Indira Gandhi University, Meerpur, Rewari  
SCHEME OF STUDIES AND EXAMINATION  
B.TECH (Computer Science and Engineering)  
SEMESTER 3\(^{rd}\) & 4\(^{th}\)  
Scheme effective from 2019-20

### COURSE CODE AND DEFINITIONS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Definition</th>
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<tr>
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<td>Humanities and Social Sciences including Management courses</td>
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Seminar
Max. Marks-25
Every candidate will have to deliver a seminar of 30 minutes duration on a topic (not from the syllabus) which will be chosen by him/her in consultation with the teacher of the department. The seminar will be delivered before the students and teachers of the department. A three member committee (one coordinator and two teachers of the department of different branches) duly approved by the departmental council will be constituted to evaluate the seminar. The following factors will be taken into consideration while evaluating the candidate.
Distribution of marks will be as follows:
1. Presentation 10 marks
2. Depth of the subject matter 10 marks
3. Answers to the questions 05 marks
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**Total** | 23 | 775

*MC-106 is a mandatory non-credit course in which the students will be required passing marks in theory.

**NOTE:** At the end of 4th semester each student has to undergo Practical Training of 4/6 weeks in an Industry/Institute/Professional Organization/Research Laboratory/training centre etc. and submit typed report along with a certificate from the organization & its evaluation shall be carried out in the 5th Semester.
Database Management System

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**Objectives of the course**

a. To understand the different issues involved in the design and implementation of a database system.
b. To study the physical and logical database designs, database modeling, relational, hierarchical, and network models
c. To understand and use data manipulation language to query, update, and manage a database
d. To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
e. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

**Note:** Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

**Unit: 1**

*Database system architecture:* Data Abstraction, Data Independence, Data Definition Language(DDL), Data Manipulation Language(DML).*Data models:* Entity-relationship model, network model, relational and object-oriented data models, integrity constraints, data manipulation operations.

**Unit: 2**

*Relational query languages:* Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server.

*Relational database design:* Domain and data dependency, Armstrong’s axioms, Normal forms, Dependency preservation, Lossless design.
Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.

Unit: 3

Storage strategies: Indices, B-trees, hashing,

Transaction processing: Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.

Unit: 4


Advanced topics: Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining.

Suggested books:
2. Introduction to Database Management System, Satinder Bal Gupta, Aditya Mittal, University Science Press, New Delhi.

Suggested reference books
Data Structure & Algorithms

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Objectives of the course:

1. To impart the basic concepts of data structures and algorithms.
   - To understand concepts about searching and sorting techniques
   - To understand basic concepts about stacks, queues, lists, trees and graphs.
   - To enable them to write algorithms for solving problems with the help of fundamental data structures

Unit 1:

Unit 2:
Stacks and Queues: Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation - corresponding algorithms and complexity analysis. queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.

Unit 3:
Linked Lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, Doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithms and the complexity analysis.
Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with
complexity analysis. Applications of Binary Trees. B Tree, B+ Tree: definitions, algorithms and analysis.

Unit 4:
**Sorting and Hashing**: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Merge Sort, Heap Sort; Performance and comparison among all the methods.

**Graph**: Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

**Suggested books**:
1. Data Structures using C & C++ : by Shukla, Wiley India Ltd.
3. Data Structures, 2ed by Venkatesan, Wiley India Ltd.

**Suggested reference books**:
2. Data Structures & Algorithms in Java, 6ed by Goodrich, Wiley India Ltd.
3. “How to Solve it by Computer”, 2nd Impression by R.G. Dromey, Pearson Education.
4. C & Data Structures by Deshpande, Wiley India Ltd.
DIGITAL ELECTRONICS

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UNIT1:
FUNDAMENTALS OF DIGITAL SYSTEMS AND LOGIC FAMILIES
Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one’s and two’s complements arithmetic, codes, error detecting and correcting codes.

UNIT2:
COMBINATIONAL DIGITAL CIRCUITS
Standard representation for \( K \)-functions using K-map, Don’t care conditions, Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, carry look serial adder, ALU, elementary ALU design, popular MSI chips, digital comparator, parity checker/generator, code converters, priority encoders, decoders/drivers for display devices, Q-M method of function realization.

UNIT3:
SEQUENTIAL CIRCUITS AND SYSTEMS
A1-bit memory, the circuit properties of Bi stable latch, the clocked SR flip flop, J-K-T and D types flip flops, applications of flip flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple (Asynchronous) counters, synchronous counters, counters design using flip flops, special counter IC’s, asynchronous sequential counters, applications of counters.
UNIT 4:
A/D AND D/A CONVERTERS
Digital to analog converters: weighted resistor/converter, R-2RLadder D/A converter, specifications for D/A converters, examples of D/A converter ICs, sample and hold circuit, Analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter,

SEMICONDUCTOR MEMORIES AND PROGRAMMABLE LOGIC DEVICES
Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory (RAM), content addressable memory (CAM), ROM as a PLD, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA).

REFERENCES:
1. Digital Electronics: Principles and Integrated Circuits: by Maini, Wiley India Ltd.
Python Programming

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**Objectives of the course:**

- To impart the basic concepts of Python programming.
- To understand syntax of Python language.
- To create dynamic applications in Python language.
- To implement object oriented concepts using Python language.

**Detailed contents:**

**Unit 1:**
**Introduction:** Fundamental ideas in computer science; modern computer systems, installing Python; basic syntax, interactive shell, editing, saving, and running a script; The concept of data types; variables, assignments; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages; Control statements: if-else, loops (for, while)

**Unit 2:**
**Strings, text files:** String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Binary, octal, hexadecimal numbers; text files: reading/writing text and numbers from/to a file; creating and reading a formatted file (csv or tab-separated).

**Unit 3:**
Lists, dictionary and Design with functions: Basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding, and removing keys, accessing and replacing values; traversing dictionaries. Hiding redundancy, complexity; arguments and return values; Program structure and design. Recursive functions.

Unit 4:
Object Oriented concepts: Classes and OOP: classes, objects, attributes and methods; defining classes; design with classes, data modelling; persistent storage of objects, Inheritance, polymorphism, operator overloading; abstract classes; exception handling, try block.

Suggested books:

Suggested reference books:
Mathematics-III (Multivariable Calculus and Differential Equations)

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**Unit-I**

**Multivariable Differential Calculus:** Limit, Continuity and Partial derivatives, Homogeneous functions, Euler’s Theorem, Total derivative, Maxima, Minima and Saddle points, Lagrange’s method of undetermined multipliers

**Unit-II**

**Multivariable Integral Calculus:** Double integral, Change of order of integration, Change of variables, Applications of double integral to find area enclosed by plane curves, Triple integral

**Unit-III**

**Ordinary Differential Equations of first order:** Linear and Bernoulli’s equations, Exact differential equations, Equations reducible to exact differential equations, Applications of differential equations of first order and first degree to simple electric circuits, Newton’s law of cooling, Heat flow and Orthogonal trajectories

**Unit-IV**

**Ordinary Differential equations of second and higher order:** Linear differential equations of second and higher order, Complete solution, Complementary function and Particular integral, Method of variation of parameters to find particular integral, Cauchy’s and Legendre’s linear equations, Simultaneous linear differential equations with constant coefficients, Applications of linear differential equations to oscillatory electric circuits
Reference Books:
7. S. L. Ross, Differential Equations, Wiley India.
Course Objectives:
1. Acquaint the student to basic concepts of economics and their operational significance.
2. To stimulate the students to think systematically and objectively about contemporary economic problems.

UNIT-1
Definition of Economics- Various definitions, types of economics- Micro and MacroEconomics, nature of economic problem, Production Possibility Curve, Economic laws and their nature, Relationship between Science, Engineering, Technology and Economic Development.

Demand- Meaning of Demand, Law of Demand, Elasticity of Demand- meaning, factors effecting it, its practical application and importance.

UNIT 2
Production- Meaning of Production and factors of production, Law of variable proportions, and Returns to scale, Internal external economies and diseconomies of scale. Various concepts of cost of production- Fixed cost, Variable cost, Money cost, Realcost, Accounting cost, Marginal cost, Opportunity cost. Shape of Average cost, Marginal cost, Total cost etc. in short run and long run.

UNIT-3
Market- Meaning of Market, Types of Market- Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly (main features).
Supply- Supply and law of supply, Role of demand & supply in price determination and effect of changes in demand and supply on prices.

UNIT-4
Indian Economy- Nature and characteristics of Indian economy as under developed, developing and mixed economy (brief and elementary introduction), Privatization - meaning, merits and demerits. Globalization of Indian economy - merits and demerits.


REFERENCES:
2. Fundamentals of Engineering Economics by Kumar, Wiley India Pvt. Ltd.
5. H. L. Ahuja, Modern Economic Theory, S. Chand.
8. Singh Jaswinder, Managerial Economics, dreamtechpress.
Database Management System Lab

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### Course Objectives:
- Keep abreast of current developments to continue their own professional development
- To engage themselves in lifelong learning of Database management systems theories and technologies this enables them to pursue higher studies.
- To interact professionally with colleagues or clients located abroad and the ability to overcome challenges that arises from geographic distance, cultural differences, and multiple languages in the context of computing.
- Develop team spirit, effective work habits, and professional attitude in written and oral forms, towards the development of database applications.

### Contents:
1. Creation of a database and writing SQL queries to retrieve information from the database.
2. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.
3. Creation of Views, Synonyms, Sequence, Indexes, Save point.
4. Creating an Employee database to set various constraints.
5. Creating relationship between the databases.
7. Write a PL/SQL block to satisfy some conditions by accepting input from the user.
8. Write a PL/SQL block that handles all types of exceptions.
10. Creation of database triggers and functions
11. Mini project (Application Development using Oracle/ MySQL)
   a) Inventory Control System
   b) Material Requirement Processing.
   c) Hospital Management System.
   d) Railway Reservation System.
   e) Personal Information System.
   f) Web Based User Identification System.
   g) Time Table Management System.
   h) Hotel Management
Digital Electronics Lab

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Implementation all experiments with help of Bread-Board.

1. Study of Logic Gates: Truth-table verification of OR, AND, NOT, XOR, NAND and NOR gates; Realization of OR, AND, NOT and XOR functions using universal gates.
2. Half Adder / Full Adder: Realization using basic and XOR gates.
4. 4-Bit Binary-to-Gray & Gray-to-Binary Code Converter: Realization using XOR gates.
5. 4-Bit and 8-Bit Comparator: Implementation using IC7485 magnitude comparator chips.
8. Flip Flops: Truth-table verification of JK Master Slave FF, T-type and D-type FF.
9. Asynchronous Counter: Realization of 4-bit up counter and Mod-N counter.
10. Synchronous Counter: Realization of 4-bit up/down counter and Mod-N counter.
13. ADC Operations: Study of 8-bit ADC
Data Structures and Algorithms Lab Using C

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Data Structures Lab List of practical exercises, to be implemented using object-oriented approach in C++ Language.

1. Write a menu driven program that implements following operations (using separate functions) on a linear array:
   - Insert a new element at end as well as at a given position
   - Delete an element from a given whose value is given or whose position is given
   - To find the location of a given element
   - To display the elements of the linear array

2. Write a menu driven program that maintains a linear linked list whose elements are stored in on ascending order and implements the following operations (using separate functions):
   - Insert a new element
   - Delete an existing element
   - Search an element
   - Display all the elements

3. Write a program to demonstrate the use of stack (implemented using linear array) in converting arithmetic expression from infix notation to postfix notation.

4. Program to demonstrate the use of stack (implemented using linear linked lists) in evaluating arithmetic expression in postfix notation.

5. Program to demonstration the implementation of various operations on a linear queue represented using a linear array.

6. Program to demonstration the implementation of various operations on a circular queue represented using a linear array.

7. Program to demonstration the implementation of various operations on a queue represented using a linear linked list (linked queue).
8. Program to illustrate the implementation of different operations on a binary search tree.
9. Program to illustrate the traversal of graph using breadth-first search
10. Program to illustrate the traversal of graph using depth-first search.
11. Program to sort an array of integers in ascending order using bubble sort.
13. Program to sort an array of integers in ascending order using insertion sort.
14. Program to sort an array of integers in ascending order using radix sort.
15. Program to sort an array of integers in ascending order using merge sort.
16. Program to sort an array of integers in ascending order using quick sort.
17. Program to sort an array of integers in ascending order using heap sort.
18. Program to sort an array of integers in ascending order using shell sort.
19. Program to demonstrate the use of linear search to search a given element in an array.
20. Program to demonstrate the use of binary search to search a given element in a sorted array in ascending order.
Python Programming Lab

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Objectives

- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, and dictionaries.
- Read and write data from/to files in Python.

List of Programs

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton’s method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. Merge sort
8. First n prime numbers
9. Multiply matrices
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file
12. Simulate elliptical orbits in Pygame
13. Simulate bouncing ball using Pygame
Discrete Mathematics

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**Unit-I**


**Unit-II**

**Basic Counting Techniques and Recurrence Relation:** Pigeon-hole principle, Permutation and Combination, the Division algorithm: Prime Numbers, The GCD: Euclidean Algorithm, The Fundamental Theorem of Arithmetic., Linear recurrence relation with constant coefficients, Homogenous Solutions, Particular Solutions, Total Solutions, Solving recurrence relation using generating functions
Unit-III

**Algebraic Structures:** Definitions and examples of Algebraic Structures with one Binary Operation: Semi Groups, Monoids, Groups; Congruence Relation and Quotient Structures, Permutation Groups, Cyclic groups, Normal Subgroups, Definitions and examples of Algebraic Structures with two Binary Operation: Rings, Integral Domain, Fields; Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form

Unit-IV

**Graphs and Trees:** Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Bi-connected component and Articulation Points, Isomorphism, Multigraph and Weighted graph, Shortest path in Weighted graphs, Eulerian paths and circuits, Hamiltonian path and circuits, Planar Graphs, Euler’s formulae, Graph Colouring, Trees, Binary trees and its traversals, Trees Sorting, Spanning tree, Minimal Spanning tree

Reference Books:
5. Discrete Mathematics, SemyourLipschutz and Marc Lipson, Schaum's outline
Computer Organization & Architecture

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**Objectives of the course:**

To expose the students to the following:
- How Computer Systems work & the basic principles
- Instruction Level Architecture and Instruction Execution
- The current state of art in memory system design
- How I/O devices are accessed and its principles.
- To provide the knowledge on Instruction Level Parallelism
- To impart the knowledge on micro programming
- Concepts of advanced pipelining techniques.

**Unit 1**

**Functional blocks of a computer:** CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU–registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some common CPUs.

**Data representation:** signed number representation, fixed and floating point representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-and add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic.
Unit 2

Introduction to x86 architecture.

CPU control unit design: hardwired and micro-programmed design approaches, Case study – design of a simple hypothetical CPU.

Memory system design: semiconductor memory technologies, memory organization.

Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers–program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes–role of interrupts in process state transitions, I/O device interfaces – SCII, USB

Unit 3

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards.

Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency.

Unit 4

Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies.

Suggested books:

2) Computer System Architecture and Organization: by Usha, Wiley India Ltd.

Suggested reference books:

Operating System

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UNIT 1:


Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non-pre-emptive, FCFS, SJF, SRTF, RR Scheduling

UNIT 2:
Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion, The Producer\Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader’s & Writer Problem, Dinning Philosopher Problem etc.

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, and Deadlock Avoidance: Banker’s algorithm, Deadlock detection and Recovery.

UNIT 3:
Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External
fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging.


UNIT 4:
I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, Secondary-Storage Structure: Disk structure, Disk scheduling algorithms


Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks. Case study on UNIX and WINDOWS Operating System.

Suggested books:

Suggested reference books:
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates
Object Oriented Programming

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**Unit - I**

**Object-Oriented Programming Concepts:** Introduction, comparison between procedural programming paradigm and object-oriented programming paradigm, basic concepts of object-oriented programming — concepts of an object and a class, interface and implementation of a class, operations on objects, relationship among objects, abstraction, encapsulation, data hiding, inheritance, overloading, polymorphism, messaging.

**Classes and Objects:** Specifying a class, creating class objects, accessing class members, access specifiers, static members, use of const keyword, friends of a class, empty classes, nested classes, local classes, abstract classes, container classes, bit fields and classes.

**Unit - II**

**Inheritance:** Introduction, defining derived classes, forms of inheritance, ambiguity in multiple and multipath inheritance, virtual base class, object slicing, overriding member functions, object composition and delegation, order of execution of constructors and destructors.

**Pointers and Dynamic Memory Management:** Declaring and initializing pointers, accessing data through pointers, pointer arithmetic, memory allocation (static and dynamic), dynamic memory management using new and delete operators, pointer to an object, this pointer, pointer related problems - dangling/wild pointers, null pointer assignment, memory leak and allocation failures.
Unit - III

Constructors and Destructors: Need for constructors and destructors, copy constructor, dynamic constructors, explicit constructors, destructors, constructors and destructors with static members, initializer lists.

Operator Overloading and Type Conversion: Overloading operators, rules for overloading operators, overloading of various operators, type conversion - basic type to class type, class type to basic type, class type to another class type.

Virtual functions & Polymorphism: Concept of binding - early binding and late binding, virtual functions, pure virtual functions, abstract classes, virtual destructors.

Unit - IV

Exception Handling: Review of traditional error handling, basics of exception handling, exception handling mechanism, throwing mechanism, catching mechanism, rethrowing an exception, specifying exceptions.

Templates and Generic Programming: Template concepts, Function templates, class templates, illustrative examples.

TEXT BOOKS, AND/OR REFERENCE MATERIAL:

2. Object-Oriented Programming in C++, by Shukla, Wiley India Ltd.
Course code: HSMC-02

Category

Course title: ORGANIZATIONAL BEHAVIOUR

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Branches (B. Tech.)

Class work: 25
Exam: 75
Total: 100 Marks
Duration of Exam: 03 Hours

The objective of this course is to expose the students to basic concepts of management and provide insights necessary to understand behavioral processes at individual, team and organizational level.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - 1

Introduction of Management- Meaning, definitions, nature of management; Managerial levels, skills and roles in an organization; Functions of Management: Planning, Organizing, staffing, Directing & Controlling, Interrelationship of managerial functions, scope of management & Importance of management. Difference between management and administration.

UNIT - 2

Introduction of organization:-Meaning and process of Organization, Management v/s Organization; Fundamentals of Organizational Behavior: Concepts, evolution, importance and relationship with other Fields; Contemporary challenges and opportunities of OB. Individual Processes and Behavior-Personality- Concept, determinants and applications; Perception- Concept, process and applications, Learning- Concept (Brief Introduction) ; Motivation- Concept, techniques and importance

UNIT - 3

Interpersonal Processes- Teams and Groups- Definition of Group, Stages of group development, Types of groups, meaning of team, merits and demerits of team; difference between team and group, Conflict- Concept, sources, types, management of conflict; Leadership: Concept, function, styles & qualities of leadership.
Communication – Meaning, process, channels of communication, importance and barriers of communication.

UNIT 4

Organizational Processes: Organizational structure - Meaning and types of organizational structure and their effect on human behavior; Organizational culture - Elements, types and factors affecting organizational culture. Organizational change: Concept, types & factors affecting organizational change, Resistance to Change.

Suggested Books:
2. Organizational Behavior, 12ed, by Schermhorn, Wiley India Ltd
5. Organizational Behaviour: Design, Structure and Culture, 2ed by Gupta, Wiley India Ltd.
Web Technologies

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Objectives of the course:
- To impart the basic concepts of Web Technologies
- To understand various client side technologies
- To create web pages
- To create dynamic applications on web through server side technologies

Detailed contents:

Unit 1:
Introduction: Concept of Internet- History of Internet, Protocols of Internet, World Wide Web, URL, Web Server, Web Browser, HTML, HTTP, SMTP, POP3, MIME, IMAP.
Web site design principles, planning the site and navigation,

Unit 2:
HTML and CSS: History of HTML, Structure of HTML Document: Text Basics, Document: Images and Multimedia, Links and webs, Document Layout, Cascading Style Sheet: 4 Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and...
properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS,

**Unit 3:**

**Unit 4:**
**PHP:** PHP Introduction, Structure of PHP, PHP Functions, AJAX with PHP, PHP Code and the Complete AJAX Example. AJAX Database, Working of AJAX with PHP, Ajax PHP Database Form, AJAX PHP MySQL Select Query.

**Suggested books:**
2. Developing Web Applications, 2ed by Savaliya, Wiley India Ltd
5. Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML and Ajax, Black Book by Kogent, Wiley India Ltd.

**Suggested reference books:**
1. Paul Deitel, Harvey Deitel, Abbey Deitel, “Internet and world wide web – How to Program”, Prentice Hall
Operating System Lab

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Contents:
1. Introduction to UNIX File System.
2. File and Directory Related Commands in UNIX.
3. Essential UNIX Commands for working in UNIX environment.
4. I/O Redirection and Piping
5. Introduction to VI Editors.
6. Introduction of Processes in UNIX
7. Communication in UNIX and AWK.
8. Introduction of the concept of Shell Scripting.
10. Writing the Shall Scripts for unknown problems.

Suggested Books:
1. UNIX Shell Programming by YashavantKanetkar.
2. UNIX Concepts and Applications by Sumitabha Das
Object Oriented Programming Lab Using C++

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<td>Duration of Exam</td>
<td>03 Hours</td>
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Contents:
1. [Classes and Objects] Write a program that uses a class where the member functions are defined inside a class.
2. [Classes and Objects] Write a program that uses a class where the member functions are defined outside a class.
3. [Classes and Objects] Write a program to demonstrate the use of static data members.
4. [Classes and Objects] Write a program to demonstrate the use of const data members.
5. [Constructors and Destructors] Write a program to demonstrate the use of zero argument and parameterized constructors.
6. [Constructors and Destructors] Write a program to demonstrate the use of dynamic constructor.
7. [Constructors and Destructors] Write a program to demonstrate the use of explicit constructor.
8. [Initializer Lists] Write a program to demonstrate the use of initializer list.
9. [Operator Overloading] Write a program to demonstrate the overloading of increment and decrement operators.
10. [Operator Overloading] Write a program to demonstrate the overloading of binary arithmetic operators.
11. [Operator Overloading] Write a program to demonstrate the overloading of memory management operators.
12. [Inheritance] Write a program to demonstrate the multilevel inheritance.
13. [Inheritance] Write a program to demonstrate the multiple inheritance.
14. [Inheritance] Write a program to demonstrate the virtual derivation of a class.
15. [Polymorphism] Write a program to demonstrate the runtime polymorphism.
16. [Exception Handling] Write a program to demonstrate the exception handling.
17. [Templates and Generic Programming] Write a program to demonstrate the use of function template.
18. [Templates and Generic Programming] Write a program to demonstrate the use of class template.
Contents:

**HTML**:
1. Simple HTML using
   a. Heading elements
   b. Text Elements
   c. Logical Styles
   d. Physical Styles
   e. Ordered, Unordered and Definition list
2. Hyper Links
   a. Image Link → Link to page containing Images and Videos
   b. File Link
   c. Single Page Link
3. Using Frames
   a. Navigation Frame
   b. Floating Frame
   c. Inline Frame
4. Registration Form with Table

**CSS**:
Inline Style, Internal Style, and External Style Sheets

**XML**:
1. Create a any catalog
2. Display the catalog created using CSS or XSL

**PHP**:
1. File operation
2. Regular Expression, Array, Math, String, Date functions
Unit-1 The Multidisciplinary nature of environment studies. Definition, scope and importance.

Unit-2 Natural Resources:
Renewable and non-renewable resources: Natural resources and associated problems.

a) Forest resources: Use and over-exploitation: deforestation, case studies. Timber extraction, mining dams and their effects on forests and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources: World food problems, changes, caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, Water logging, salinity, case studies.

e) Energy resources: Growing energy needs; renewable and non-renewable energy sources, use of alternate energy sources, case studies.

f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

* Role of an individual in conservation of natural resources.
* Equitable use of resources for sustainable lifestyles.

Unit-3 Ecosystems:

* Producers, consumers and decomposers.
* Energy flow in the ecosystem.
* Ecological succession.
* Food chains, food webs and ecological pyramids.
* Introduction, types, characteristic features, structure and function of the following eco-system:
  a. Forest ecosystem.
  b. Grassland ecosystem.
  c. Desert ecosystem.
  d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) (6 lectures)
Unit-4 Biodiversity and its conservation
* Introduction - Definition: Genetic, Species and ecosystem diversity.
* Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
* Biodiversity at global, National and local levels.
* India as a mega-diversity nation.
* Hot-spots of biodiversity.
* Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
* Endangered and endemic species of India.
* Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Unit-5 Environmental pollution:
Definition, causes, effects and control measures of:
   a) Air pollution.
   b) Water pollution
   c) Soil pollution
   d) Marine pollution
   e) Noise pollution
   f) Thermal pollution
   g) Nuclear hazards
* Solids waste management: causes, effects and control measures of urban and industrial wastes.
* Role of an individual in prevention of pollution.
* Pollution case studies.
* Disaster management: floods, earthquake, cyclone and landslides.

(8 lectures)

Unit-6 Social issues and the Environment:
* From unsustainable to sustainable development.
* Urban problems related to energy.
* Water conservation, rain water harvesting, watershed management.
* Resettlement and rehabilitation of people: its problems and concerns case studies.
* Environmental ethics: Issues and possible solutions.
* Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
* Wasteland reclamation.
* Consumerism and waste products.
Environment Protection Act.
* Air (Prevention and Control of pollution) Act.
* Wildlife Protection Act.
* Forest Conservation Act.
* Issues involved in enforcement of environmental legislation.
  * Public awareness. (7 lectures)

**Unit-7** Human population and the Environment.

Population growth, variation among nations.
Population explosion- Family Welfare Programme.
Environment and human health.
Human Rights.
Value Education.
HIV/AIDS.
Woman and Child Welfare

Role of Information Technology in Environment and human health.
Case Studies. (6 lectures)

**Unit-8** Field Work:
  * Visit to a local area to document environmental assets - river/forest/grassland/hill/mountain.
  * Visit to a local polluted site-urban/Rural/ Industrial/ Agricultural.
  * Study of common plants, insects, birds.

Study of simple ecosystems- pond, river, hill slopes, etc. (Field work equal to 10 lecture hours)

**References**

2. Bharucha, Frach, The Biodiversity of India, MApin Publishing Pvt. Ltd. Ahmedabad-380013, India,
7. Down to Earth, Centre for Science and Environment (R).
The scheme of the paper will be as follows:

The subject of Environmental Studies will be included as a qualifying paper in all UG Courses and the students will be required to qualify the same otherwise the final result will not be declared and degree will not be awarded.

The duration of the course will be 40 lectures. The examination will be conducted along with the semester examinations.

Exam. Pattern: In case of awarding the marks, the paper will carry 100 marks. Theory: 75 marks, Practical/Field visit: 25 marks.

The structure of the question paper will be:

Part- A: Short Answer Pattern : 15 marks
Part- B: Essay Type with inbuilt choice : 60 marks
Part- C: Field Work (Practical) : 25 marks

Instructions for Examiners:

Part- A: Question No. 1 is compulsory and will contain five short-answer type questions of 3 marks each covering the entire syllabus.

Part-B: Eight essay type questions (with inbuilt choice) will be set from the entire syllabus and the candidate will be required to answer any four of them. Each essay type question will be of 15 marks.
The examination of the regular students will be conducted by the concerned college/Institute. Each student will be required to score minimum 40% marks separately in theory and practical/Field visit. The marks in this qualifying paper will not be included in determining the percentage of marks obtained for the award of degree.

However, these marks will be shown in the detailed marks certificate of the students.