اعتماد
NCAAA

T4

2020

# Course Specifications

| **Course Title:** | Discreet Mathematics |
|---|---|
| **Course Code:** | 153 Math |
| **Program:** | **Bachelor's in Applied Computing** |
| **Department:** | Department of Natural & Engineering Sciences |
| **College:** | **Applied Studies and Community Service** |
| **Institution:** | **King Saud University** |
| **Credit Hours:** | **(3+0+2)** |
| **Lecture Time:** | **Tuesday  2.45-6.20 pm**<br> **Wednesday  2.45- 5.05 pm** |
| **Faculty Member** | **Obaid Algahtani**<br>**Ahmed Alsayed** |

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## Table of Contents

## A. Course Identification

| 1. **Credit hours:** |
|---|

**2. Course type**

a.      University [√]    College [√]    Department [√]      Others [ ]

b.      Required [ ]      Elective [ ]

**3. Level/year at which this course is offered:**    **3**

**4. Pre-requisites for this course** (if any)**:**

**5. Co-requisites for this course** (if any)**:**

### 6. Mode of Instruction (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|---|---|---|---|
| 1 | **Traditional classroom** | 50 | %50 |
| 2 | **Blended** | 50 | %50 |
| 3 | **E-learning** | | |
| 4 | **Distance learning** | | |
| 5 | **Other** | | |

### 7. Contact Hours (based on academic semester)

| No | Activity | Contact Hours |
|---|---|---|
| 1 | **Lecture** | 80 |
| 2 | **Laboratory/Studio** | |
| 3 | **Tutorial** | 20 |
| 4 | **Others** (specify) | |
| | **Total** | 100 |

## B. Course Objectives and Learning Outcomes

### 1. Course Description

Basic concepts of elementary logic: statements and statement forms, connectives, logical equivalence, truth tables; converse, inverse and contrapositive of a conditional statement. Tautologies and contradictions. Universal and existential statements. Boolean algebras: general definitions, Boolean functions, complete sum of products form, complete product of sums form. Karnaugh maps, minimal sum of products forms and minimal product of sums form. Gates and design of logic circuits. Graph theory: basic definitions and examples, paths, cycles, connected graphs, subgraphs. Regular, complete and bipartite graphs. Isomorphism of simple graphs. Trees, spanning trees. Counting Systems: Permutations and Combinations, Binomial Theorem. Sets Theorem

### 2. Course Main Objective

Learn specific math concepts and their applications in computer science

## 3. Course Learning Outcomes

| | CLOs | Aligned PLOs |
|---|---|---|
| 1 | **Knowledge and Understanding** | |
| 1.1 | Summarize the basic concepts of mathematical logic. | 1 |
| 1.2 | Representing groups and performing operations on them. | 2 |
| 1.3 | Learn the basic properties of Boolean algebra and Boolean functions. | 3 |
| 1... | Know the important typical applications of graph theory. | 4 |
| **2** | **Skills :** | |
| 2.1 | Summarize some basic concepts in graph theory, and some types of special graphs. | 5 |
| 2.2 | Summarize some concepts related to trees, spanning trees, and algorithms. | 6 |
| 2.3 | Draw and graphically represent trees | 7 |
| 2... | | |
| **3** | **Values:** | |
| 3.1 | Understand the value of mathematics in computer science | 8 |
| 3.2 | | |
| 3.3 | | |
| 3... | | |

## C. Course Content

| No | List of Topics | Contact Hours |
|---|---|---|
| 1 | **Introduction to Number Systems**<br>− Binary System (Binary to Decimal Conversion - Decimal to Binary Conversion – Arithmetic: addition, subtraction, multiplication)<br>− Octal Number System (Conversions and Arithmetic)<br>− Hexadecimal Number System (Conversions and Arithmetic) | ١٦ |
| 2 | **Logic**<br>− Proposition calculus and connectives<br>− Truth tables<br>− Propositional Equivalence | ١٦ |
| 3 | **Sets**<br>Set operations | ١٦ |
| 4 | **Boolean Algebra**<br>− Boolean Functions<br>− Representation Boolean Functions<br>− Logic Gates<br>− Minimization of Circuit | ١٦ |
| 5 | **Basic Concepts of Graph Theory**<br>− Graph Terminology and Special Types of Graphs | ١٦ |

| | | Connectivity | |
|---|---|---|---|
| ... | | | |
| **Total** | | | |

**Course Academic Calendar**

| Week | Basic and support material to be covered |
|---|---|
| (1) | Introduction to Number Systems: Binary System (Binary to Decimal Conversion |
| (2) | Introduction to Number Systems: Decimal to Binary Conversion – Arithmetic: addition, subtraction, multiplication),) |
| (3) | Introduction to Number Systems:, Octal Number System (Conversions and Arithmetic), Hexadecimal Number System (Conversions and Arithmetic) |
| (4) | Logic: Proposition calculus and connectives,, |
| (5) | Logic: Truth tables, Propositional Equivalence. |
| (6) | Sets: Set operations |
| (7) | Boolean Algebra: Boolean Functions, Representation Boolean Functions, |
| (8) | |
| (9) | Boolean Algebra: Logic Gates ,Minimization of Circuit |
| (10) | Basic Concepts of Graph Theory: Graph Terminology and Special Types of Graphs ,**Connectivity** |

## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|---|---|---|---|
| **1.0** | **Knowledge and Understanding** | | |
| 1.1 | Summarize the basic concepts of mathematical logic. | Lecture | Quiz |
| 1.2 | Representing groups and performing operations on them. | Discussion | Paper Creativity |
| … | Learn the basic properties of Boolean algebra and Boolean functions. | collaborative work | Paper Creativity |
| | Know the important typical applications of graph theory. | Brainstorming | Paper Creativity |
| | | | |
| | | | |
| **2.0** | **Skills** | | |
| 2.1 | Summarize some basic concepts in graph theory, and some types of special graphs. | participatory learning | Paper Creativity |
| 2.2 | Summarize some concepts related to trees, spanning trees, and algorithms. | participatory learning | Paper Creativity |
| … | Draw and graphically represent trees | | |

**Course Specifications**

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|------|--------------------------|---------------------|---------------------|
| **3.0** | **Values** | | |
| 3.1 | Understand the value of mathematics in computer science | Project | Paper Creativity |
| 3.2 | | | |
| … | | | |

## 2. Assessment Tasks for Students

| # | Assessment task* | Week Due | Percentage of Total Assessment Score |
|---|------------------|----------|--------------------------------------|
| 1 | Quizzes, Homework, Projects | End of Lecture | %35 |
| 2 | Midterm Examination | MD1 | %25 |
| 3 | Final Exam | End of Semester | %40 |
| 4 | | | 100 |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

# E. Student Academic Counseling and Support

**Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :**
Students were given academic guidance, support and feedback at the end of each lecture and exam

# F. Learning Resources and Facilities

## 1.Learning Resources

| | |
|---|---|
| **Required Textbooks** | • K. Rosen, Discrete Mathematics and Its Applications, 7th edition<br>• R.P. Grimaldi; Addison-Wesley. Discrete and combinatorial mathematics: an applied introduction<br>معروف سـمحان، أحمد شـراري (١٤٢٦). الرياضـيات المتقطعة. دار الخريجي للنشـر والتوزيع، الرياض. |
| **Essential References Materials** | |
| **Electronic Materials** | **1. http://www.wikihow.com/Convert-from-Binary-to-Decimal**<br>**2. http://www.cci-compeng.com/Unit_1_Representing_Data/1309_Fractions.htm**<br>**3. http://syedatnsu.tripod.com/chap1.pdf**<br>**4. Digital logic and computer design, Morris mano:** |
| **Other Learning Materials** | |

## 2. Facilities Required

| Item | Resources |
|---|---|
| **Accommodation**<br>(Classrooms, laboratories, demonstration rooms/labs, etc.) | |
| **Technology Resources**<br>(AV, data show, Smart Board, software, etc.) | |
| **Other Resources**<br>(Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | |

## G. Course Quality Evaluation

| Evaluation Areas/Issues | Evaluators | Evaluation Methods |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
**Assessment Methods** (Direct, Indirect)
**Attendance Policy:**

Absence from lectures and/or tutorials shall not exceed 25%. Students who exceed the 25% limit without an accepted medical or emergency excuse shall not be allowed to take the final examination and shall receive a grade of "DN" for the course.

## H. Specification Approval Data

| Council / Committee | |
|---|---|
| **Reference No.** | |
| **Date** | |

**Course Specifications**