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

Course Specification

1- Basic Information		
Code: GEN 222	**Course Title:** Mathematics (3)	**Year/Level:** Second year – First term
Programme: B.Sc degree in Computer Science	**Number of units:** **Lecture:** 4 hrs/ week **Tutorial:** 3 hrs/ week **Practical:** 0 hrs/ week	

2- Aims of Course:	1. Introduce the students to understand and develop the basic concepts of mathematical logic. 2. Introduction to Boolean algebra , relations, and functions. 3. Understanding of graph theory

3- Intended Learning Outcomes	
A- Knowledge and Understanding:	**A3. Demonstrate the essential mathematics and physics relevant to computer science.** **A7. Demonstrate essential facts, concepts, principles and theories relating to computing and information and computer applications as appropriate to the program of study.** **A8. Express the main concepts of statistics, probability theory, algebra and numerical analysis and their role in the computing and information discipline.** **A10. Identify and explain the fundamental concepts, principles, and techniques needed for the analysis, development, validation, verification, deployment, and operations of computer-based and information systems.** a1) Basic and principles of Boolean algebra a2) Understanding of Propositional logic math a3) Knowledge of graph theory a4) Understanding of matrices and linear equations a5) Principles of Eigen values and vectors
B- Intellectual Skills:	**B1. Analyze real problems, and appropriate problem solving methods that satisfy commercial or industrial constraints and analyze results.** **B4. Apply solutions to a computer science problem, follow-up on solution to verify it, and if necessary restrict the solution methodologies upon the results.** **B7. Determine goals for problem solving and test the result of**

	the solution of the problems b1) Solve problems in logic , Boolean Matrices b2) Evaluate the Eigen values and Eigen vectors b3) Apply the theorem's concepts and various applications
C- Professional and Practical Skills:	**C1. Analyze and improve organizational processes from an ICT perspective.** **C8. Deploy appropriate tools for the construction and documentation of computer-based systems that are used to solve practical problems.** **C9.Deploy different modeling techniques to model and analyze real life computing problems.** **C11. Develop a range of fundamental research skills that enable the graduate to continuously increase his knowledge, advance his career and pursue graduate studies.** c1) Solve different problems c2) Distinguish between different methods to find inverse matrix
D- General and transferable Skills	**D2. Use effective information-retrieval skills (including the use of browsers, search engines and catalogues) and general IT facilities.** **D4. Demonstrate independent critical thinking and problem solving skills.** **D7. Prepare technical reports to a professional standard.** d1) Make reports d2) Gain access to data and information from libraries and internet d3) Show math thinking and be self independent in problem solving

4-Course Content:	1. Sets, 2. sequences, 3. algorithms and pseudo codes, 4. Prepositional logic. 5. Proof by induction. 6. Matrices and Boolean matrices. 7. Relations and functions. 8. Graph theory. Posits lattices. 9. Boolean algebra. 10. Linear equations and matrices. Vector spaces. Inner product spaces. Linear transformations. 11. Eigen values and eigenvectors. Canonical forms. Jordan forms.

5- Teaching and Learning Methods:	1. Lectures 2. Discussion 3. Library

	4. Home works and Exercise

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: 0% Mid-Term Examination: 16% Oral Examination: 8% Final-term Examination: 76%

8- Books and References	
A- Notes:	-
B- Essential Books (Text Books):	▪ Elementary linear algebra by Ronald E.Larson, the pennsylvanla state university (2012)
C- Recommended Books:	▪ Discrete mathematical structures by Bernard Kolman 6th edition (2014)
D- Periodicals, Web sites, … etc	-

Course Professor: Dr. Moustafa Sakran Department Head: Dr. Amira Edress

Course Content Intended Learning Outcomes Matrix

Course Title: Mathematics (3)
Course Code: GEN 222

Course Content	Week	Knowledge & Understanding					Intellectual Skills			Professional & Practical Skills		General & Transferable Skills		
		a1	a2	a3	a4	a5	b1	b2	b3	c1	c2	d1	d2	d3
1. Sets,	1		x						x	x		x	x	x
2. sequences,	2		x						x	x		x	x	x
3. algorithms and pseudo codes,	3		x						x	x		x	x	x
4. prepositional logic.	4		x						x	x		x	x	x
5. Proof by induction.	5		x				x		x	x		x	x	x
6. Matrices and Boolean matrices.	6				x				x	x	x	x	x	x
7. Relations and functions.	7				x				x	x		x	x	x
8. Graph theory. Posits lattices.	8			x					x	x		x	x	x
9. Boolean algebra.	9	x					x		x	x		x	x	x
10. Linear equations and matrices. Vector spaces. Inner product spaces. Linear transformations.	10				x				x	x	x	x	x	x
11. Eigen values and Eigen vectors. Canonical forms. Jordan forms.	11					x		x	x	x		x	x	x

Course coordinator: Dr. Moustafa Sakran

Head of Department: Dr. Amira Edress