parallel programs using the Message Passing Interface. c2. Design parallel programming applications. c3. Use appropriate programming languages and design methodologies. c4. Specify, design, and implement computer-based systems.
D- General and transferable Skills	d1. Communicate effectively by oral, written and visual means. d2. Work effectively as an individual and as a member of a team. d3. Lead and motivate individuals.

4-Course Content:	• Course introduction and motivation • Parallel algorithm design and analysis. • Collective communications • Parallel programming efficiency. • Parallel languages and architectures. • Application problems.

5- Teaching and Learning Methods:	Lectures, direct instruction, student-teacher dialogues, and student-centered activities such as group work. Choice of teaching methods subject to instructor's decision, depending on class size, student skill base, and other relevant factors.

6- Teaching and Learning Methods for handicapped students :	-

7- Student Assessment	
A- Assessment Methods:	1. Assignments and Quizzes 2. Midterm written exam 3. Oral exam 4. Final written exam
B- Assessment schedule:	Midterm Examination: Week 7 Oral Examination: Week 14 Final Examination: Week 15
C- Weighting of assessments:	Assignments and Quizzes: 20% Mid-Term Examination: 10% Oral Examination: 10% Final-term Examination: 60%

8- Books and References	
A- Notes:	PowerPoint presentations for the course.
B- Essential Books (Text Books):	Ananth Grama, Anshul Gupta, George Karypis, and Vipin Kumar. Introduction to parallel computing, second edition, Addison-Wesley, 2003.
C- Recommended	-Parallel Algorithms by Guy Blelloch and Bruce Maggs.

Books:	From Computer Science Handbook, Second Edition, Allen B. Tucker (Editor).
D- Periodicals, Web sites, … etc	-

Course Professor: …… Department Head: ……

University: ***FayoumUniversity***
Faculty: ***Computers and Information***
Department: Master (Computer Science)

Course Specification

1- Basic Information

Code: CS 604	**Course Title:** Advanced Operating Systems	**Year/Level:**
Programme :	**Number of units:** **Lecture:** **Tutorial:** **Practical:**	

2- Aims of Course:	This course covers general issues of design and implementation of advanced operating systems. The focus is on issues that are critical to the applications of distributed systems and computer networks, which include interprocess communication, distributed processing, sharing and replication of data and files. Approximately two third of the course will be devoted to basic concepts and techniques, and the remaining third will be on assorted current topics in modern operating systems and distributed systems.

3- Intended Learning Outcomes

A- Knowledge and Understanding:	A1	Locate and classify the Theories and fundamentals related to Advanced Operating Systems
	A2	Recognize The mutual influence between practice and its reflection on the environment for the basic functions and methods for Operating Systems.
	A3	Recognize Scientific developments in various approaches of Operating Systems and design the components of the systems for Operating Systems
B- Intellectual Skills:	B1	How to solve a problem using the Operating Systems techniques and methodologies.
	B2	How to interact with the various Operating Systems

	paradigms to represent well semantic information B3 Prepare a research study and / or writing a systematic scientific study on Advanced Operating Systems B6 Planning to develop performance in the field of Operating Systems
C- Professional and Practical Skills:	C1 Practice the professional, basic and modern skills in the field of Operating Systems to handle certain problem C2 Prepare the Writing and evaluating professional reports in the field of Operating Systems. C3 Demonstrate the existing methods and tools in the field of Operating Systems to Solve different problems in this field.
D- General and transferable Skills	D1 Work as a part of a team to find a solution for practical problems and projects. D2 Write structural reports. D3 Make oral communication skills by making report presentation.

4-Course Content:	• Distributed systems • Issues in communication • Remote Procedure Call • Remote Method Invocation • Message- and Stream-Oriented communication • Processes and threads • Distributed scheduling • Clock Synchronization • Distributed mutual exclusion and distributed deadlocks • Distributed transaction • Consistency models • Replication • Fault tolerance • Distributed commit and failure recovery • Distributed file systems

	• Security in distributed systems • Security: authentication

5- Teaching and Learning Methods:	8. Lectures 9. Tutorials 10. Computer-lab Sessions 11. Practical lab work 12. Class discussions 13. Internet searches 14. Independent Work 15. Group projects 16. Problem-based Learning 17. Writing reports

6- Teaching and Learning Methods for handicapped students :	-

7- Student Assessment	
A- Assessment Methods:	5. Assignments and Quizzes 6. Midterm written exam 7. Oral exam 8. Practical exam Final written exam
B- Assessment schedule:	Assignments: Week 7 Practical examination: Week 13 Oral Examination: Week 14 Final Examination: Week 15
C- Weighting of assessments:	Assignments: 20% Oral Examination: 10% Practical Examination: 10% Final-term Examination: 60%

8- Books and References	
A- Notes:	-
B- Essential Books (Text Books):	Andrew S. Tanenbaum and Maarten van Steen. "Distributed Systems: Principles and Paradigms", Prentice Hall, 2nd Edition, 2007. (Required)
C- Recommended Books:	Randy Chow and Theodore Johnson. "Distributed Operating Systems & Algorithms", Addison-Wesley, 1997.
D- Periodicals, Web sites, … etc	-

Course Professor: …… Department Head: ……

University: ***Fayoum University***
Faculty: ***Computers and Information***
Department: Master computer science

Course Specification

1- Basic Information		
Code: CS 619	**Course Title:** Big Data Fundamentals	**Year/Level:**
Programme :	**Number of units:** **Lecture:** **Tutorial:** **Practical:**	

2- Aims of Course:	1. Provide students with a solid understanding of the principles, methods and technologies for big data management to drive business innovations; 2. Equip students with the essential knowledge and skills to design a plan for big data management and evaluate the effectiveness of the proposed solution; 3. Enable students to apply the learnt methods and technologies in big data management for business improvements and innovations.

3-Course Content:	1. Introduction Concepts and principles of big data (e.g. volume, velocity, variety and veracity), market and business drivers, industry barriers and considerations for big data management in a business context. 2. The business cases Characteristics of big data applications, perception and quantification of business values, assessing organizational fitness, and design of business cases for big data applications. 3. Types of big data applications, product knowledge hub, infrastructure and operations studies, location-based services, profile-based recommendation services. 4. technologies are right for you, good practices for soliciting business user requirements. 5. High-performance appliance for big data management Storage considerations, big data appliances (hardware and software tuned for big data applications), architectural choices, performance characteristics, platform alternatives. 6. Big data tools and techniques Overview of high-performance architectures Hadoop, 7. Distributed File Systems GFS,OCSS,DOCSS,HDFS, 8. MapReduce and YARN, Spark, HBase, 9. Hive and Mahout. 10. Big data applications Managing the lifecycle of big data, machine-to-machine data, big transaction data, biometrics,

4- Teaching and Learning Methods:	1. Lectures 2. Literature Reviews 3. Computer-lab Sessions 4. Practical lab work 5. Class discussions 6. Internet searches 7. Problem-based searching

5- Student Assessment	
A- Assessment Methods:	9. Assignments and Quizzes 10. Midterm written exam 11. Oral Exam 12. Practical exam 13. Final written exam
B- Assessment schedule:	Midterm Examination: Week 6 Practical examination: Week 12 Oral Examination: Week 12 Final Examination: Week 15
C- Weighting of assessments:	Assignments and Quizzes: 0% Mid-Term Examination: 20% Oral Examination: 10% Practical Examination: 10%

	Final-term Examination: 60%

6- Books and References	
A- Notes:	Handouts and notes prepared by the instructor
B- Essential Books (Text Books):	David Loshin, 2013, Big Data Analytics: From strategic planning to enterprise integration with tools, techniques, NoSQL and graph, Elsvier, ISBM: 978-0-12-417319-4.
D- Periodicals, Web sites, … etc	Arvind Sathi, 2012, Big Data Analytics: Disruptive Technologies for Changing the Game, MC Press Online, ISBN: 978-1-58347-380-1.

Course Professor: …… Department Head: ……

▪

University: ***Fayoum University***
Faculty: ***Computers and Information***
Department: Computer Science

Course Specification

1- Basic Information		
Code: CS 614	**Course Title:** Data Mining algorithms	**Year/Level: Master (Big Data ماجستير مهنى)**
Programme :	**Number of units:** **Lecture:** 3 **Tutorial:** 2 **Practical:** 2	

2- Aims of	The aims of this course are to: • Expand on the student's understanding and awareness of the concept of data mining basics, techniques, and applications.

Course:	• Introduce the basic concepts of 'Data Pre-processing & Summary Statistics'. • Introduce the concepts of 'Frequent Item set Generation, Associations and Correlations measures'. • Introduce the concepts of 'Classification, Prediction, and Clustering Algorithms'. • Build on the programming and problem solving skills developed in previous subjects studied by the student, to achieve an understanding of the development of Classification, Prediction, and Clustering applications.

3- Intended Learning Outcomes	
A- Knowledge and Understanding:	On completing the course, students should be able to: K.1 Explain the basic concepts of Data Mining. K.2 Illustrate the concept of Data Pre-processing & Summary Statistics. K.3 Know and understand the concepts and techniques of Frequent Item set Generation, Associations and Correlations measures. K.4 Know and understand the concepts and techniques of Classification, Prediction, and Clustering Algorithms. K.5 Know applications of data mining in real life.
B- Intellectual Skills:	On completing the course, students should be able to: I.1 Learn how to use Statistical measures. I.2 Learn how to apply the Graphic Displays of Data Summaries. I.3 Handle data quality problems Noisy and outliers Data, and missing values. I.4 Learn how to apply Data Transformation and Reduction. I.5 Measure data similarity and dissimilarity. I.6 Mine Frequent Patterns, Associations, and Correlations.
C- Professional and Practical Skills:	On completing the course, students should be able to: P.1 Predict useful information from given data. P.2 Use data mining techniques in real data mining life applications. P.3 Find the impact of data analysis techniques in decision making process. P.4 Implement different Classification/Prediction/Clustering techniques.
D- General and transferable Skills	On completing the course, students should be able to: G.1 Work effectively as individuals or as a part of a team to apply skills gained throughout the course to design and implement different data mining techniques. G.2 Apply problem solving capabilities. G.3 Know the role of data mining in real life applications. G.4 Know the importance of data analysis in decision

	support systems and applications.

4-Intended Learning Outcomes of Course (ILOs)

5- Course Matrix Contents

	Main Topics / Chapters	Duration (Weeks)	Course ILOs Covered by Topic (By ILO Code)			
			K & U	I.S.	P.S.	G.S.
1	Introduction to Data Mining & Basic concepts	2	K1			
2	Data Pre-processing	1	K2	I1,I2,I3,I4,I5		
3	Summary Statistics	1	K2	I1,I2,I3,I4,I5		
4	Mining Frequent Patterns, Associations, and Correlations	2	K3,K5	I6	P1,P2,P3	All
5	Classification	4	K4,K5		All	All
6	Prediction	1	K4,K5		All	All
7	Clustering	1	K4,K5		All	All
	Net Teaching Weeks	13				

4-Course Content:	

Week No.	Sub-Topics	Total Hours	Contact Hours	
			Theoretical Hours	Practical Hours
1	Introduction to Data Mining & Basic Concepts	2.5	2.5	
2	Introduction to Data Mining & Basic Concepts	4	2.5	1.5
3	Data Pre-processing	4	2.5	1.5
4	Summary Statistics	4	2.5	1.5
5	Mining Frequent Patterns, Associations, and Correlations: Association Rules & Frequent Item set Generation	4	2.5	1.5
6	Mining Frequent Patterns, Associations and Correlations :Correlation Measures	4	2.5	1.5
7	Midterm Exam			
8	Classification: Decision Tree Induction	4	2.5	1.5
9	Classification : Bayesian Classification	4	2.5	1.5
10	Classification: Rule-Based Classification	4	2.5	1.5
11	Classification: Artificial Neural Networks & Lazy Learners	4	2.5	1.5

12	Prediction : Linear Regression	4	2.5	1.5
13	Clustering: Distance measures & K-means clustering	4	2.5	1.5
14	Review	4	2.5	1.5
15	Final Exam			
Total Teaching Hours		51	33	18

5- Teaching and Learning Methods:

Teaching/Learning Method	Selected Method	Course ILOs Covered by Method (By ILO Code)			
		K&u	Intellectual Skills	Professional Skills	General Skills
Lectures & Seminars	Y	All	All	P1 ,P2	
Tutorials					
Computer lab Sessions	Y		All	P4	
Practical lab Work	Y		I6	P1, P4	All
Reading Materials	Y	All	All	P1, P2, P3	
Web-site Searches					
Problem Solving / Problem-based Learning	Y				
Projects					
Independent Work	Y			All	All
Group Work	Y				

Case Studies					G1
Presentations					
Simulation Analysis					
Others (Specify):					

7- Student Assessment

A- Assessment Methods:	
B- Assessment schedule:	
C- Weighting of assessments:	

Assessment Method	Selected Method	Course ILOs Covered by Method (By ILO Code)				Assessment Weight / Percentage	Week No.
		K&U	I.S.	P.S.	G.S.		
Midterm Exam	Y	All	All			15%	7
Final Exam	Y	All	All			60%	
Quizzes							
Course Work	Y		All			10%	3,5,8,10
Report Writing							
Case Study Analysis							
Oral Presentations							
Practical	Y			All	All	15%	4,6,9,11
Group Project							

Individual Project Others (Specify):							

8- Books and References

A- Notes:	-available on book's site:
B- Essential Books (Text Books):	▪ Data Mining: Concepts and Techniques 2nd Edition (Jiawei Han & Micheline Kamber
C- Recommended Books:	- Introduction to Data Mining by Pang-Ning Tan, Michael Steinbach, Vipin Kumar.
D- Periodicals, Web sites, … etc	-ACM digital Library:http://portal.acm.org/dl.cfm?coll=portal&dl=ACM&CFID=21491530&CFTOKEN=49241968 IEEE computer society:http://www.computer.org/portal/site/ieeecs/index.jsp

Course Professor: …… Department Head: ……

University: ***Fayoum University***
Faculty: ***Computers and Information***
Department: Master (Computer Science)

Course Specification

1- Basic Information		
Code: CS 623	**Course Title:** Advanced Database Systems	**Year/Level: Post Graduate**
Programme :Master of Computer science	**Number of units:** **Lecture:** 2 hrs/ week **Tutorial:** 0 hrs/ week **Practical:** 2 hrs/ week	

2- Aims of Course:	1.This course aims to provide students with the advanced concepts of relational databases. 2. Students will gain knowledge to: • Understand transaction management and concurrency control • Understand file organization, indexing and hashing • Understand query processing and query optimization • Understand recovery systems. • Understand distributed databases and client/server architecture • Understand object-oriented databases

3- Intended Learning Outcomes	
A- Knowledge and Understanding:	A1 Locate and classify the Theories and fundamentals related to the field of learning as well as **Computer Science** a1.Understand file organization, indexing and hashing a2. understand of fundamental concepts and issues of transaction management, concurrency control, and recovery systems a3.Understand query processing and query optimization A2. Recognize The mutual influence between practice and its reflection on the environment a4.understand the problems and potentials of current database systems A3. Recognize Scientific developments in **Computer Science** a5. Explain relational, semantic, and object-oriented data models

	a6.Understand distributed databases and client/server architecture A4. Recognize the Principles and basics of quality in professional practice in the field of **Computer Science** a7. learn different database model.
B- Intellectual Skills:	B1.Analysis and evaluation of information in the field of specialization and measurement to solve problems b1.analyze and evaluate information in database organization b2.analyze the performance of database systems using test collections b3.Characterize Schedules based on Recoverability/ Serializability b4.analyze the recovery schemes b5. analyze the recovery in multi-database system B2. Solving specialized problems with some lake of data b3. Resolve a wide range of database systems problems B6. Planning to develop performance in the field of **Computer Science** b4.link different knowledge to solve professional problems. b5. evaluate different database model
C- Professional and Practical Skills:	C1. Practice the professional, basic and modern skills in the field of **Computer Science** c1. Support transaction in SQL C3 Demonstrate the existing methods and tools in the field of **Computer Science** C2 Demonstrate the existing methods and algorithms in concurrency control/ recovery c3 Perform database experiments in which they transform theoretical models to a working system c4 Testing and evaluating database experiments c5 Examine and analyze the result c6 implement advanced techniques for information retrieval
D- General and transferable Skills	D1 Recognize the Effective communication of various types D2 Use of information technology to serve professional

	practice D3 Recognize the Self-assessment and identification of personal educational needs D4 Use different sources to access information and knowledge D5 Develop rules and indicators to evaluate the performance of others D6 Practice to Working in a team, leading teams in different professional contexts D7 Demonstrate the Time management efficiently D8 Practice to Self-learning and continuous

4-Course Content:	1. File Organization 2. Internal Design of a Mini Database Engine 3. Object-Oriented Databases 4. Query Processing and Query Optimization 5. Transaction Management and Concurrency Control 6. Concurrency control techniques 7. Database Recovery Techniques 8. Distributed Databases and Client/Server Architecture

5- Teaching and Learning Methods:	1. Lectures 2. Tutorials 3. Class discussions 4. Internet searches 5. Independent Work 6. Group projects 7. Problem-based Learning

6- Teaching and Learning Methods for handicapped students :	-

7- Student Assessment	
A- Assessment Methods:	1. Assignments 2. Practical exam 3. Oral exam 4. Final written exam
B- Assessment schedule:	Practical Examination: Week 13 Oral Examination: Week 14 Final Examination: Week 15
C- Weighting of assessments:	Practical Examination: 20% Oral Examination: 20% Final-term Examination: 60%

8- Books and References	
A- Notes:	-
B- Essential Books (Text Books):	▪ Fundamentals of Database Systems. Ramez Elmasri, and Shamkant B. Navathe , Sixth Edition, Boston:Addison-Wesley , 2011
C- Recommended Books:	-Fundamentals of Database Management Systems. Mark L.Gillenson, 2012
D- Periodicals, Web sites, … etc	-

Course Professor: …… Department Head: ……

University: ***FayoumUniversity***
Faculty: ***Computers and Information***
Department: Master (Computer Science)

Course Specification

1- Basic Information		
Code: CS 605	**Course Title:** Image and Pattern Recognition	**Year/Level:**
Programme :	**Number of units:** **Lecture:** **Tutorial:** **Practical:**	

2- Aims of Course:	To give students a broad knowledge on, and techniques used in contemporary research on Image and Pattern Recognition. This course gives an introduction to the main methods of image analysis and pattern recognition. Moreover, introduction to Mathematical Morphology Examples and applications.

3- Intended Learning Outcomes	
A- Knowledge and Understanding:	A4 Locate and classify the Theories and fundamentals related to computer vision and pattern recognition A5 Recognize The mutual influence between practice and its reflection on the environment for the basic functions and methods for image processing. A6 Recognize Scientific developments in various approaches of computer vision and pattern recognition and design the components of the systems for computer vision and pattern recognition
B- Intellectual Skills:	B4 How to solve a problem using the Image and Pattern Recognition techniques and methodologies. B5 How to interact with the various Image and Pattern Recognition paradigms to represent well semantic information B4 Prepare a research study and / or writing a systematic scientific study on Image and Pattern Recognition
C- Professional and Practical Skills:	C4 Practice the professional, basic and modern skills in the field of computer vision and pattern recognition

	to handle certain problem C5 Prepare the Writing and evaluating professional reports in the field of computer vision and pattern recognition. C6 Demonstrate the existing methods and tools in the field of computer vision and pattern recognition to Solve different problems in this field.
D- General and transferable Skills	D4 Work as a part of a team to find a solution for practical problems and projects. D5 Write structural reports. D6 Make oral communication skills by making report presentation.

4-Course Content:	I. Overview of Computer Vision and Pattern Recognition II. Basic Theories and Techniques in Pattern Recognition A. Bayesian decision theory B. Parametric techniques C. Non-parametric techniques D. Formal linguistics theory E. Linear discriminant function F. Syntactic / structural PR techniques III. Feature Extraction A. Feature extraction techniques in statistical PR B. Feature extraction techniques in syntactic / structural PR IV. Image Formation A. Photometric image formation B. Geometric primitives and transformations V. Image Processing A. Image analysis B. Image filtering and enhancement VI. Object Representation and Tracking A. Object representation B. Point tracking C. Kernel tracking VII. Applications

5- Teaching and Learning Methods:	18. Lectures 19. Tutorials 20. Computer-lab Sessions 21. Practical lab work 22. Class discussions 23. Internet searches 24. Independent Work 25. Group projects 26. Problem-based Learning 27. Writing reports

6- Teaching and Learning Methods for handicapped students :	-

7- Student Assessment	
A- Assessment Methods:	14. Assignments and Quizzes 15. Midterm written exam 16. Oral exam 17. Practical exam

	Final written exam
B- Assessment schedule:	Assignments: Week 7 Practical examination: Week 13 Oral Examination: Week 14 Final Examination: Week 15
C- Weighting of assessments:	Assignments: 20% Oral Examination: 10% Practical Examination: 10% Final-term Examination: 60%

8- Books and References

A- Notes:	-
B- Essential Books (Text Books):	- **Computer Vision: Algorithms and Applications, Richard Szeliski, September 3, 2010 Springer.**
C- Recommended Books:	✓ - **Digital Image Processing, 2nd edition, Rafael C. Gonzalez and Richard E. Woods, Prentice Hall, 2008. http://www.imageprocessingplace.com** ✓ Also see textbook website, **http://www.imageprocessingplace.com** ✓ The Essential Guide to Image Processing, Alan C. Bovik, Academic Press, 2009. ✓ Digital Image Processing Using MATLAB, 2nd edition, Rafael C. Gonzalez, Richard E. Woods, and Steven L. Eddins, Gatesmark Publishing, 2009.
D- Periodicals, Web sites, … etc	-

Course Professor: Shereen Aly Taie Department Head: ……

University: ***Fayoum University***
Faculty: ***Computers and Information***
Department: Master (Big Data اكاديمى + مهنى + ماجستير علوم الحاسب)

Course Specification

1- Basic Information		
Code: CS 620	**Course Title:** Machine Learning	**Year/Level:**
Programme :	**Number of units:** **Lecture:** 3 **Tutorial:** 2 **Practical:** 2	

2- Aims of Course:	Introducing the field of Machine learning, its models and applications and how to design and develop algorithms for real life applications.

3- Intended Learning Outcomes	
A- Knowledge and Understanding:	On completing the course, students should be able to: K.1 Define essential facts, concepts, principles, and theories for Machine Learning, computing and software applications. K.2 Recognize and explain essential facts, concepts, principals, and theories related to Machine Learning and software applications K.3 Recognize different algorithms that are suitable for real life applications
B- Intellectual Skills:	I.1 Distinguish Machine Learning concepts and Decision Support approaches to solve problems in scientific and systematically way. I.2 Apply appropriate approach to achieve partial or approximate solution. I.3 Design and develop algorithms that are suitable for real life applications.
C- Professional and Practical Skills:	P.1 Apply the principles of machine learning using appropriate techniques, tools, and languages. P.2 Apply the principles of machine learning techniques to various types of data.

D- General and transferable Skills	G.1 Work as a part of a team to produce reports. G.2 Work as a part of a team to find a solution for practical problems and projects. G.3 Write structural reports. G.4 Apply specific task in certain period of time “training problems in labs.

4-Course Content:	

Week No.	Sub-Topics	Total Hours	Contact Hours	
			Theoretical Hours	Practical Hours
1	Introduction	2.5	2.5	
2	Learning by Risk Minimization	4	2.5	1.5
3	Kernels and Linear Classifiers	4	2.5	1.5
4	Support Vector Classification Learning I	4	2.5	1.5
5	Support Vector Classification Learning II	4	2.5	1.5
6	Adaptive Margin Machines	4	2.5	1.5
7	Midterm Exam			
8	The Bayesian Framework	4	2.5	1.5
9	Gaussian Processes I	4	2.5	1.5
10	Gaussian Processes II	4	2.5	1.5
11	The Relevance Vector Machine	4	2.5	1.5
12	Bayes Point Machines	4	2.5	1.5
13	Fisher Discriminants	4	2.5	1.5
14	Learning Theory	4	2.5	1.5
15	Final Exam			
	Total Teaching Hours	51	33	18

5- Teaching and Learning Methods:

Teaching/Learning Method	Selected Method	Course ILOs Covered by Method (By ILO Code)			
		K&u	Intellectual Skills	Professional Skills	General Skills
Lectures & Seminars	Y	K1,k2,k3	I1,I2		
Tutorials					
Computer lab Sessions				P1,p2	G2,G4
Practical lab Work					
Reading Materials					G3,G1
Web-site Searches					G3,G1
Problem Solving / Problem-based Learning			I1,I2,I3		G3,G1
Projects					G3,G1
Independent Work					
Group Work			I1,I2,I3		G1,G2
Case Studies					
Presentations					
Simulation Analysis					
Others (Specify):					

7- Student Assessment	
A- Assessment Methods:	
B- Assessment schedule:	
C- Weighting of assessments:	

Assessment Method	Selected Method	Course ILOs Covered by Method (By ILO Code)				Assessment Weight / Percentage	Week No.
		K&U	I.S.	P.S.	G.S.		
Midterm Exam	Y	All	I1,I2			110%	7
Final Exam	Y	All	I1,I2			60%	15
Quizzes							
Course Work	Y				G4	15%	
Report Writing					G1,G3		
Case Study Analysis							
Oral Presentations							
Practical	Y			P1,p2		15%	
Group Project			I1,I2,I3	P1,p2	G2	15%	
Individual Project							
Others (Specify):							

8- Books and References

A- Notes:	Ralf Herb Rich. Learning Kernel Classifiers: Theory and Algorithms. MIT Press
B- Essential Books (Text Books):	Course notes provided by the DR
C- Recommended Books:	
D- Periodicals, Web sites, … etc	

Course Professor: …… Department Head: ……

University: ***Fayoum University***
Faculty: ***Computers and Information***
Department: ***Master (علوم الحاسب)***

Course Specification

1- Basic Information		
Code: CS 612	**Course Title:** Mobile Computing	**Year/Level: Master of Computer Science**
Programme	**Number of units:** **Lecture:** 2 **Tutorial:** 2 **Practical:**	

2- Aims of Course:	This course will give you an understanding of mobile computer systems particularly in the context of wireless network systems such as 2G/3G/4G mobile telephony، data networks، and other wireless networks and infrastructure. The course emphasises how to interface hardware to mobile computing devices، and programming those devices.

3- Intended Learning Outcomes	
A- Knowledge and Understanding:	A1. grasp the concepts and features of mobile computing technologies and applications; A2. have a good understanding of how the underlying wireless and mobile communication networks work, their technical features, and what kinds of applications they can support; A3. identify the important issues of developing mobile computing systems and applications; A4. Student is familiar with wireless communications standards and data transmission standards
B- Intellectual Skills:	B1. organize the functionalities and components of mobile computing systems into different layers and apply various techniques for realizing the functionalities; B2. develop mobile computing applications by analyzing their characteristics and requirements, selecting the appropriate computing models and software architectures, and applying standard programming languages and tools;

	B3. Student knows how to prepare a mobile application for distribution
C- Professional and Practical Skills:	C1. Communication skills C2. Time management C3. Learning and working both independently and in groups C4. Writing and evaluating professional reports and presentations.
D- General and transferable Skills	D1.Use of range of specialized mobile computing technology such as programming languages, web based systems and other means of dealing with mobile devices and networks D2. Preparation of essays, reports and presentations. D3. Recognize the Self-assessment and identification of personal educational needs D4. Use different sources to access information and knowledge

4-Course Content:	• Basics of Mobile Apps & Wireframing • Mobile App Development Tools & Strategies • Localization • Mobile Cloud and Back-End Servers • Location Awareness • Context-Aware Systems • Sensors and Sensing • RFID & NFC • Fundamentals of Networks • Wireless Networks • Ad-Hoc Networks • Bluetooth and BLE • Cellular Networks • Wearable Computing & Internet of Things

5- Teaching and Learning Methods:	lecture, tutorial, seminar

6- Teaching and Learning Methods for handicapped students :	-

7- Student Assessment	
A- Assessment Methods:	Reports, presentation, exams
B- Assessment schedule:	
C- Weighting of assessments:	**40% classwork, 60% final exam**

8- Books and References	
A- Notes:	-
B- Essential Books (Text Books):	*Ubiquitous Computing: Smart Devices, Environments and Interactions* – Stefan Poslad – Wiley 2009
C- Recommended Books:	Mobile Computing: Technology, Applications, and Service Creation – Asoke K. Talukder, Roopa R. Yavagal - McGraw-Hill Communications Engineering 2007
D- Periodicals, Web sites, … etc	-

Course Professor: Howida Youssry Department Head: ……

University: ***FayoumUniversity***
Faculty: ***Computers and Information***
Department: Master (Computer Science)

Course Specification

1- Basic Information		
Code: CS 621	**Course Title:** Selected Topics 1	**Year/Level:**
Programme :	**Number of units:** **Lecture:** **Tutorial:** **Practical:**	

2- Aims of Course:	To give students a broad knowledge on, and techniques used in contemporary research on Image and Pattern Recognition. This course gives an introduction to the main methods of image analysis and pattern recognition. Moreover, introduction to Mathematical Morphology Examples and applications. Image Restoration and face recognition.

3- Intended Learning Outcomes	
A- Knowledge and Understanding:	A7 Locate and classify the Theories and fundamentals related to computer vision and pattern recognition A8 Recognize The mutual influence between practice and its reflection on the environment for the basic functions and methods for image processing. A9 Recognize Scientific developments in various approaches of computer vision and pattern recognition and design the components of the systems for computer vision and pattern recognition
B- Intellectual Skills:	B6 How to solve a problem using the Image and Pattern Recognition techniques, face recognition, image restoration and methodologies. B7 How to interact with the various Image and Pattern Recognition paradigms to represent well semantic information B4 Prepare a research study and / or writing a systematic scientific study on Image and Pattern Recognition

C- Professional and Practical Skills:	C7	Practice the professional, basic and modern skills in the field of computer vision and pattern recognition to handle certain problem
	C8	Prepare the Writing and evaluating professional reports in the field of computer vision and pattern recognition.
	C9	Demonstrate the existing methods and tools in the field of computer vision and pattern recognition to Solve different problems in this field.
D- General and transferable Skills	D7	Work as a part of a team to find a solution for practical problems and projects.
	D8	Write structural reports.
	D9	Make oral communication skills by making report presentation.

4-Course Content:	I. Overview of Computer Vision and Pattern Recognition II. Basic Theories and Techniques in Pattern Recognition A. Bayesian decision theory B. Parametric techniques C. Non-parametric techniques D. Formal linguistics theory E. Linear discriminant function F. Syntactic / structural PR techniques III. Feature Extraction A. Feature extraction techniques in statistical PR B. Feature extraction techniques in syntactic / structural PR IV. Image Formation A. Photometric image formation B. Geometric primitives and transformations V. Image Processing A. Image analysis B. Image filtering and enhancement VI. Object Representation and Tracking A. Object representation B. Point tracking C. Kernel tracking VII. Image Restoration VIII. Face Recognition

5- Teaching and Learning Methods:	28. Lectures 29. Tutorials 30. Computer-lab Sessions 31. Practical lab work 32. Class discussions 33. Internet searches 34. Independent Work 35. Group projects 36. Problem-based Learning 37. Writing reports

6- Teaching and Learning Methods for handicapped students :	-

7- Student Assessment	
A- Assessment Methods:	18. Assignments and Quizzes 19. Midterm written exam

	20. Oral exam 21. Practical exam Final written exam
B- Assessment schedule:	Assignments: Week 7 Practical examination: Week 13 Oral Examination: Week 14 Final Examination: Week 15
C- Weighting of assessments:	Assignments: 20% Oral Examination: 10% Practical Examination: 10% Final-term Examination: 60%

8- Books and References	
A- Notes:	-
B- Essential Books (Text Books):	- **Computer Vision: Algorithms and Applications, Richard Szeliski, September 3, 2010 Springer.**
C- Recommended Books:	✓ - **Digital Image Processing, 2nd edition, Rafael C. Gonzalez and Richard E. Woods, Prentice Hall, 2008. http://www.imageprocessingplace.com** ✓ Also see textbook website, **http://www.imageprocessingplace.com** ✓ The Essential Guide to Image Processing, Alan C. Bovik, Academic Press, 2009. ✓ Digital Image Processing Using MATLAB, 2nd edition, Rafael C. Gonzalez, Richard E. Woods, and Steven L. Eddins, Gatesmark Publishing, 2009.
D- Periodicals, Web sites, … etc	-

Course Professor: Shereen Aly Taie Department Head: ……

University: ***FayoumUniversity***
Faculty: ***Computers and Information***
Department: Master (علوم الحاسب)

Course Specification

1- Basic Information		
Code: CS 622	**Course Title:**Selected Topics2	**Year/Level:**
Programme :	**Number of units:** **Lecture:** **Tutorial:** **Practical:**	

2- Aims of Course:	This course is an introduction to data science. The major goals of this course are to learn how to use tools for acquiring, cleaning, analyzing, exploring, and visualizing data; making data-driven inferences and decisions; and effectively communicating results. Moreover, this course will introduce students to data preparation and analysis methods

3- Intended Learning Outcomes	
A- Knowledge and Understanding:	A10 Locate and classify the Theories and fundamentals related to data science A11 Recognize The mutual influence between practice and its reflection on the environment for the basic functions and methods for data science. A12 Recognize Scientific developments in various approaches of data science.
B- Intellectual Skills:	B8 How to solve a problem using the data science techniques and methodologies. B9 How to interact with the data science to represent well semantic information B4 Prepare a research study and / or writing a systematic scientific study on data science
C- Professional and Practical Skills:	C10 Practice the professional, basic and modern skills in the field of data science to handle certain problem C11 Prepare the Writing and evaluating professional reports in the field of data science. C12 Demonstrate the existing methods and tools in the field of data science to Solve different problems in

	this field.
D- General and transferable Skills	D10 Work as a part of a team to find a solution for practical problems and projects. D11 Write structural reports. D12 Make oral communication skills by making report presentation.

4-Course Content:	• Acquiring data through web-scraping and data APIs • Cleaning and reshaping messy datasets using methods such as regular expressions or dedicated tools such as open refine • Exploratory data analysis and visualization • Rating and ranking • Clustering and classification • Recommendation • Network analysis • Regression and statistical inference

5- Teaching and Learning Methods:	38. Lectures 39. Tutorials 40. Computer-lab Sessions 41. Practical lab work 42. Class discussions 43. Internet searches 44. Independent Work 45. Group projects 46. Problem-based Learning 47. Writing reports

6- Teaching and Learning Methods for handicapped students :	-

7- Student Assessment	
A- Assessment Methods:	22. Assignments and Quizzes

	23. Midterm written exam 24. Oral exam 25. Practical exam Final written exam
B- Assessment schedule:	Assignments: Week 7 Practical examination: Week 13 Oral Examination: Week 14 Final Examination: Week 15
C- Weighting of assessments:	Assignments: 20% Oral Examination: 10% Practical Examination: 10% Final-term Examination: 60%

8- Books and References	
A- Notes:	-
B- Essential Books (Text Books):	Software for Data Analysis: Programming with R (Statistics and Computing) 1st ed. 2008. Corr. 2nd printing 2009 Edition, John M. Chambers
C- Recommended Books:	- Data Science from Scratch: First Principles with Python 1st Edition, Joel Grus - Doing Data Science: Straight Talk from the Frontline 1st Edition, Cathy O'Neil, Rachel Schutt - Learning the Pandas Library: Python Tools for Data Munging, Analysis, and Visualization (Treading on Python Book 3), Matt Harrison, Michael Prentiss
D- Periodicals, Web sites, … etc	-

Course Professor: …… Department Head: ……

1- attributes of the Master of Computer Science graduate & the ILO's: :

The attributes of the master of computer science graduate	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	D1	D2	D3	D4	D5	D6	D7	D8
1. Proficiency in applying the basics and methodologies of scientific research and using its various tools.										√					√									√
2. Apply of the analytical method and its use in the field of specialization.							√	√					√											
3. Apply specialized knowledge and integrate it with relevant knowledge in his professional practice.			√					√						√				√		√				
4. Demonstrate awareness of current problems and modern visions in the field of specialization	√	√	√					√	√		√	√						√		√				
5. Identify professional problems and find solutions.								√	√				√			√								
6. Mastering an appropriate range of specialized professional skills and using appropriate technology to serve his professional practice.	√						√				√	√		√	√	√		√						
7. Communicate effectively and be able to lead teams.					√												√				√	√	√	√
8. Decision-making in different professional contexts																								
9. Use available resources to achieve the highest utilization and preservation				√	√	√							√											
10. To show awareness of his role in the development of society and the preservation of the environment in the light of global changes.		√					√																	
11. Act in a way that reflects the commitment to integrity, credibility and adherence to the rules of the profession				√	√	√							√											

12. Develop himself academically, professionally and capable of continuous learning													√						√			√	√	√

Program coordinator: Dr. Sheren Ahmed Department Head: Prof.Nabila Hasan