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| **Course Title:** | **Discrete Mathematics** |
| **Course Code:** | **283MATH-3** |
| **Program:** | **Computer Science + Information System** |
| **Department:** | **Computer Science + Information Systems** |
| **College:** | **Computer Science and Information Systems** |
| **Institution:** | **Najran University** |

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# Course Identification

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| --- |
| **1. Credit hours:** |
| **2. Course type** |
| **a.** | University | College | **√** | Department |  | Others |
| **b.** | Required | **√** | Elective |  |  |
| **3. Level/year at which this course is offered:** | **4** | **/ 2** |  |
| **4. Pre-requisites for this course** (if any)**:** |
| **5. Co-requisites for this course** (if any)**:** Non |

1. **Mode of Instruction** (mark all that apply)

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Mode of Instruction** | **Contact Hours** | **Percentage** |
| **1** | **Traditional classroom** | **3** | 100% |
| **2** | **Blended** | --- | --- |
| **3** | **E-learning** | --- | --- |
| **4** | **Correspondence** | --- | --- |
| **5** | **Other** | --- | --- |

1. **Actual Learning Hours** (based on academic semester)

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Activity** | **Learning Hours** |  |
| **Contact Hours** |
| **1** | **Lecture** | 45 |
| **2** | **Laboratory/Studio** | **---** |  |
| **3** | **Tutorial** | --- |  |
| **4** | **Others** (specify) | --- |
|  | **Total** | 48 |
| **Other Learning Hours\*** |
| **1** | **Study** | 30 |
| **2** | **Assignments** | 15 |
| **3** | **Library** | 10 |
| **4** | **Projects/Research Essays/Theses** | --- |
| **5** | **Office hours** | 10 |
|  | **Total** | 110 |

**\*** The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

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# Course Objectives and Learning Outcomes

|  |
| --- |
| **1. Course Description**This course introduces Numbers system, Logic: Conjunctions, logical equivalence and arguments; Methods of proofs, Sets, operations on sets, Cartesian products. Relations: Equivalence relations, Order relations, Functions, Counting principles, Permutations and Combinations. It also covers Trees: Tree diagrams, Types of trees, Graphs: Undirected graphs, Directed graphs, Adjacency matrix for directed graph, Planar graphs, and Isometry. |
| **2. Course Main Objective** |
| Understanding numbers systems; Logic: Conjunctions, logical equivalence and arguments; Methods of proofs. Sets, operations on sets, Cartesian products. Know relations: Equivalence relations, Order relations, Functions, Counting principles, Permutations and Combinations. Recognize trees: Tree diagrams, Types of trees. Finally, Understand graphs: Undirected graphs, Directed graphs, Adjacency matrix for directed graph, Planar graphs, Isometry. |

## 3. Course Learning Outcomes

|  |  |
| --- | --- |
| **CLOs** | **Aligned PLOs** |
| 1 | **Knowledge:** |
| 1.1 | Describe mathematical structures and to distinguish between them. |  |
| 1.2 | Know methods of mathematical proof and graphs(plans) and their types. |  |
|  |  |  |
| 1... |  |  |
| **2** | **Skills :** |
| 2.1 | Explain how students apply the relationships and logic diagrams (data). |  |
| 2.2 | Determine the types of relationships and graphs and methods of proofs. |  |
| 2.3 |  |  |
| 2... |  |  |
| **3** | **Competence:** |
| 3.1 | Work effectively with in groups and independently |  |
| 3.2 | Apply critical thinking, communication skills and mathematical techniques in solving many problems . |  |
| 3.3 |  |  |
| 3... |  |  |

# Course Content

|  |  |  |
| --- | --- | --- |
| **No** | **List of Topics** | **Contact Hours** |
| 1 | Numbers systems | 6 |
| 2 | Logic: Conjunctions, logical equivalence and arguments; Methods of proofs. | 6 |
| 3 | Sets, operations on sets, Cartesian products. Relations: Equivalence relations, Order relations, Functions | 12 |
| 4 | Types of trees, Graphs: Undirected graphs, Directed graphs, Adjacency matrix for directed graph, Planar graphs, Isometry. | 9 |
| 5 | Counting principles, Permutations and Combinations, Trees: Tree diagrams and Binomial theorem. | 12 |
| ... |  |  |

**4**

**Total**

**45**

# Teaching and Assessment

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Course Learning Outcomes** | **Teaching Strategies** | **Assessment Methods** |
| **1.0** | **Knowledge** |
| 1.1 | Describe mathematical structures and to distinguish between them. | * Lecture
* Discussions
 | * Quiz
* Written Exam
 |
| 1.2 | Know methods of mathematical proof and graphs(plans) and their types. | * Lecture
* Discussions
 | * Quiz
* Written Exam
 |
| … | --- | --- | --- |
| **2.0** | **Skills** |
| 2.1 | Explain how students apply the relationships and logic diagrams (data). | **-** Identify induced sub graphs, and proper sub graphs | * Lecture
* Discussions
 |
| 2.2 | Determine the types of relationships and graphs and methods of proofs. | **-** Solve problems involving first and second fundamentalforms. | * Lecture
* Discussions
 |
| … | --- | --- | --- |
| **3.0** | **Competence** |
| 3.1 | Work effectively with in groups and independently | * Solve exercises through individual work and groups.
* Lectures,

discussion | **-** Solving exercise* Oral Exam
 |
| 3.2 | Apply critical thinking, communication skills and mathematical techniques in solving many problems  |
| … | --- | --- | --- |

## Assessment Tasks for Students

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Assessment task\*** | **Week Due** | **Percentage of Total Assessment Score** |
| **1** | Exercises, Homework& Assignments | Open | 10% |
| **2** | Oral Exam and Rubrics | 14th Week | 5% |
| **3** | Quizzes | Open | 5% |
| **4** | Written Test(1) | 7th Week | 15% |
| **5** | Written Test(2) | 13th Week | 15% |
| **6** | Final Exam | End of Semester | 50% |

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

# Student Academic Counseling and Support

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| --- |
| **Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :** |
| * Introducing the course syllabus, grading scale and the distribution of marks for the course in the first lecture of the course.
* Arrangements for availability of teaching staff for individual student consultations and academic
 |

advice (include amount of time teaching staff are expected to be available each week).

* + Office hours for a teaching staff for one hour weekly.

# Learning Resources and Facilities

## Learning Resources

|  |  |
| --- | --- |
| **Required Textbooks** | **-** K. H. Rosen, Discrete Mathematics and its Applications, McGraw- Hill, 5th Edition (2004). |
| **Essential References Materials** | * S. S. Epp, Discrete Mathematics with Applications, PWS-Cant Pub. Co., 1990.
* L. Lesniak, Discrete Structures, Logic, and Computability, Jones and Bartlett.
 |
| **Electronic Materials** | * Richard Johnsonburg, Discrete Mathematics, Prentice Hall, 6th Edition (2004).
* K. Devlin, Sets, Functions and Logic, Chapman and Hall, (1995).
 |
| **Other Learning Materials** | **-** Matlab software |

## Facilities Required

|  |  |
| --- | --- |
| **Item** | **Resources** |
| **Accommodation**(Classrooms, laboratories, demonstration rooms/labs, etc.) | Lecture Hall by the number of seats = 30 seat approximately. |
| **Technology Resources**(AV, data show, Smart Board, software, etc.) | * Datashow
* Smart Board
* Wi Fi
 |
| **Other Resources**(Specify, e.g. if specific laboratoryequipment is required, list requirements or attach a list) | * None
 |

# Course Quality Evaluation

|  |  |  |
| --- | --- | --- |
| **Evaluation Areas/Issues** | **Evaluators** | **Evaluation Methods** |
| Student course evaluation survey at the end of semester. | Students | Questionnaire (Indirect) |
| Effectiveness of teaching and assessment | Peer Reviewer | Rubrics (Indirect) |
| --- | --- | --- |
| --- | --- | --- |
| --- | --- | --- |
| --- | --- | --- |
| --- | --- | --- |

**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)

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**Assessment Methods** (Direct, Indirect)

# Specification Approval Data

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| --- | --- |
| **Council / Committee** | Department Council  |
| **Reference No.** | Session No. 10 (441-38-43300) |
| **Date** | 17/2/2020 |

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