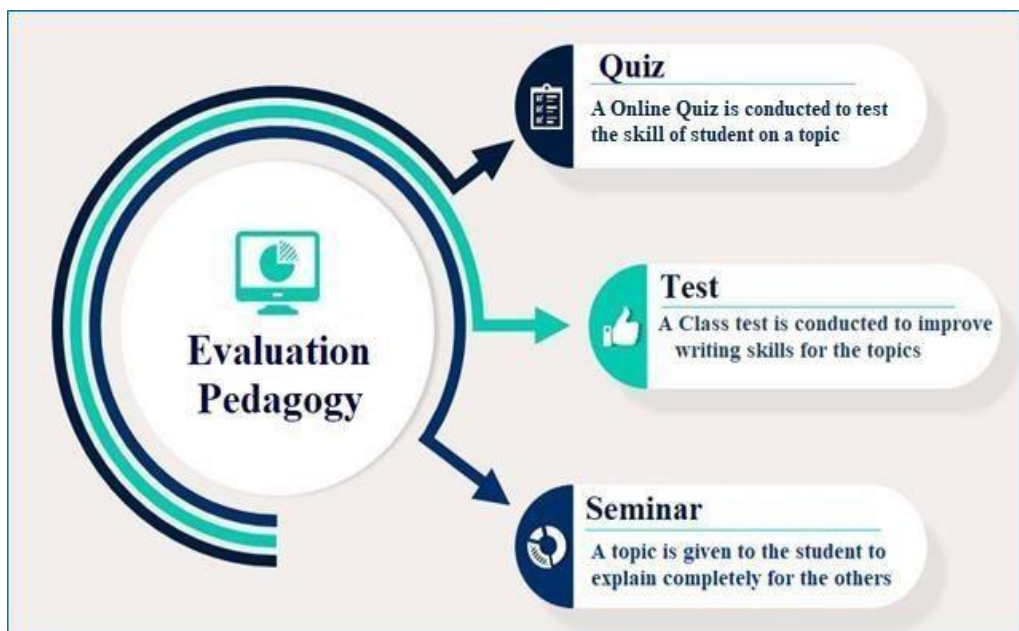
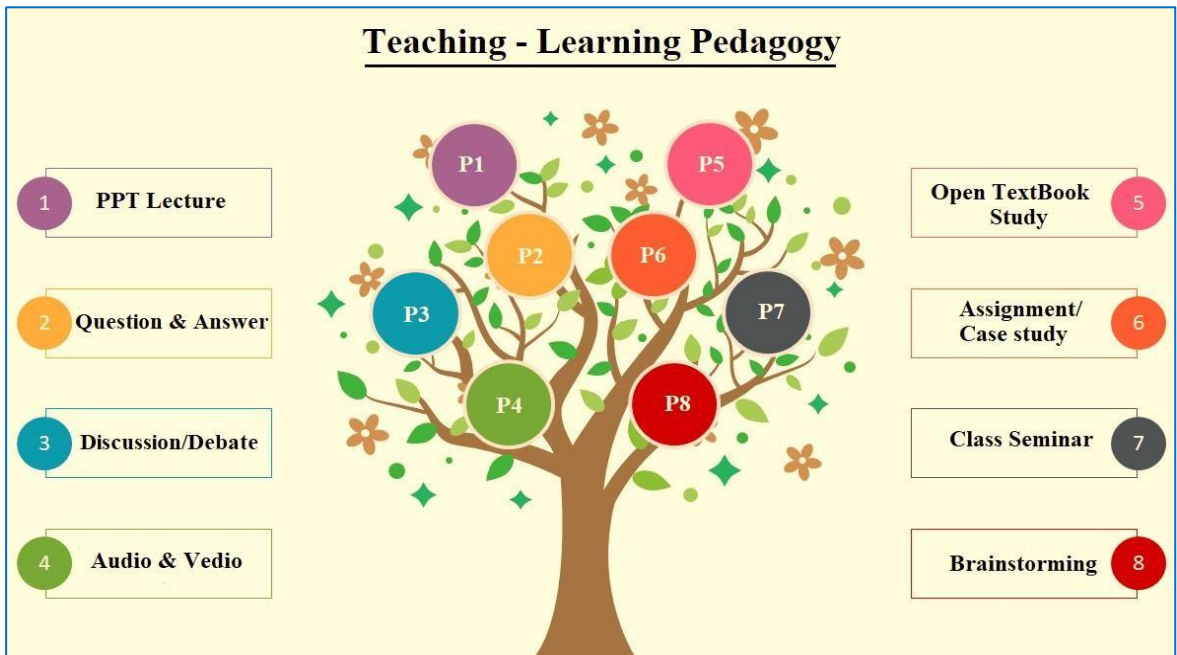


# DEPARTMENT OF COMPUTER SCIENCE



<b>Course: M.Sc</b>	<b>Year:I</b>	<b>Semester:I</b>					
<b>Subject</b>	<b>Artificial Intelligence</b>						
<b>Units</b>	<ol style="list-style-type: none"> <li>1. Introduction to Artificial Intelligence</li> <li>2. Search Techniques</li> <li>3. Knowledge Representation using Rules</li> <li>4. Symbolic Logic</li> <li>5. Reasoning under Uncertainty</li> <li>6. Natural Language Processing</li> <li>7. Experts Systems</li> </ol>						
<b>Duration</b>	<b>60hours</b>						
<b>Learning Objectives</b>	<p>1.To understand the importance of search and the corresponding search strategies for solving AI problem.</p> <p>2.To introduce to Planning, Natural Language Processing and Expert Systems.</p> <p>3.To learn about AI problem, Production Systems and their characteristics.</p>						
<b>Units</b>	U1	U2	U3	U4	U5	U6	U7
<b>Hours Split: Total: 60</b>	10	10	10	5	10	10	5
<b>Internal valuation:40marks</b>	2	2	2	2	2	2	2
<b>Resource Material:</b>	<p><b>Study Material(Handouts):</b></p> <ol style="list-style-type: none"> <li>1.<a href="https://youtu.be/8egjI-p16u4">https://youtu.be/8egjI-p16u4</a></li> <li>2. <a href="https://youtu.be/0CnVlykdaF4">https://youtu.be/0CnVlykdaF4</a></li> </ol> <p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Artificial Intelligence, Elaine Rich and Kevin Knight, Tata Mcgraw -Hill Publications</li> <li>2.Python Programming: A modular approach by Pearson; by TanejaSheetal (Author), Kumar Naveen.</li> </ol> <p><b>YouTube Links:</b></p> <p><a href="https://youtu.be/qYNweeDHivU">https://youtu.be/qYNweeDHivU</a></p> <p><a href="https://youtu.be/HcZ6bq-RVM0">https://youtu.be/HcZ6bq-RVM0</a></p> <p><b>Power Point Presentations:</b></p> <p><a href="https://youtu.be/wHXUEYJPWrA">https://youtu.be/wHXUEYJPWrA</a></p> <p><a href="https://youtu.be/hWIpEnUChWM">https://youtu.be/hWIpEnUChWM</a></p>						

UNIT	DESCRIPTION	PEDAGOGY	INTERNAL EVALUATION
I	<b>Introduction to Artificial Intelligence:</b> Artificial Intelligence, AI Problems, AI Techniques, Defining the Problem as a State Space Search, Problem Characteristics, Production Systems.	P1,P2,P3	PQ,P6,PT
II	<b>Search Techniques:</b> Issues in The Design of Search Programs, Un-Informed Search, BFS, DFS; Heuristic Search Techniques: Generate-And- Test, Hill Climbing, Best-First Search, A* Algorithm, Problem Reduction, AO*Algorithm, Constraint Satisfaction, Means-Ends Analysis.	P1,P2,P3,P5	P6,PT
III	<b>Knowledge Representation using Rules:</b> Procedural Vs Declarative Knowledge, Logic programming, Forward Vs Backward Reasoning, Matching Techniques, Partial Matching, RETE Matching Algorithm AI Programming languages: Overview of LISP and PROLOG, Production System in Prolog	P1,P2,P3,P5	PQ,PT
IV	<b>Symbolic Logic:</b> Propositional Logic, First Order Predicate Logic: Representing Instance and is-a Relationships, Computable Functions and Predicates, Unification & Resolution, Natural Deduction; Structured Representations of Knowledge: Semantic Nets, Partitioned Semantic Nets, Frames, Conceptual Dependency, Conceptual Graphs, Scripts.	P1,P2,P4	PQ,P6,PT
V	<b>Reasoning under Uncertainty:</b> Introduction to Non-Monotonic Reasoning, Truth Maintenance Systems, Logics for Non-Monotonic Reasoning, Statistical Reasoning: Bayes Theorem, Certainty Factors and Rule-Based Systems, Bayesian Probabilistic Inference, Bayesian Networks, Dempster- Shafer Theory, Fuzzy Logic: Crisp Sets ,Fuzzy Sets, Fuzzy Logic Control, Fuzzy Inferences &Fuzzy Systems.	PQ,P6,PT,P8	PQ,PT
VI	<b>Natural Language Processing:</b> Steps in The Natural Language Processing, Syntactic Processing and Augmented Transition Nets, Semantic Analysis, NLP Understanding Systems; Planning: Components of a Planning System, Goal Stack Planning, Non-linear Planning using Constraint Posting, Hierarchical Planning, Reactive Systems.	P1,P3,P5	P6,PT

<b>VII</b>	<b>Experts Systems:</b> Overview of an Expert System, Architecture of an Expert Systems, Different Types of Expert Systems Rule Based, Frame Based, Decision Tree based, Case Based, Neural Network based, Black Board Architectures, Knowledge Acquisition and Validation Techniques, , Knowledge System Building Tools, Expert System Shells.	PQ,P6,PT, <b>P8</b>	PQ,PT
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<b>Course: M.Sc</b>	<b>Year:I</b>	<b>Semester:I</b>					
<b>Subject</b>	<b>DATA STRUCTURES THROUGH C++</b>						
<b>Units</b>	<ol style="list-style-type: none"> <li>1. arrays</li> <li>2. stacks and queues</li> <li>3. linked lists</li> <li>4. circular lists</li> <li>5. trees</li> <li>6. graphs</li> <li>7. sorting</li> </ol>						
<b>Duration</b>	<b>60hours</b>						
<b>Learning Objectives</b>	<p>1.Introduce the student to the concept of data structures through abstract data structures including lists, sorted lists, stacks, queues, dequeues, sets/maps, directed acyclic graphs, and graphs; and implementations including the use of linked lists, arrays, binary search trees, M-way search trees, hash tables, complete trees, and adjacency matrices and lists.</p> <p>2.Introduce the student to algorithms design including greedy, divide-and-conquer, random and backtracking algorithms and dynamic programming; and specific algorithms including, for example, resizing arrays, balancing search trees, shortest path, and spanning trees.</p>						
<b>Units</b>	U1	U2	U3	U4	U5	U6	U7
<b>Hours Split: Total: 60</b>	10	10	10	5	10	10	5
<b>Internal valuation:40marks</b>	2	2	2	2	2	2	2
<b>Resource Material:</b>	<p><b>Study Material(Handouts):</b>  1.<a href="https://youtu.be/StCb0H84T6A">https://youtu.be/StCb0H84T6A</a>  2. <a href="https://youtu.be/zLQfQDr7JjA">https://youtu.be/zLQfQDr7JjA</a></p> <p><b>Reference Books:</b>  1.Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson  2.Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.  3.Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.</p> <p><b>YouTube Links:</b>  1.<a href="https://youtu.be/B31LgI4Y4DQ">https://youtu.be/B31LgI4Y4DQ</a>  2.<a href="https://youtu.be/dOdHeQoUBCE">https://youtu.be/dOdHeQoUBCE</a></p> <p><b>Power Point Presentations:</b>  <a href="https://youtu.be/CzWZYwOvrcE">https://youtu.be/CzWZYwOvrcE</a>  <a href="https://youtu.be/-vOqh90wyeE">https://youtu.be/-vOqh90wyeE</a></p>						

UNIT	DESCRIPTION	PEDAGOGY	INTERNAL EVALUATION
I	<b>ARRAYS:</b> Abstract Data Types and the C++ Class, An Introduction to C++ Class- Data Abstraction and Encapsulation in C++- Declaring Class Objects and Invoking Member Functions- Special Class Operations- Miscellaneous Topics- ADTs and C++Classes, The Array as an Abstract Data Type, The Polynomial Abstract Data type- Polynomial Representation- Polynomial Addition, Representation of Arrays.	P1,P2,P3	PQ,P6,PT
II	<b>STACKS AND QUEUES:</b> Templates in C++, Template Functions- Using Templates to Represent Container Classes, The Stack Abstract Data Type, The Queue Abstract Data Type, Subtyping and Inheritance in C++, Evaluation of Expressions, Expression- Postfix Notation- Infix to Postfix.	P1,P2,P3,P5	P6,PT
III	<b>LINKED LISTS:</b> Single Linked List and Chains, Representing Chains in C++, Defining a Node in C++- Designing a Chain Class in C++- Pointer manipulation in C++- Chain Manipulation Operations, The Template Class Chain, Implementing Chains with Templates- Chain Iterators- Chain Operations- Reusing a Class.	P1,P2,P3,P5	PQ,PT
IV	<b>CIRCULAR LISTS:</b> Available Space Lists, Linked Stacks and Queues, Polynomials, Polynomial Representation- Adding Polynomials- Circular List Representation of Polynomials, Equivalence Classes, Sparse Matrices, Sparse Matrix Representation- Sparse Matrix Input- Deleting a Sparse Matrix, Doubly Linked Lists, Generalized Lists, Representation of Generalized Lists- Recursive Algorithms for Lists- Reference Counts, Shared and Recursive Lists	P1,P2,P4	PQ,P6,PT
V	<b>TREES:</b> Introduction, Terminology, Representation of Trees, Binary Trees, The Abstract Data Type, Properties of Binary Tress, Binary Tree Representations, Binary Tree Traversal and Tree Iterators, Introduction, Inorder Traversal Preorder Traversal, Postorder Traversal, Thread Binary Trees, Threads, Inorder Traversal of a Threaded Binary Tree, Inserting a Node into a Threaded Binary Tree, Heaps, Priority Queues, Definition of a Max Heap, Insertion	PQ,P6,PT,P8	PQ,PT

	into a Max Heap, Deletion from a Max Heap, Binary Search Trees, Definition, Searching a Binary Search Tree, Insertion into a Binary Search Tree, Deletion from a Binary Search Tree, Height of Binary Search Tree.		
<b>VI</b>	<b>GRAPHS:</b> The Graph Abstract Data Type, Introduction, Definition, Graph Representation, Elementary Graph Operation, Depth First Search, Breadth First Search, Connected Components, Spanning Trees, Biconnected Components, Minimum Cost Spanning Trees, Kruskal S Algorithm, Prim s Algorithm Sollin’ s Algorithm, Shortest Paths and Transitive Closure, Single Source/All Destination: Nonnegative Edge Cost, Single Source/All Destination: General Weights, All-Pairs Shortest Path, Transitive Closure.	P1,P3,P5	P6,PT
<b>VII</b>	<b>SORTING:</b> Insertion Sort, Quick Sort, Merge Sort Merging, Iterative Merge Sort, Recursive Merge Sort, Heap Sort.	PQ,P6,PT,P8	PQ,PT

<b>Course: M.Sc</b>	<b>Year:I</b>	<b>Semester:I</b>					
<b>Subject</b>	<b>COMPUTER ORGANIZATION AND ARCHITECTURE</b>						
<b>Units</b>	<ol style="list-style-type: none"> <li>1. <b>Register Transfer and Micro operations</b></li> <li>2. <b>Basic Computer Organization and Design</b></li> <li>3. <b>Micro programmed Control</b></li> <li>4. <b>Central Processing Unit</b></li> <li>5. <b>Pipeline and Vector Processing</b></li> <li>6. <b>Input/output Organization</b></li> <li>7. <b>Memory Organization</b></li> </ol>						
<b>Duration</b>	<b>60hours</b>						
<b>Learning Objectives</b>	<ol style="list-style-type: none"> <li>1. To study about structure and functional components of a computer.</li> <li>2. Understanding the hierarchical organization of a computer system which consists of instruction set of commands.</li> <li>3. Learn about the architecture of a computer from a programming view.</li> <li>4. To design a balance system that minimizes performance and utilization of all elements.</li> </ol>						
<b>Units</b>	U1	U2	U3	U4	U5	U6	U7
<b>Hours Split: Total: 60</b>	10	10	10	5	10	10	5
<b>Internal valuation:40marks</b>	2	2	2	2	2	2	2



**Resource  
Material:**

**Study Material(Handouts):**

- 1.<https://youtu.be/ZMSdU9DLbrU>
- 2.<https://youtu.be/zlX8cpvOW7U>

**Reference Books:**

- 1.Computer Architecture and Organization, William Stallings, PHI Pvt. Ltd., Eastern Economy Edition, Sixth Edition, 2003.
- 2.Computer Organization and Architecture, Linda Null, Julia Lobur, Narosa Publications ISBN81- 7319-609-5
- 3.Computer System Architecture”, John. P.Hayes.

**YouTube Links:**

- 1.<https://youtu.be/Ol8D69VKX2k>
- 2.<https://youtu.be/BIpPTqHK-Lc>

**Power Point Presentations:**

- 1.<https://youtu.be/A3t7ckliyaA>
- 2.<https://youtu.be/pmyMDe43tdE>

UNIT	DESCRIPTION	PEDAGOGY	INTERNAL EVALUATION
I	<b>Register Transfer and Micro operations:</b> Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit.	P1,P2,P3	PQ,P6,PT
II	<b>Basic Computer Organization and Design:</b> Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input- Output and Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator Logic.	P1,P2,P3,P5	P6,PT
III	<b>Micro programmed Control:</b> Control Memory, Address Sequencing, Micro program Example, Design of Control Unit.	P1,P2,P3,P5	PQ,PT
IV	<b>Central Processing Unit:</b> Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC), Architecture and Programming of 8085 Microprocessor	P1,P2,P4	PQ,P6,PT
V	<b>Pipeline and Vector Processing:</b> Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISK Pipeline, Vector Processing, Array Processors.	PQ,P6,PT,P8	PQ,PT
VI	<b>Input/output Organization:</b> Peripheral Devices, I/O interface, Asynchronous data transfer, Modes of transfer, priority Interrupt, Direct memory access, Input-Output Processor (IOP), Serial Communication.	P1,P3,P5	P6,PT
VII	<b>Memory Organization:</b> Memory Hierarchy, Main memory, Auxiliary memory, Associate Memory, Cache Memory, and Virtual memory, Memory Management Hardware.	PQ,P6,PT,P8	PQ,PT

<b>Course: M.Sc</b>	<b>Year:I</b>	<b>Semester:I</b>					
<b>Subject</b>	<b>OBJECT ORIENTED PROGRAMMING THROUGH JAVA</b>						
<b>Units</b>	<ol style="list-style-type: none"> <li>1. <b>Introduction to Java</b></li> <li>2. <b>Objects and Classes</b></li> <li>3. <b>Inheritance and Polymorphism</b></li> <li>4. <b>Event and GUI programming</b></li> <li>5. <b>I/O programming</b></li> <li>6. <b>Multithreading in java</b></li> <li>7. <b>Java Database Connectivity (JDBC)</b></li> </ol>						
<b>Duration</b>	<b>60hours</b>						
<b>Learning Objectives</b>	<ol style="list-style-type: none"> <li>1.This subject will help to improve the analytical skills of object-oriented programming</li> <li>2.Overall development of problem solving and critical analysis</li> <li>3.Formal introduction to Java programming language.</li> </ol>						
<b>Units</b>	U1	U2	U3	U4	U5	U6	U7
<b>Hours Split: Total: 60</b>	10	10	10	5	10	10	5
<b>Internal valuation:40marks</b>	2	2	2	2	2	2	2
<b>Resource Material:</b>	<p><b>Study Material(Handouts):</b>  1.<a href="https://youtu.be/lci-8SIPc8k">https://youtu.be/lci-8SIPc8k</a>  2.<a href="https://youtu.be/B05KjM_OLTA">https://youtu.be/B05KjM_OLTA</a></p> <p><b>Reference Books:</b>  1.Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition, Pearson.  2.Programming in Java, Sachin Malhotra &amp; Saurabh Chaudhary, Oxford University Press.  3.Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman, SPD.</p> <p><b>YouTube Links:</b>  1.<a href="https://youtu.be/j0lBrYSIYaU">https://youtu.be/j0lBrYSIYaU</a>  2.<a href="https://youtu.be/lci-8SIPc8k">https://youtu.be/lci-8SIPc8k</a></p> <p><b>Power Point Presentations:</b>  1.<a href="https://youtu.be/UODqbPVtKTo">https://youtu.be/UODqbPVtKTo</a>  2.<a href="https://youtu.be/xiCBefiV_GQ">https://youtu.be/xiCBefiV_GQ</a></p>						

UNIT	DESCRIPTION	PEDAGOGY	INTERNAL EVALUATION
I	<b>Introduction to Java:</b> Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java.	P1,P2,P3	PQ,P6,PT
II	<b>Objects and Classes:</b> Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, StringBuffer, File, this reference	P1,P2,P3,P5	P6,PT
III	<b>Inheritance and Polymorphism:</b> Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.	P1,P2,P3,P5	PQ,PT
IV	<b>Event and GUI programming:</b> Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing	P1,P2,P4	PQ,P6,PT
V	<b>I/O programming:</b> Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files.	PQ,P6,PT,P8	PQ,PT
VI	<b>Multithreading in java:</b> Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to JavaBeans and Network Programming.	P1,P3,P5	P6,PT

<b>VII</b>	<b>Java Database Connectivity (JDBC):</b> JDBC Product, Types of Drivers, Two-Tier Client/Server Model, Three-Tier Client/Server Model, Basic Steps of JDBC, Creating and Executing SQL Statement, The Result Set Object, Working with Database MetaData Interface	PQ,P6,PT, <b>P8</b>	PQ,PT
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<b>Course: M.Sc</b>	<b>Year:I</b>	<b>Semester:I</b>					
<b>Subject</b>	<b>DATABASE MANAGEMENT SYSTEMS</b>						
<b>Units</b>	<ol style="list-style-type: none"> <li>1. <b>Introduction</b></li> <li>2. <b>Introduction to Database Design and The Relational Model.</b></li> <li>3. <b>Relational Algebra and SQL</b></li> <li>4. <b>Database Design</b></li> <li>5. <b>Transaction Management</b></li> <li>6. <b>Concurrency Control</b></li> <li>7. <b>Crash Recovery</b></li> </ol>						
<b>Duration</b>	<b>60hours</b>						
<b>Learning Objectives</b>	<ol style="list-style-type: none"> <li>1.To learn the evolution of DBMS Versus File systems, data models, and layers of abstraction.</li> <li>2.To understand conceptual and physical aspects of database design.</li> <li>3.To learn formal and commercial query language specifications.</li> <li>4.To understand concurrency control, recovery management, and other related issues.</li> </ol>						
<b>Units</b>	U1	U2	U3	U4	U5	U6	U7
<b>Hours Split: Total: 60</b>	10	10	10	5	10	10	5
<b>Internal valuation:40marks</b>	2	2	2	2	2	2	2
<b>Resource Material:</b>	<p><b>Study Material(Handouts):</b></p> <ol style="list-style-type: none"> <li>1.<a href="https://youtu.be/f1oV46r69YM">https://youtu.be/f1oV46r69YM</a></li> <li>2.<a href="https://youtu.be/dl00fOOYLOM">https://youtu.be/dl00fOOYLOM</a></li> </ol> <p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Database System Concepts; A. Silberschatz, H. Korth 5th Edition, McGraw-Hill.</li> </ol> <p><b>YouTube Links:</b></p> <ol style="list-style-type: none"> <li>1.<a href="https://youtu.be/c5HAwKX-suM">https://youtu.be/c5HAwKX-suM</a></li> <li>2.<a href="https://youtu.be/mqprM5YUdpk">https://youtu.be/mqprM5YUdpk</a></li> </ol> <p><b>Power Point Presentations:</b></p> <ol style="list-style-type: none"> <li>1.<a href="https://youtu.be/T2zocNJRw8">https://youtu.be/T2zocNJRw8</a></li> <li>2.<a href="https://youtu.be/rWq4HQmky90">https://youtu.be/rWq4HQmky90</a></li> </ol>						

UNIT	DESCRIPTION	PEDAGOGY	INTERNAL EVALUATION
I	<b>Introduction:</b> File system versus a DBMS, Advantages of a DBMS, Describing and Storing Data in a DBMS, The Relational model, Levels of abstraction, Data Independence, Transaction management, Structure of a DBMS.	P1,P2,P3	PQ,P6,PT
II	<b>Introduction to Database Design and The Relational Model:</b> Database Design and ER Diagrams, Entities, Attributes and Entity Sets, Relationships & Relationship Sets, Additional Features of the ER Model, Conceptual Design with ER Model, Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity Constraints, Querying Relational Data, Logical Database Design: ER to Relational, Introduction to Views, Destroying/ Altering Tables and Views.	P1,P2,P3,P5	P6,PT
III	<b>Relational Algebra and SQL:</b> Preliminaries, Relational Algebra, The form of a Basic SQL Query, UNION, INTERSECT and EXCEPT, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers and Active Databases, Embedded SQL, Dynamic SQL, JDBC.	P1,P2,P3,P5	PQ,PT
IV	<b>Database Design:</b> Schema Refinement and Normal Forms, Introduction to Schema Refinement, Functional Dependencies, Reasoning about FD's, Normal Forms, Properties of Decomposition, Normalization, Other kinds of Dependencies.	P1,P2,P4	PQ,P6,PT
V	<b>Transaction Management:</b> The ACID Properties, Transactions & Schedules, Concurrent Execution of Transactions, Lock-Based Concurrency Control.	PQ,P6,PT,P8	PQ,PT
VI	<b>Concurrency Control:</b> 2PL, Serializability and Recoverability, Introduction to Lock Management, Lock Conversions, Dealing with Deadlocks, Specialized Locking Techniques, Concurrency Control without Locking.	P1,P3,P5	P6,PT

<b>VII</b>	<b>Crash Recovery:</b> Introduction to ARIES, The Log, Other Recovery-Related Structures, The Write-Ahead Log Protocol, Check pointing, Recovering from a System Crash, Media Recovery.	PQ,P6,PT, <b>P8</b>	PQ,PT
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