

Course Title: Computer Mathematics

Course Code: CS117

Program: Computer Science (Cybersecurity- Programming-

Networks)

Department: Applied Sciences

College: Applied College

Institution: Imam Muhammad Bin Saud Islamic University

Version: Course Specification Version Number

Last Revision Date: Pick Revision Date.



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A. General information about the course:

Со	Course Identification					
1.	Credit hours:	3				
2. (Course type					
a.	University □	College ⊠	Departmen	nt□	Track□	Others□
b.	Required ⊠	Elective□				
3.	Level/year at wh	nich this course	is offered:	First Le	evel	
This of s	4. Course general Description: This course introduces the students to a body of mathematical concepts essential for the mastery of some of the higher-level computer science courses. The course covers fundamental concepts of mathematics for computer science and engineering. It emphasizes mathematical definitions and proofs as well as applicable methods.					
5. Pre-requirements for this course (if any): None						
6.	6. Co- requirements for this course (if any): None					

7. Course Main Objective(s):

Providing the ideas and mathematical concepts essential that are widely used in computer science and engineering. In addition, this course teaches the students techniques in how to think logically and mathematically and apply these techniques in solving problems. To achieve this goal, students will learn counting systems, sets, arithmetic operations of counting systems, logical operations, Boolean algebra, and logic gates.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	3hours\week	100%
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

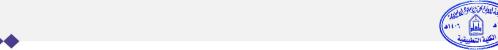
No	Activity	Contact Hours
1.	Lectures	36
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	36





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	.0 Knowledge and understanding			
1.1	Describe the different numbering systems in computer science.	K1	 Lecture. Discussion. Survey. Discovery Learning. Self-education. online achieve tests. Question Assignmand 	achievement
1.2	Identify the expressions, logic gates, and operations on them.	K2		Questions.Assignments
1.3	Define the concept of sets and operations and their properties.	K3	lecture Brainstorming Web survey KWL - Learning Schedule Mind maps Concept maps	 Presentations Discussion and debates. Cognitive performance tests. Achievement file.
2.0	Skills			
2.1	Ability to convert between different counting systems.	S1	Demonstration.Developed lecture.	PresentationsRating ladders.
2.2	Perform various arithmetic operations on the binary system.	\$4	Discovery learning.Peer learning.	 Performance tests. Production metrics. Observation. Projects. Achievement
2.3	Apply essential logical operations to expressions and logic gates.	\$3	Self-education.Discussion.Web survey.Brainstorming.	
2.4	Design of logic circuits using logic gates.	S2	Cooperative learning.Problem Solving.	file Peer assessment.
2.5	Perform various operations on sets.	S4	Project.Online discussion.	- Self-calendar
3.0	Values, autonomy, ar	nd responsibility		
3.1	Cooperation, teamwork, and professional ethics.	V1	Demonstration.Developed lecture.	PresentationsRating ladders.Performance
3.2	Take responsibility for continuous learning and continuing personal development.	V2	Discovery learning.Peer learning.Self-education.Discussion.	tests Production metrics Observation Projects.
3.3	Efficient and effective time management when applying	ve - Web survey Brainstorming Cooperative learning.	Achievement file.Peer assessment.	



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	acquired knowledge and skills.		Problem Solving.Project.Online discussion.	- Self-calendar



C. Course Content

No	List of Topics	Contact Hours
1.	 Counting Systems and Sets: Counting Systems: Decimal System. Binary System. Hexadecimal System. Converting Between Counting Systems. Computer Coding Systems: ASCII Code. EBCDIC Code. Unicode. 	9
2.	 Arithmetic Operations of Binary Systems: Binary Addition. Binary Subtraction. Binary Multiplication. Binary Division. 	6
3.	 Logic expressions and operations: The Concept of Logical Expressions. The Logical Operators: AND. OR. NOT. XOR. XNOR. NAND. NAND. NOR. 	9





	 Tautology and Contradiction. Logical Equivalence. Laws of Algebra: Commutative Laws. Associative Laws. Distributive Laws. Idempotent Laws. Identity Laws. Complement Laws. Double Negation Laws. De Morgan's Laws. 	11:7 A1:0
	 Absorption Laws. 	
	 Boolean Algebra and logic gates: Boolean Functions. 	
	Truth Tables.	
	o Logic Gates.	
4.	o Circuits Design Using Logic Gates.	9
	o Converting Truth Tables into Boolean Expressions.	
	o Converting Digital Circuits into Boolean Expressions.	
	o Minimization of Circuits.	
	Sets and Relations.	
5.	 Sets: Concept of Set Theory. Set Theory Symbols. Partly Set. Inclusion and Exclusion. Equality of Sets. Universal and Empty Sets. Operations on Sets: Union of Sets. Intersection of Sets. Complement of a Set. 	6
	Difference of Sets.Symmetric Difference.	



Total 36

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Exam	Week7	20%
2.	Quizzes (3 Quizzes)	Continuous	15%
3.	Assignments	Continuous	20%
4.	Participation	Continuous	5%
5.	Practical exercise	Week 11,12	10%
6.	Final Exam	Week13	30%

^{*}Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)







E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Discrete Mathematics and Its Applications 8th edition, By Kenneth Rosen, 2019, 8th Edition, ISBN13: 9781259676512	
Supportive References Mathematics for Computer Scientists, By Gareth J. Janacek, Ma Lemmon Close, 2011, ISBN 978-8776814267		
Electronic Materials Online resources will be provided during class lectures.		
Other Learning Materials	arning Materials N/A	

2. Required Facilities and equipment

Items	Resources	
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom, Computer lab	
Technology equipment (projector, smart board, software)	Data Show, Smart Board,	
Other equipment (depending on the nature of the specialty)	N\A	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Students feedback (collected through surveys) as per university policy/procedure Teacher's Course report
Effectiveness of students assessment	Faculty	Review of Course Reports Review of Student feedback
Quality of learning resources	Student and Faculty	Indirect using course evaluation and faculty survey
The extent to which CLOs have been achieved		
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)





Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

