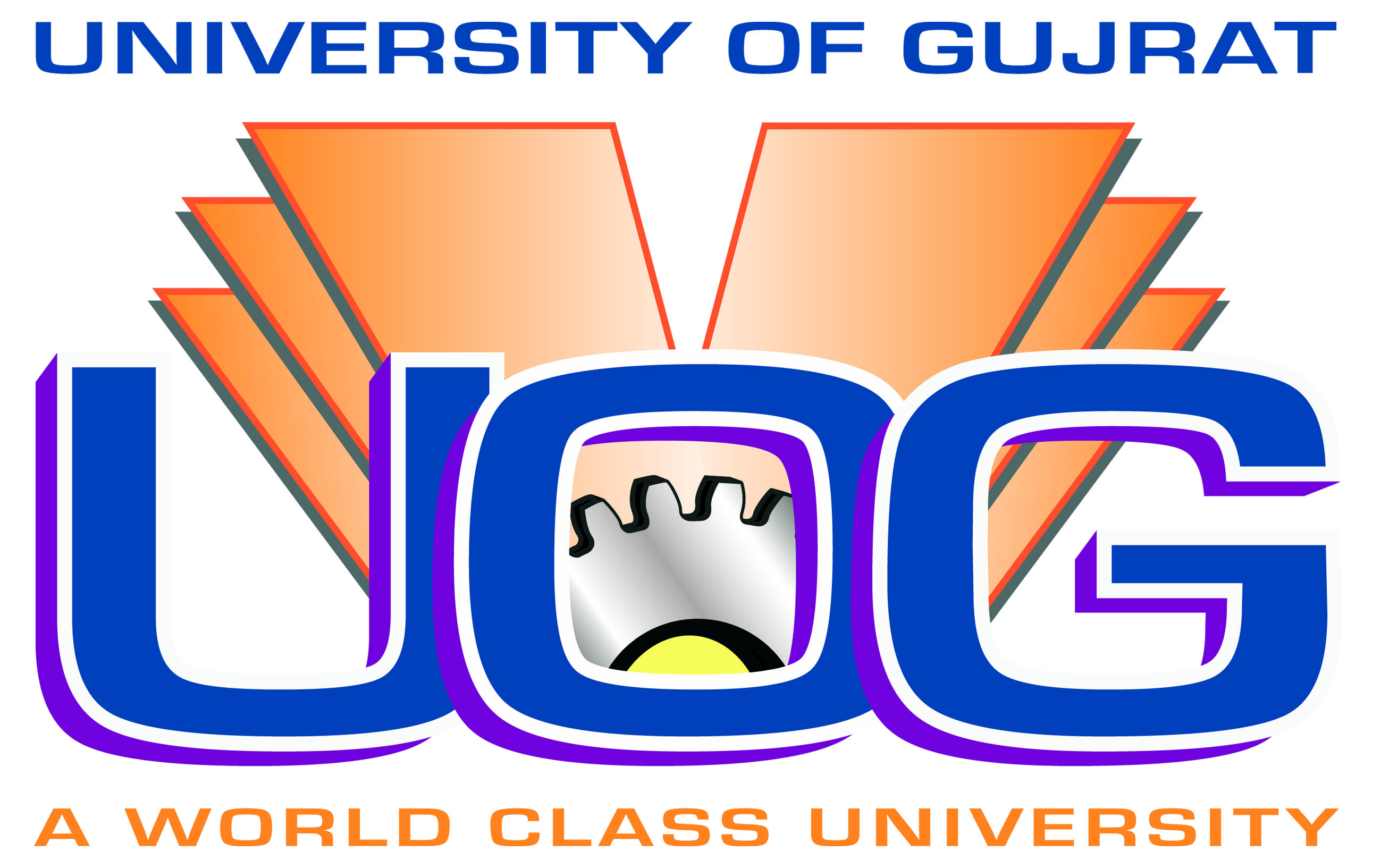
University of Gujrat



A World Class University

**Teacher Description**

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| **Course Coordinator** |  |
| **Teacher name** |  |
| **E-mail addres** |  |
| **Phone number** |  |
| **Course Description** | |
| **Course Code** | CS-261 |
| **Course Title** | Discrete Structures |
| **Credit Hours** | 03 |
| **Category** | Computing Core Course |
| **Prerequisite** | None |
| **Amis and Objectives** | Introduces the foundations of discrete mathematics as they apply to Computer Science, focusing on providing a solid theoretical foundation for further work. Further, this course aims to develop understanding and appreciation of the finite nature inherent in most Computer Science problems and structures through study of combinatorial reasoning, abstract algebra, iterative procedures, predicate calculus, tree and graph structures. In this course more emphasis shall be given to statistical and probabilistic formulation with respect to computing aspects. |
| **Learning Outcomes** | One can apply the rules of Discrete Mathematics to Computer Science. |
| **Course Outline / Syllabus** | Introduction to logic and proofs: Direct proofs; proof by contradiction, Sets, Combinations, Sequences, Formal logic, Prepositional and predicate calculus, Methods of Proof, Mathematical Induction and Recursion, loop invariants, Relations and functions, Pigeonhole principle, Trees and Graphs, Elementary number theory, Optimization and matching. Fundamental structures: Functions; relations (more specifically recursions); pigeonhole principle; cardinality and countability, probabilistic methods. |
| **Text Book** | Kenneth H, *Discrete Mathematics and Its Applications*, 7TH edition. |
| **Reference Material** | 1. Richard Johnson Baugh, *Discrete Mathematics,* 7TH edition, 2008, Prentice Hall Publishers. 2. Kolman, Busby & Ross, *Discrete Mathematical Structures*, 4th edition, 2000, Prentice-Hall Publishers. 3. Ralph P. Grimaldi, *Discrete and Combinatorial Mathematics: An Applied Introduction*, Addison-Wesley Pub. Co., 1985. |
| **Assessment Criteria** | 5% weightage of Quiz, 10 % weightage of Assignments and 10% weightage of Presentation.  25 % weightage of Mid Term Exam and 50 % weightage of Final Exam. |

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| ***Marks in Percentage*** | ***Letter Grade*** | ***Numeric value of Grade*** | ***Description*** |
| 85+ | A+ | 4.00 | Exceptional |
| 80-84 | A | 3.70 | Outstanding |
| 75-79 | B+ | 3.40 | Excellent |
| 70-74 | B | 3.00 | Very Good |
| 65-69 | B- | 2.50 | Good |
| 60-64 | C+ | 2.00 | Average |
| 55-59 | C | 1.50 | Satisfactory |
| 50-54 | D | 1.00 | Pass |
| 49 and below | F | 0.0 | Fail |
|  | W |  | Withdrawal |
|  | I |  | Incomplete |

***Grading System***

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| **Week** | **Lecture** | **Topic** | **Source**  **(Book-Chapter No. Section No.)** | **Recommendations for Learning Activities**  **(Mention Assignments, Test, Quizzes,**  **Practical, Case Study, Projects, Lab Work**  **or Reading Assignments)** |
| 1 | 1 | * Sets, Methods to represent them. | Kenneth H, *Discrete Mathematics and Its Applications*, 7TH edition, Chapter # 02, Sec 2.1, Exercise 2.1 |  |
| 2 | * Set Operations | Chapter # 02, Sec 2.2, Exercise 2.2 | Assignment will be given to students |
| 2 | 3 | * Functions, Domain and Range, One to One, Onto and Bijective Functions | Chapter # 02, Sec 2.3, Exercise 2.3 |  |
| 4 | * Relations, Inverse and Composition of functions. Some important Functions, Quiz | Chapter # 02, Sec 2.3, Exercise 2.3 | Quiz |
| 3 | 5 | * Sequences | Chapter # 02, Sec 2.5, Exercise 2.5 |  |
| 6 | * Summations | Chapter # 02, Sec 2.5, Exercise 2.5 | Assignment will be given to students |
| 4 | 7 | * Introduction to Logics. | Chapter # 01, Sec 1.1, Exercise 1.1 |  |
| 8 | * Quiz |  | Quiz |
| 5 | 9 | * Propositions and Predicates | Chapter # 01, Sec 1.1, Exercise 1.1 |  |
| 10 | * Logical Operators | Chapter # 01, Sec 1.2, Exercise 1.2 |  |
| 6 | 11 | * Propositional Equivalences | Chapter # 01, Sec 1.3, Exercise 1.3 | Assignment will be given |
| 12 | * Predicates and Quantifiers | Chapter # 01, Sec 1.3, Exercise 1.3 |  |
| 7 | 13 | * Quiz |  | Quiz |
| 14 | * Rules of Inference | Chapter # 01, Sec 1.4, Exercise 1.4 |  |
| 8 | 15 | * Rules of Inference | Chapter # 01, Sec 1.4, Exercise 1.4 |  |
| 16 | * Mid Term exam |  | Objective and Subjective |
| 9 | 17 | * Methods of proofs | Chapter # 01, Sec 1.6, Exercise 1.6 |  |
| 18 | Direct Proofs, proofs by contradiction | Chapter # 01, Sec 1.6, Exercise 1.6 | Assignment will be given to students |
| 10 | 19 | * Algorithms | Chapter # 03, Sec 3.1 |  |
| 20 | Searching Algorithms and Sorting Algorithms | Chapter # 03, Sec 3.1 |  |
| 11 | 21 | * Quiz |  | Quiz |
| 22 | * Graphs | Chapter # 08, Sec 8.1 |  |
| 12 | 23 | * Graph Terminologies and some special types of graphs | Chapter # 08, Sec 8.2 | Assignment will be given to students |
| 24 | * Representing Graphs, Quiz | Chapter # 08, Sec 8.3 | Quiz |
| 13 | 25 | * Connectivity of Graphs | Chapter # 08, Sec 8.4 |  |
| 26 | * Shortest Path Algorithm | Chapter # 08, Sec 8.6 |  |
| 14 | 27 | * Quiz |  | Quiz |
| 28 | * Pigeonhole Principal |  |  |
| 15 | 29 | * Mathematical Induction and recursion | Chapter # 04, Sec 4.1, Exercise 4.1 | Assignment will be given to students |
| 30 | * Mathematical Induction and recursion | Chapter # 04, Sec 4.1, Exercise 4.1 |  |
| 16 | 31 | * Problems |  |  |
| 32 | * Revision of Course |  |  |