هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

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.*

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	3				
2. Course type					
a.	University ☐	College ☒	Department☐	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered:	First Level				
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. 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.	Hybrid • Traditional classroom • E-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	Knowledge and understanding			
1.1	Describe the different numbering systems in computer science.	K1	- Lecture. - Discussion. - Survey. - Discovery learning. - Self-education. - Developed lecture. - Brainstorming. - Web survey. - KWL - Learning Schedule. - Mind maps. - Concept maps	- Traditional and online achievement tests. - Questions. - Assignments and assessments. - Presentations - Discussion and debates. - Cognitive performance tests. - Achievement file.
1.2	Identify the expressions, logic gates, and operations on them.	K2		
1.3	Define the concept of sets and operations and their properties.	K3		
2.0	Skills			
2.1	Ability to convert between different counting systems.	S1	- Demonstration. - Developed lecture. - Discovery learning. - Peer learning. - Self-education. - Discussion. - Web survey. - Brainstorming. - Cooperative learning. - Problem Solving. - Project. - Online discussion.	- Presentations - Rating ladders. - Performance tests. - Production metrics. - Observation. - Projects. - Achievement file. - Peer assessment. - Self-calendar
2.2	Perform various arithmetic operations on the binary system.	S4		
2.3	Apply essential logical operations to expressions and logic gates.	S3		
2.4	Design of logic circuits using logic gates.	S2		
2.5	Perform various operations on sets.	S4		
3.0	Values, autonomy, and responsibility			
3.1	Cooperation, teamwork, and professional ethics.	V1	- Demonstration. - Developed lecture. - Discovery learning. - Peer learning. - Self-education. - Discussion. - Web survey. - Brainstorming. - Cooperative learning.	- Presentations - Rating ladders. - Performance tests. - Production metrics. - Observation. - Projects. - Achievement file. - Peer assessment.
3.2	Take responsibility for continuous learning and continuing personal development.	V2		
3.3	Efficient and effective time management when applying	V3		

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:** o Counting Systems: ▪ Decimal System. ▪ Binary System. ▪ Hexadecimal System. ▪ Converting Between Counting Systems. o Computer Coding Systems: ▪ ASCII Code. ▪ EBCDIC Code. ▪ Unicode.	9
2.	• **Arithmetic Operations of Binary Systems:** o Binary Addition. o Binary Subtraction. o Binary Multiplication. o Binary Division.	6
3.	• **Logic expressions and operations:** o The Concept of Logical Expressions. o The Logical Operators: ▪ AND. ▪ OR. ▪ NOT. ▪ XOR. ▪ XNOR. ▪ 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. ▪ Absorption Laws.	
4.	• **Boolean Algebra and logic gates:** ○ Boolean Functions. ○ Truth Tables. ○ Logic Gates. ○ Circuits Design Using Logic Gates. ○ Converting Truth Tables into Boolean Expressions. ○ Converting Digital Circuits into Boolean Expressions. ○ Minimization of Circuits.	9
5.	• **Sets and Relations.** ○ 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. ▪ Difference of Sets. ▪ Symmetric Difference.	6

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, Mark Lemmon Close, 2011, ISBN 978-8776814267
Electronic Materials	Online resources will be provided during class lectures.
Other Learning 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	1. Students feedback (collected through surveys) as per university policy/procedure 2. Teacher's Course report
Effectiveness of students assessment	Faculty	1. Review of Course Reports 2. 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	