

## **MASTER OF COMPUTER APPLICATION**

Syllabus w.e.f. the Academic Session 2020-2021





MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY WEST BENGAL

## **First Year: Semester-I**

Contracts Hours / Week: 4         Total Contact Hours: 40         Credit: 4           Course Outcome:          Learn, undextand and comprehend the concept of programming.            V         Design algorithm to solve simple programming problem.             V         Learn, undextand and comprehend the concept of Programming.             V         Cotate application using secondary storage.             V         Apply Python to implement different solutions for the same problem and analyze why one solution is better than the other.            V         To write program for real life problem.         (Cull History of Computers, Basic Anatomy of Computer System, Primary & Secondary Memory, Processing Unit, Input & Output devices. Basic Concepts of Assembly language, High level language, Compiler and Assembler.           1         Number systems (decimal, octal and hexadecimal) with signed and unsigned numbers (using 1's and 2's computers) static statement.         (CL)           2         Problem analysis.         (CL)         Problem analysis.         (CL)           2         Problem analysis.         (CL)         Problem analysis.         (CL)           3         Variables as names for values; expressions (arithmetic and logical) and their evaluation (uperators, associativity, preceduce). Assignment operation; difference between helt hand side and right hand side of assignment, Consolv inputroutput: taking	Code: MG	°AN-101	Paner: Programn	ing Concept with Pyth	on		
Course Outcome:           After successful completion of this course, students will be able to:                - Design algorithm to solve simple programming problem.                 - Orestand and comprehend the concept of programming.                 - Concert application using secondary storage.                 - Concert application using secondary storage.                 - Vinderstand and apply library for data analysis.                 - Vinderstand and apply library for data analysis.                 - Vinte program for real life problem.                 OWNT               Fundamentals of Computer                 Vortic program for real life problem.               (G1)                 History of Computers, Basic Anatomy of Computer System, Primary & Secondary Memory. Processing Unit, Input             & & Output devices. Basic Concepts of Assembly language, High level language, Compiler and Assembler.                  Number systems. (Sciend), octal and hexadecimal) with signed and unsigned numbers (using 1's and 2's             complement) - their representation conversion and arithmetic operations.                  Problem analysis, Flow/Durt, algorithms, Pseudo codes, structured programming, Example of Flow/chart and             Algorithm representation                 Variables an inset for values; expressions (arithmetic and logicia) and their evaluat						Credit: 4	
After successful completion of this course, students will be able to: <ul> <li>Learn, understand and comprehend the semantics of Python.</li> <li>Understand and remember syntax and semantics of Python.</li> <li>Create application using secondary storage.</li> <li>Understand and remember syntax and semantics of Python.</li> <li>To write program for real life problem.</li> </ul> <li>UNIT         <ul> <li>Fundamentals of Computer</li> <li>(61)</li> <li>History of Computers, Basic Anatomy of Computer System, Primary &amp; Secondary Memory, Processing Unit, Input &amp; Output devices. Basic Concepts of Assembly language. High level language. Compiler and Assembler.</li> </ul> </li> <li>Number systems (decimal, octal and hexadecimal) with signed and unsigned numbers (using 1's and 2's complement) - their prepresentation, conversion and arithmetic operations.</li> <ul> <li>Pecked and unpacked BCD system, ASCII. IEEE-754 floating point representation (half-16 bit, full-32 bit, double-64 bit).</li> </ul> <li>Programming Basics         <ul> <li>Programming Basics, Flowchart, algorithms, Pseudo codes, structured programming, Example of Flowchart and Agorithm representation</li> <li>Variables and Expression</li> <li>(11)</li> </ul> </li> <li>Variables and Expression</li> <li>(21)</li> <li>Problem mallysis, Flowchart, and priming user information.</li> <ul> <li>(21)</li> <li>Problem mallysis, flowchart and priming user information.</li> <li>(21)</li> <li>Variables and Expression (difference between left hand side and right hand side of assignment, Console input onput abit infinition programming, Basterment and Prime system (delin)</li> <li>Control Statement and</li></ul>						er cuitt i	
<ul> <li>Learn, understand and comprehend the concept of programming.</li> <li>Design algorithm to solve simple programming problem.</li> <li>Understand and remember syntax and semantics of Python.</li> <li>Create application using secondary storage.</li> <li>Understand and apply library for data analysis.</li> <li>Apply Python to implement different solutions for the same problem and analyze why one solution is better than the other.</li> <li>To write program for real life problem.</li> <li>UNIT</li> <li>Fundamentals of Computer</li> <li>Mathematical Solution of Computer System, Primary &amp; Secondary Memory, Processing Unit, Input &amp; Output devices, Basic Concepts of Assembly language, High level language, Compiler and Assembler.</li> <li>Number systems (docimal, out-al and hexadecimal) with signed and unsigned numbers (using 1's and 2's complement) - their representation conversion and arithmetic operations.</li> <li>Programming Basics</li> <li>Variables and Basics</li> <li>Variables and Expression</li> <li>Variables and Expression</li> <li>Variables and Expression</li> <li>Variables and Expression</li> <li>Control Matement and Iteration</li> <li>Control Natement and Iteration (eff.)</li> <li>Programming Basics</li> <li>Control Natement and Iteration genetic information.</li> <li>Control Natement and Iteration solution specific statement, multiple statements within if, multiple if statement, etc., po. Nesting Loogs. Expression Sing Break and Continue, Else Statement, Range Statement and Descino System, Scielection sort, Bubble sort</li> <li>Gorierol Statement and Iteration genetics in use and printing user information.</li> <li>Strings, Liat, Tuples, Dictionary, Set, Selection sort, Bubble sort</li> <li>Gorierolon on files (opening, modes, attributes, encoding, closing), read() &amp; write() methods, tell() &amp; seek() methods, real of printing indepton users Statement and Descino foly (St.)</li> <li>Prevers not Excr</li></ul>			of this course students w	vill be able to			
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9       Create a Class, Create Object,Init() Function, Methods, Self Parameter, Modification and Deletion of Object         9       Parameter, Deletion of Object, Pass Statement, Inheritance and Polymorphism, Scope, Module, Built-In Math Function, Math Module, Module datetime and Date Objects, RegEx Module andRegEx Functions, Exception Handling.         10       Modules& Packages (2L)         11       Modules& Packages (2L)         11       ndArray, Pandas: reading files, exploratory data analysis, data preparation and processing, , Matplolib: Scatterplot, Line plot, Bar plot, Histogram, Box plot, Pair plot         Reference Books:         •       N.S. Gill, Handbook of Computer Fundamentals, Khanna Publishing House         •       Dr.Jeeva Jose-Taming Python by Programming, Khanna Publishing         •       Martin C. Brown – The Complete Reference Python, Mc Graw Hill         •       A. Martelli, A. Ravenscroft, S. Holden, Python in a Nutshell,OREILLY.         •       Jason Rees-Python Programming: Pactical introduction to Python Programming for total beginners,         •       Anthony Brun - Python Programming: A Step By Step Guide From Beginner To Expert (Beginner, Intermediate & Advanced)         •       Mark Pilgrim-Diva into Python, Springer-Verlag Berlin and Heidelberg GmbH & Co. KG				88			
<ul> <li>Parameter, Deletion of Object, Pass Statement, Inheritance and Polymorphism, Scope, Module, Built-In Math Function, Math Module, Module datetime and Date Objects, RegEx Module andRegEx Functions, Exception Handling.</li> <li>Modules&amp; Packages (2L) Importing a module, Creating module, Function aliases, packages (2L) Importing a module, Creating module, Function aliases, packages (6L) ndArray, Pandas: reading files, exploratory data analysis, data preparation and processing, Matplolib: Scatterplot, Line plot, Bar plot, Histogram, Box plot, Pair plot</li> <li>Reference Books:         <ul> <li>N.S. Gill, Handbook of Computer Fundamentals, Khanna Publishing House</li> <li>Dr.Jeeva Jose-Taming Python by Programming, Khanna Publishing</li> <li>Martin C. Brown – The Complete Reference Python, Mc Graw Hill</li> <li>A. Martelli, A. Ravenscroft, S. Holden, Python in a Nutshell,OREILLY.</li> <li>Jason Rees-Python Programming:Practical introduction to Python Programming for total beginners,</li> <li>Anthony Brun - Python Programming: A Step By Step Guide From Beginner To Expert (Beginner, Intermediate &amp; Advanced)</li> <li>Mark Pilgrim-Diva into Python, Springer-Verlag Berlin and Heidelberg GmbH &amp; Co. KG</li> </ul> </li> </ul>				) Function, Methods, Se	lf Parameter, Modification ar		
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<ul> <li>Intermediate &amp; Advanced)</li> <li>Mark Pilgrim-Diva into Python, Springer-Verlag Berlin and Heidelberg GmbH &amp; Co. KG</li> </ul>							
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	•			verlag Berlin and Heidel	berg GmbH & Co. KG		

Code: MCAN-102         Paper: Relational Database Management System         Credit: 4           Course Outcome:         After successful completion of this course, students will be able to:         ////////////////////////////////////
Contacts Hours / Week: 4         Total Contact Hours: 40         Credit: 4           Course Outcome:         After successful completion of this course, students will be able to:         Identify the need for a database over the file system.         Understand and analyze the functional dependencies among attributes of the entity set and normalization between the relations.         Understand and Implement the process of data insertion, retrieval, and manipulation.         Understand and Implement the process of data insertion, retrieval, and manipulation.           V Understand and Implement the Transaction control and concurrency control management.         Fvaluate the relational tables, PL/SQL programs, triggers, database files, indexing of RDBMS.           UNITS         Basic Concept         (7L           Database Management System , File based system, Advantages of DBMS over file based system, Database Approach, Logical DBMS Architecture, Three level architecture of DBMS or logical DBMS architecture, Need for three level architecture, Database Administrator (DBA) Functions & Role, Data files indices and Data Dictionary         (7L           Types of Database, Relational and ER Models: Data Models, Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys, Primary keys and foreign key for the Relational Constraint, Super and Constraint, Integrity Constraint, Update Operations and Dealing with Constraint Violations, Relational Database Integrity, Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.         (8L           Problems, Single Valued Dependencies, Normalization, Ruee Anomalization, The First Normal Form, The Sevend Normal
After successful completion of this course, students will be able to: <ul> <li>Identify the need for a database over the file system.</li> <li>Understand and implement the process of data insertion, retrieval, and manipulation.</li> <li>Understand and analyze the functional dependencies among attributes of the entity set and normalization between the relations.</li> <li>Implement SQL concept for a database transaction.</li> <li>Understand and Implement the Transaction control and concurrency control management.</li> <li>Evaluate the relational tables, PL/SQL programs, triggers, database files, indexing of RDBMS.</li> </ul> <li>UNITS Brococpt (7L Database Management System, File based system, Advantages of DBMS over file based system, Database Approach, Logical DBMS Architecture, Three level architecture of DBMS or logical DBMS architecture, Need for three level architecture, Database Administrator (DBA) Functions &amp; Role, Data files indices and Data Dictionary</li> <li>Types of Database, Relational and ER Models: Data Models, Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys , Primary keys and foreign key for the Relations, Relational Constraint, Nev Constraint, Integrity Constraint, Update Operations and Dealing with Constraint Violations, Relational Depentations (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.</li> <li>Database Integrity And Normalization, Rules of Data Normalization, and Associated File Organization</li> <ul> <li>File Organization</li> <li>File Organization Preservation.</li> <li>File Organization</li> <li>File Organization</li> <li>File Organization</li> <li>File Organization</li> <li>File Organization, The Sink Normal Fo</li></ul>
<ul> <li>Identify the need for a database over the file system.</li> <li>Understand and implement the process of data insertion, retrieval, and manipulation.</li> <li>Understand and analyze the functional dependencies among attributes of the entity set and normalization between the relations.</li> <li>Implement SQL concept for a database transaction control and concurrency control management.</li> <li>Evaluate the relational tables, PL/SQL programs, triggers, database files, indexing of RDBMS.</li> <li>UNITS</li> <li>Basic Concept (CLURSE CONTENT) (7L</li> <li>Database Management System , File based system, Advantages of DBMS over file based system, Database Approach, Logical DBMS Architecture, Three level architecture of DBMS or logical DBMS architecture, Need for three level architecture, Physical DBMS Architecture, Database Administrator (DBA) Functions &amp; Role, Data files indices and Data Dictionary</li> <li>Types of Database, Relational and ER Models: Data Models , Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys , Primary keys and foreign key for the Relations, Relational Constraint, Violations, Relational Operations and Dealby in Constraint, Violations, Relational Operations and Dealing with Constraint Violations, Relational Database Integrity And Normalization metabase.</li> <li>Database Integrity And Normalization (BL</li> <li>Relational Database Integrity And Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, Multi-valued Functional Dependency, Attribute Preservation, Unselses, Normalization, Rules of Data Normalization, The First Normal Form, The Fird Normal Form, Multi-valued Functional Dependency, Attribute Preservation, Losslessjoin Decomposition, Dependency Preservation.</li> <li>File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Heek and Tree Structure, Multi-key File Organization, Heek of Index and Tree Structure, Multi-key File Organization, H</li></ul>
<ul> <li>Understand and implement the process of data insertion, retrieval, and manipulation.</li> <li>Understand and analyze the functional dependencies among attributes of the entity set and normalization between the relations.</li> <li>Implement SQL concept for a database transaction.</li> <li>Understand and Implement the Transaction control and concurrency control management.</li> <li>Evaluate the relational tables, PL/SQL programs, triggers, database files, indexing of RDBMS.</li> <li>UNITS</li> <li>Basic Concept (7L)</li> <li>Basic Concept (7L)</li> <li>Database Management System , File based system, Advantages of DBMS over file based system, Database Approach, Logical DBMS Architecture, Three level architecture of DBMS or logical DBMS architecture, Need for three level architecture, Postabase, Administrator (DBA) Functions &amp; Role, Data files indices and Data Dictionary</li> <li>Types of Database, Relational and ER Models: Data Models , Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys , Primary keys and foreign key for the Relations, Relational Constraints, Domain Constraint, Key Constraint , Integrity Constraint, - Update Operations and Dealing with Constraint Violations, Relational Operations</li> <li>Entity Relationship (FR) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.</li> <li>Database Integrity And Normalization</li> <li>Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normal Form, The Fourth Normal Form, Suce CODD Normal Form, The Fourth Normal Form, The Second Normal Form, The Fourth Normal Form, Suce CoDD Normal Form, The Firth Normal Form, The Second Normal Form, The Fourth Normal Form, Suce CoDD Normal Form, The Fourth Normal Form, The Second Normal Form, The Fourth Normal Form, Suce CodD Normal Form, The Fourt</li></ul>
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<ul> <li>Implement SQL concept for a database transaction.</li> <li>Understand and Implement the Transaction control and concurrency control management.</li> <li>Fevaluate the relational tables, PL/SQL programs, triggers, database files, indexing of RDBMS.</li> <li>UNITS</li> <li>Basic Concept</li> <li>OCURSE CONTENT</li> <li>Basic Concept</li> <li>Database Management System , File based system, Advantages of DBMS over file based system, Database Approach, Logical DBMS Architecture, Three level architecture of DBMS or logical DBMS architecture, Need for three level architecture, Physical DBMS Architecture, Database Administrator (DBA) Functions &amp; Role, Data files indices and Data Dictionary</li> <li>Types of Database, Relational and ER Models: Data Models , Relational Model, Domains, Tuple and Relation, Super Keys, Candidate keys , Primary keys and foreign key for the Relations, Relational Constraint, Jourgint , Update Operations and Dealing with Constraint Violations, Relational Operations</li> <li>Entity Relationship (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.</li> <li>Database Integrity And Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, The Third Normal Form, Boyce CODD Normal Form, The Fourth Normal Form, The Second Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.</li> <li>File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Mashe File Organization, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Secure using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Suconyres using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Sponyms, Table Handling.</li> <li>Transaction and Concurrency Management</li> <li>Yunctured Query L</li></ul>
<ul> <li>✓ Understand and Implement the Transaction control and concurrency control management.</li> <li>✓ Evaluate the relational tables, PL/SQL programs, triggers, database files, indexing of RDBMS.</li> <li>UNITS</li> <li>Basic Concept</li> <li>(7L Database Management System , File based system, Advantages of DBMS over file based system, Database Approach, Logical DBMS Architecture, Three level architecture of DBMS or logical DBMS architecture, Need for three level architecture, Physical DBMS Architecture, Database Administrator (DBA) Functions &amp; Role, Data files indices and Data Dictionary</li> <li>1 Types of Database, Relational and ER Models: Data Models, Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys , Primary keys and foreign key for the Relations, Relational Constraints, Domain Constraint, Key Constraint , Integrity Constraint,- Update Operations and Dealing with Constraint Violations, Relational Operations</li> <li>Entity Relationship (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.</li> <li>2 Database Integrity And Normalization</li> <li>(8L Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.</li> <li>(4L Physical Database Design Issues, Storage of Database on Hard Disks, File Organization, Mealfor Multiple Access Paths, Multi-isli El Organiziation, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Hashed File Organization, Sequential File Organization, Indexed (I</li></ul>
✓         Evaluate the relational tables, PL/SQL programs, triggers, database files, indexing of RDBMS.           UNITS         COURSE CONTENT           Basic Concept         (7L           Database Management System , File based system, Advantages of DBMS or logical DBMS architecture, Niced for three level architecture, Three level architecture of DBMS or logical DBMS architecture, Niced for three level architecture, Physical DBMS Architecture, Need for three level architecture, Physical DBMS Architecture, Database Administrator (DBA) Functions & Role, Data files indices and Data Dictionary           1         Types of Database, Relational and ER Models: Data Models, Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys, Primary keys and foreign key for the Relations, Relational Constraint, Somain Constraint, Key Constraint , Integrity Constraint, Update Operations and Dealing with Constraint Violations, Relational Database.           Entity Relationship (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.         (81           2         Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, Moreal Form, Moyce CODD Normal Form, The Fourth Normal Form, The Second Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.         (41           Physical Database Design Issues, Storage of Database on Hard Disks, File Organization, Meed for Multiple Access Paths, Multi-list File Organization, Inverted File Organizatio
UNITS         COURSE CONTENT         (7L           Basic Concept         (7L           Database Management System , File based system, Advantages of DBMS over file based system, Database Approach, Logical DBMS Architecture, Three level architecture of DBMS or logical DBMS architecture, Need for three level architecture, Physical DBMS Architecture, Database Administrator (DBA) Functions & Role, Data files indices and Data Dictionary         (7L           1         Types of Database, Relational and ER Models: Data Models , Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys , Primary keys and foreign key for the Relations, Relational Constraint, Superant, Key Constraint , Integrity Constraint, - Update Operations and Dealing with Constraint Violations, Relational Operations         Relational Constraint, Fuel Constraint, - Update Operations and Dealing with Constraint Violations, Relational Operations           2         Database Integrity And Normalization         (8L           2         The Second Normal Form, The Third Normal Form, Buse CODD Normal Form, The Fourth Normal Form, The Fourth Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.         (4L           Physical Database Design Issues, Storage of Database on Hard Disks, File Organization, Need for Multiple Access Paths, Multi-list File Organization, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.         (7L           4         Transaction and Concurrency Management
Basic Concept         (71.           Database Management System, File based system, Advantages of DBMS over file based system, Database Approach, Logical DBMS Architecture, Three level architecture of DBMS or logical DBMS architecture, Need for three level architecture, Physical DBMS Architecture, Database Administrator (DBA) Functions & Role, Data files indices and Data Dictionary           1         Types of Database, Relational and ER Models: Data Models, Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys, Primary keys and foreign key for the Relations, Relational Constraints, Domain Constraint, Key Constraint, Integrity Constraint,- Update Operations and Dealing with Constraint Violations, Relational Operations           Entity Relationship (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.         (8L           2         Database Integrity And Normalization Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.         (41.           93         File Organization File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.         (71.           4
Database Management System , File based system, Advantages of DBMS over file based system, Database Approach, Logical DBMS Architecture, Three level architecture of DBMS or logical DBMS architecture, Need for three level architecture, Physical DBMS Architecture, Database Administrator (DBA) Functions & Role, Data files indices and Data Dictionary         1       Types of Database, Relational and ER Models: Data Models, Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys , Primary keys and foreign key for the Relational, Roden, Role, Donstraint, Key Constraint , Integrity Constraint, - Update Operations and Dealing with Constraint Violations, Relational Operations         Entity Relationship (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.       (8L         2       Database Integrity And Normalization Relational Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Song Normal Form, The Fourth Normal Form, The Fifth Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.       (4L         Physical Database Design Issues, Storage of Database on Hard Disks, File Organization, Nuel for Multiple Access Paths, Multi-list File Organization, Inverted File Organization, Nuel of Multiple Access Paths, Multi-list File Organization, Inverted File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization, Steed Queries. Joins, Views, Sequences, Indexa and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-lis
Approach, Logical DBMS Architecture, Three level architecture of DBMS or logical DBMS architecture, Need for three level architecture, Physical DBMS Architecture, Database Administrator (DBA) Functions & Role, Data files indices and Data Dictionary         1       Types of Database, Relational and ER Models: Data Models, Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys, Primary keys and foreign key for the Relations, Relational Constraint, New Constraint, Integrity Constraint, - Update Operations and Dealing with Constraint Violations, Relational Operations         Entity Relationship (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.       (8L         2       Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.       (4L         Physical Database Design Issues, Storage of Database on Hard Disks, File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.       (7L         4       Transaction and Concurrency Management       (8L         5       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery maning, Kinds of failures, Failure controlling methods, Database Costraing, News, Sequences, Indexes and Sponyms, Table Handling.         7       Transaction a
Need for three level architecture, Physical DBMS Architecture, Database Administrator (DBA) Functions & Role, Data files indices and Data Dictionary         1       Types of Database, Relational and ER Models: Data Models, Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys, Primary keys and foreign key for the Relations, Relational Constraint, Domain Constraint, Key Constraint, Integrity Constraint,- Update Operations and Dealing with Constraint Violations, Relational Operations         Entity Relationship (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.       (8L         Relational Database Integrity And Normalization       (8L         Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, The Third Normal Form, Boyce CODD Normal Form, The Fourth Normal Form, The Fifth Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.         7       File Organization       (4L         9       files (Unordered files), Sequential File Organization, Indexed Indexed Sequential) File Organization, Hashed       (7L)         4       Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Spronyms, Table Handling.       (7L)         4       Transaction and Concurrency Management       (8L)
Role, Data files indices and Data Dictionary         Types of Database, Relational and ER Models: Data Models , Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys , Primary keys and foreign key for the Relations, Relational Constraint, Super keys, Candidate keys , Primary keys and foreign key for the Relations, Relational Constraint, Key Constraint , Integrity Constraint, Update Operations and Dealing with Constraint Violations, Relational Operations         Entity Relationship (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.       (8L         Patabase Integrity And Normalization       (8L         Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.       (4L         Physical Database Design Issues, Storage of Database on Hard Disks, File Organization and Its Types, Heap files (Unordered files), Sequential File Organization, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.       (7L         4       Structured Query Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.       (8L)         5       (2L), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database
1       Types of Database, Relational and ER Models: Data Models, Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys, Primary keys and foreign key for the Relations, Relational Constraints, Domain Constraint, Key Constraint, Integrity Constraint, - Update Operations and Dealing with Constraint Violations, Relational Operations         Entity Relationship (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.       (8L)         2       Database Integrity And Normalization       (8L)         Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, The Third Normal Form, Boyce CODD Normal Form, The Fourth Normal Form, The Fifth Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.         3       File Organization       (4L)         9       files (Unordered files), Sequential File Organization, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multipe Access Paths, Multi-list File Organization, Inverted File Organization.       (7L)         4       Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction and Concurrency Management       (8L)         5       (2L)       (7L)         4       Transaction and Concurrency Management       (8L) </th
Super keys, Candidate keys, Primary keys and foreign key for the Relations, Relational Constraints, Domain Constraint, Key Constraint, Integrity Constraint,- Update Operations and Dealing with Constraint Violations, Relational Operations         Entity Relationship (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.       (8L         Database Integrity And Normalization       (8L         Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.         File Organization       (4L)         Physical Database Design Issues, Storage of Database on Hard Disks, File Organization, and Its Types, Heap       (7L)         Access Paths, Multi-list File Organization, Inverted File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.       (7L)         4       Structured Query Language (SQL)       (7L)         4       Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.       (8L)         5       (2PL), Deadlock and its Prevention, Optimistic& Pessinistic Concurrency Control. Database Recovery and Security Database Recovery meaning, Kinds of failures, Failure controlling methods, Database Recovery and Security Authorization.         6 </th
Constraint, Key Constraint , Integrity Constraint, - Update Operations and Dealing with Constraint Violations, Relational Operations Entity Relationship (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database. Database Integrity And Normalization (8L Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, The Third Normal Form, Boyce CODD Normal Form, The Fourth Normal Form, The Fifth Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation. File Organization files (Unordered files), Sequential File Organization, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization. Structured Query Language (SQL) Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling. Transactions, Concurrent Transactions, Locking Protocol,Serializable Schedules, Locks Two Phase Locking (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.
Relational Operations         Entity Relationship (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.         Database Integrity And Normalization       (8L)         Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.         File Organization       (4L)         Physical Database Design Issues, Storage of Database on Hard Disks, File Organization and Its Types, Heap files (Unordered files), Sequential File Organization, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.         4       Structured Query Language (SQL)       (7L)         4       Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.       (8L)         5       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database rerors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.
Entity Relationship (ER) Model: Entities, Attributes, Relationships,More about Entities and Relationships, Conversion of E-R Diagram to Relational Database.       Database Integrity And Normalization       (8L         Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, The Third Normal Form, Boyce CODD Normal Form, The Fourth Normal Form, The Second Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.       (4L         Physical Database Design Issues, Storage of Database on Hard Disks, File Organization and Its Types, Heap files (Unordered files), Sequential File Organization, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.       (7L         4       Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.       (8L         5       (2PL), Deadlock and its Prevention, Optimistic& Pessinistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Receovery Techniques, Security & Integrity, Database Security Authorization.
Conversion of E-R Diagram to Relational Database.       (8L         Database Integrity And Normalization       (8L         Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated         Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, The Third Normal Form, Boyce CODD Normal Form, The Fourth Normal Form, The Fifth Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.         File Organization       (4L         Physical Database Design Issues, Storage of Database on Hard Disks, File Organization and Its Types, Heap         files (Unordered files), Sequential File Organization, Indexed (Indexed Sequential) File Organization, Hashed         File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.         A       Structured Query Language (SQL)       (7L         4       Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.       (8L         5       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security. Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization. </th
2       Database Integrity And Normalization       (81.         2       Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.         2       File Organization       (41.         3       File Organization       (41.         9       Physical Database Design Issues, Storage of Database on Hard Disks, File Organization and Its Types, Heap files (Unordered files), Sequential File Organization, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.       (71.         4       Structured Query Language (SQL)       (71.         4       Transaction and Concurrency Management       (81.         5       Sequences, Indexes and Synonyms, Table Handling.       (81.         5       Transaction and Concurrency Management       (81.         5       Q2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.       (61.
2       Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, The Third Normal Form, Boyce CODD Normal Form, The Fourth Normal Form, The Fifth Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.         7 <b>File Organization</b> (4L         9       Physical Database Design Issues, Storage of Database on Hard Disks, File Organization and Its Types, Heap files (Unordered files), Sequential File Organization, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.         4       Structured Query Language (SQL)       (7L         4       Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.         5       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.
2       Problems, Single Valued Dependencies, Normalization, Rules of Data Normalization, The First Normal Form, The Second Normal Form, The Third Normal Form, Boyce CODD Normal Form, The Fourth Normal Form, The Fifth Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.         4       File Organization (Preservation, Indexed (Indexed Sequential) File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.         4       Structured Query Language (SQL) (Preservation Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.         5       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.
2       The Second Normal Form, The Third Normal Form, Boyce CODD Normal Form, The Fourth Normal Form, The Fifth Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.         4       File Organization (File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.         4       Structured Query Language (SQL) (TL Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.         5       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.
The Fifth Normal Form, Multi-valued Functional Dependency, Attribute Preservation,Losslessjoin Decomposition, Dependency Preservation.         File Organization       (4L)         Physical Database Design Issues, Storage of Database on Hard Disks, File Organization and Its Types, Heap files (Unordered files), Sequential File Organization, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.         4       Structured Query Language (SQL)       (7L)         4       Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.       (8L)         5       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.       (6L)
Decomposition, Dependency Preservation.       (4L         Physical Database Design Issues, Storage of Database on Hard Disks, File Organization and Its Types, Heap       (4L         Physical Database Design Issues, Storage of Database on Hard Disks, File Organization and Its Types, Heap       (Indexed Sequential) File Organization, Hashed         File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.       (7L         4       Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.       (8L         5       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.       (6L
File Organization       (4L         Physical Database Design Issues, Storage of Database on Hard Disks, File Organization and Its Types, Heap         3       files (Unordered files), Sequential File Organization, Indexed (Indexed Sequential) File Organization, Hashed         6       File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.         4       Structured Query Language (SQL)       (7L         4       Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.         5       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.
<ul> <li>Physical Database Design Issues, Storage of Database on Hard Disks, File Organization and Its Types, Heap files (Unordered files), Sequential File Organization, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.</li> <li>Structured Query Language (SQL) (7L Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.</li> <li>Transaction and Concurrency Management (8L Transactions, Concurrent Transactions, Locking Protocol,Serializable Schedules, Locks Two Phase Locking (2PL), Deadlock and its Prevention, Optimistic&amp; Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup &amp; Recovery Techniques, Security &amp; Integrity, Database Security Authorization.</li> </ul>
<ul> <li>files (Unordered files), Sequential File Organization, Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.</li> <li>Structured Query Language (SQL) (7L Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.</li> <li>Transaction and Concurrency Management (8L Transactions, Concurrent Transactions, Locking Protocol,Serializable Schedules, Locks Two Phase Locking C2PL), Deadlock and its Prevention, Optimistic&amp; Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup &amp; Recovery Techniques, Security &amp; Integrity, Database Security Authorization.</li> </ul>
File Organization, Types of Indexes, Index and Tree Structure, Multi-key File Organization, Need for Multiple Access Paths, Multi-list File Organization, Inverted File Organization.       (7L)         4       Structured Query Language (SQL)       (7L)         4       Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.       (8L)         5       Transaction and Concurrency Management       (8L)         5       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.       PL/SQL
Access Paths, Multi-list File Organization, Inverted File Organization.       (7L)         4       Structured Query Language (SQL)       (7L)         4       Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.       (8L)         5       Transaction and Concurrency Management       (8L)         5       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.       PL/SQL
4       Structured Query Language (SQL)       (7L         4       Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.         5       Transaction and Concurrency Management (8L         5       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.         PL/SQL       (6L
4       Meaning, SQL commands, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.         7       Transaction and Concurrency Management (8L Transactions, Concurrent Transactions, Locking Protocol,Serializable Schedules, Locks Two Phase Locking (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.         PL/SQL       (6L
<ul> <li>Transaction Control Language, Queries using Order by, Where, Group by, Nested Queries. Joins, Views, Sequences, Indexes and Synonyms, Table Handling.</li> <li>Transaction and Concurrency Management (8L Transactions, Concurrent Transactions, Locking Protocol, Serializable Schedules, Locks Two Phase Locking (2PL), Deadlock and its Prevention, Optimistic&amp; Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup &amp; Recovery Techniques, Security &amp; Integrity, Database Security Authorization.</li> <li>PL/SQL (6L</li> </ul>
Sequences, Indexes and Synonyms, Table Handling.       (8L)         Transaction and Concurrency Management       (8L)         Transactions, Concurrent Transactions, Locking Protocol, Serializable Schedules, Locks Two Phase Locking       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and         Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.       PL/SQL
5       Transactions, Concurrent Transactions, Locking Protocol, Serializable Schedules, Locks Two Phase Locking (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.         PL/SQL       (6L)
5       (2PL), Deadlock and its Prevention, Optimistic& Pessimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.         PL/SQL       (6L)
Security: Database Recovery meaning, Kinds of failures, Failure controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity, Database Security Authorization.           PL/SQL         (6L)
& Recovery Techniques, Security & Integrity, Database Security Authorization.           PL/SQL         (6L)
PL/SQL (6L
6 Introduction to PL/SQL, Variables & Data types, Basic blocks, Conditional & branching statement, Handling
of Cursor, Trigger, Function, Procedure, Package and Exception.
Reference Books:
<ul> <li>Silverchatz, Korth&amp;Sudarshan-Data Base System Concepts, MH.</li> <li>Elmasri, Navathe- Fundamentals of Database Systems, Pearson</li> </ul>
<ul> <li>Elimasri, Navatie- Fundamentals of Database Systems, Pearson</li> <li>C J date-An Introduction to Database, Addison-Wesley Publishing Company</li> </ul>
<ul> <li>Majumder&amp; Bhattacharyya-Data Base Management Systems, TMH</li> </ul>
<ul> <li>Feuerstein-Oracle PL/SQL Programming,SPD/O'REILLY</li> </ul>
Leon-Data Base Management Systems, VIKAS
Kroenke-Data Base Processing: Fundamentals, Design & Implementation, PHI
• P.S Deshpande-SQL PL/SQL for Oracle 8 & 8i, Wiley Dreamtech
P. Bhatia, S. Bhatia, G. Singh- Concepts of Database Management System, Kalyani Publishers
R.P. Mahapatra, Database Management Systems, Khanna Publishing House (AICTE Recommended)

Code: MC		Paper: Computer Organization and Architecture	
	Hours / Week: 4	Total Contact Hours: 40	Credit: 4
Course Or	utcome:		
		his course, students will be able to:	
		pitfalls in computer performance measurements and analyze the impact of	instruction set
		ormance of computer design	
		rcuits, Data Representation, Register and Processor level Design and Instr	uction Set
	chitecture		
		o computer arithmetic and Determine which hardware blocks and control l	ines are used for
	ecific instructions		
		nsistent execution of instructions with minimum hazards	
✓ Ex	plain memory organiz	ation, I/O organization and its impact on computer cost/performance.	
UNITS		COURSE CONTENT	
	INTRODUCTION		(8L)
	Digital Logic Desi	gn: Axioms and laws of Boolean algebra, Reduction of Boolean exp	ressions, conversio
1		forms, Karnaugh map (4 variable), Half Adder, full adder, 4-bitparallel	
	checker circuit, Dec	oder, Encoder, Multiplexer, IC RAM, ROM, Memory Organization, Sequ	ential Circuits, Stat
	transistors, Flip-flop	o, RS, JK, D-Latch, Master-slave.	
	<b>INSTRUCTION S</b>	ET ARCHITECTURE:	(8L)
	Memory Locati	ons and Addresses: Byte Addressability, Big-Endian	and Little-Endia
2	Assignments, We	ord Alignment, Instructions and Instruction Sequencing, A	ddressing Modes
	Assembly Langu	age, Subroutines, Additional Instructions, dealing with	32-Bit Immediat
	Values.		
		ING UNIT & PIPELINING	(8L)
	Basic Processing U	Init: Some Fundamental Concepts, Instruction Execution, Hardware Com	
3		cution Steps, Control Signals, Hardwired Control, CISC	
		Concept, Pipeline Organization, Pipelining Issues, Data Dependencie	s, Memory Delays
		eline Performance Evaluation.	
	MEMORY ORGA		(8L)
4		emiconductor RAM Memories, Read-only Memories, Direct Memor	
т		lemories, Performance Considerations, Virtual Memory, Memory Manage	ement Requirements
	Secondary Storage.		
		& PARALLEL PROCESSING	(8L)
_		ut: Accessing I/O Devices, Interrupts, Input Output Organization:	
5		ion, Interface, Interconnection Standards. Parallel Processing: Hardw	
		Processing, Shared-Memory Multiprocessors, Cache Coherence,	, Message-Passin
		rallel Programming for Multiprocessors, Performance Modeling.	
eference l			
		on and Embedded Systems, 6 <sup>th</sup> Edition, Hamacher Carl, et. al, Tata McGrav	N
	Hill, New Delhi, 2011	on and Design: The Hardware Software / Interface, 5 <sup>th</sup> Edition, 1994, Patter	con David A
•	Computer Organizatio	chitecture, Revised 3 <sup>rd</sup> Edition, Mano M. Morris, Pearson Education,	Ison David A.
•	Computer System Ard	mation, Revised 5 Edition, Mano M. Montis, reason Education,	

Code: MC	CAN-104 Paper: Discrete Mathematics Hours / Week: 4 Total Contact Hours: 40	Credit: 4
Course O		
	essful completion of this course, students will be able to:	
	nterpret the problems that can be formulated in terms of graphs and trees.	
✓ E	Explain network phenomena by using the concepts of connectivity, independent sets, clique	es, matching, graph coloring
	tc.	
	Achieve the ability to think and reason abstract mathematical definitions and ideas r	
	oncepts of well-ordering principle, division algorithm, greatest common divisors and cong	
	Apply counting techniques and the crucial concept of recurrence to comprehend the	e combinatorial aspects of
	lgorithms. Analyze the logical fundamentals of basic computational concepts.	
	Compare the notions of converse, contrapositive, inverse etc. in order to consolidate the c	omprehension of the logical
	ubtleties involved in computational mathematics.	omprenension of the logical
UNITS	COURSE CONTENT	
	Logic and Proofs	(3L)
1	Propositional logic, Propositional equivalences, Predicates and quantifiers, Nested quant	
	Principles of Mathematical Induction	(5L)
2	The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Nur	
	Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic.	
	Sets and Sequence	(8L)
	Sets, Relation and Function: Operations and Laws of Sets, Cartesian Products, Bina	
3	Relation, Equivalence Relation, Image of a Set, Sum and Product of Functions, Bij	
	Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncoun	
	argument and The Power Set theorem, Schroeder-Bernstein theorem. Fuzzy set, Basic Counting and Combinatorics	(8L)
	Counting, Sum and product rule, Principle of Inclusion Exclusion. Pigeon Hole Princ	
4	Double Counting. Linear Recurrence relations - methods of solutions. Generating	Functions. Permutations ar
	Combination.	
	Algebraic Structure	(9L)
	Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Group	
5	Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Subs	tructures, Normal Subgroup
-	Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. F	
	Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Normal Form	Disjunctive and Conjunctiv
	Graph and Tree	(7L
	Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphis	
6	Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring	
	Perfect Graph, definition properties and Example, rooted trees, trees and sorting, wei	
	Bi-connected component and Articulation Points, Shortest distances.	
eference		
	B. Singh, Discrete Structures, Khanna Book Publishing, Delhi	
	undel& Baker- Discrete Mathematics for Comp. Scientists & Mathematicians, Mott, PHI L.Liu- Discrete Mathematical Structure, C.L.Liu,TMH	
	S.RAO- Discrete Mathematical Structure, New Age International	

- G.S.RAO- Discrete Mathematical Structure, New Age International DeoNarsingh Graph Theory With Applications To Engineering And Computer Science, PHI Learning Arumugam, Ramachandran- Invitation to Graph Theory, Scitech Publications (India)

Contacts Hours / Week: 3       Total Context Hours: 30       Credit: 3         Contacts Hourse Outcome:         After successful completion of this course, students will be able to:           ✓       Be able to understand the natural environment and its relationships with human activities.           ✓       Be able to understand environment and its relationships with human activities.           ✓       Be able to understand environmental laws and regulations to develop guidelines and procedures for health and safety issues          ✓       Be able to solve scientific problem-solving to air, water, noise and land pollutions. <b>UNITS</b> COURSE CONTENT         1       Basic ideas of environment and interrelationship among man society and environment. Environmental problems and issues, Segments of environments, Natural Cycles of environments Mathematics of population growth and its associated problems, Logistic population growth       (3L)         2       Open and closed system ecology, species, population, community, definition of ecosystem-components type and functions, Environmental perspectives, Montreal protocol       (3L)         3       Pollutants and Contaminants       (3L)       (3L)       (3L)         3       Definition of primary and secondary pollutants and contaminants. Source and effects of different air pollutant suspended particulate matter, oxide		Computer Application
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<ul> <li>Be able to apply the fundamental knowledge of science and engineering to assess environmental and health risk.</li> <li>Be able to understand environmental laws and regulations to develop guidelines and procedures for health and safety issues</li> <li>Be able to solve scientific problem-solving to air, water, noise and land pollutions.</li> <li>UNITS</li> <li>COURSE CONTENT</li> <li>Introduction</li> <li>Basic ideas of environment and interrelationship among man society and environment.</li> <li>Environmental problems and issues, Segments of environments, Natural Cycles of environments Mathematics of population growth and its associated problems, Logistic population growth</li> <li>Elements of Ecology</li> <li>Open and closed system ecology, species, population, community, definition of ecosystem-components type and functions, Environmental perspectives, Montreal protocol</li> <li>Pollutants and Contaminants</li> <li>Definition of primary and secondary pollutants and contaminants. Source and effects of different air pollutant suspended particulate matter, oxides of carbon, nitrogen, sulphur particulate</li> <li>Air Pollution</li> <li>Structures of the atmosphere, global temperature models, Greenhouse effect, global warming; acid rain: causes effects and control. Lapse rate and atmospheric stability; pollutants and contaminants; smog; depletion of ozon layer; standards and control measures of air pollution.</li> <li>Water Pollution</li> <li>Mather Pollution</li> <li>Noise: definition and classification; noise frequency, noise pressure, noise intensity, l</li></ul>		
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UNITS         COURSE CONTENT           1         Introduction         (4L)           1         Basic ideas of environment and interrelationship among man society and environment. Environmental problems and issues, Segments of environments, Natural Cycles of environments Mathematics of population growth and its associated problems, Logistic population growth         (3L)           2         Open and closed system ecology, species, population, community, definition of ecosystem-components type and functions, Environmental perspectives, Montreal protocol         (3L)           3         Definition of primary and secondary pollutants and contaminants. Source and effects of different air pollutant suspended particulate matter, oxides of carbon, nitrogen, sulphur particulate         (3L)           4         Air Pollution         (5L)           5         Structures of the atmosphere, global temperature models, Greenhouse effect, global warming; acid rain: causes effects and control. Lapse rate and atmospheric stability: pollutants and contaminants; smog; depletion of ozon layer; standards and control measures of air pollution.         (5L)           5         Hydrosphere; pollutants of water: origin and effects; oxygen demanding waste; thermal pollution; pesticides salts. Biochemical effects of heavy metals; eutrophication: source, effect and control. Water quality parameters DO, BOD, COD. Water treatment: surface water and wastewater.         (5L)           6         Land pollution         (5L)         (5L)           7         Noise Pollution         (5L)           <		
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and functions, Environmental perspectives, Montreal protocol       (31)         3       Definition of primary and secondary pollutants and contaminants. Source and effects of different air pollutant suspended particulate matter, oxides of carbon, nitrogen, sulphur particulate       (3L)         4       Air Pollution       (5L)         5       Structures of the atmosphere, global temperature models, Greenhouse effect, global warming; acid rain: causes effects and control. Lapse rate and atmospheric stability; pollutants and contaminants; smog; depletion of ozon layer; standards and control measures of air pollution.       (5L)         5       Water Pollution       (5L)         6       Land Pollution       (5L)         7       Noise Pollution       (5L)         7       Noise: definition and classification; noise frequency, noise pressure, noise intensity, loudness of noise, noise threshold limit value; noise pollution effects and control.       (5L)         7       Noise: definition and classification; noise frequency, noise pressure, noise intensity, loudness of noise, noise threshold limit value; noise pollution effects and control.       (5L)         8       Environmental Engineering and Elementary Biology, GourKrishna Das Mahapatra, Vikas Publishing House P. Ltd.       Environmental Chemistry, A. K. De, New Age International.         6       Environmental Chemistry, A. K. De, New Age International.       Environmental Chemistry with Green Chemistry, A. K. Das, Books and Allied P. Ltd.		Elements of Ecology (3L)
3       Pollutants and Contaminants       (3L)         3       Definition of primary and secondary pollutants and contaminants. Source and effects of different air pollutant suspended particulate matter, oxides of carbon, nitrogen, sulphur particulate       (3L)         4       Air Pollution       (5L)         5       Structures of the atmosphere, global temperature models, Greenhouse effect, global warming; acid rain: causes effects and control. Lapse rate and atmospheric stability; pollutants and contaminants; smog; depletion of ozon layer; standards and control measures of air pollution.       (5L)         5       Water Pollution       (5L)         6       Land Pollution       (5L)         7       Noise Pollution       (5L)         8       Biochemical effects of heavy metals; eutrophication: source, effect and control. Water quality parameters DO, BOD, COD. Water treatment: surface water and wastewater.       (5L)         6       Land Pollution       (5L)         7       Noise Pollution       (5L)         8       Noise Pollution       (5L)         7       Noise Pollution       (5L)         8       Environmental Studies, M.P. Poonia & S.C. Sharma, Khanna Publishing House.       (5L)         9       Environmental Engineering and Elementary Biology, GourKrishna Das Mahapatra, Vikas Publishing House P. Ltd.       Environmental Chemistry, A. K. De, New Age International. <td< td=""><td>2</td><td>Open and closed system ecology, species, population, community, definition of ecosystem-components types</td></td<>	2	Open and closed system ecology, species, population, community, definition of ecosystem-components types
3       Definition of primary and secondary pollutants and contaminants. Source and effects of different air pollutant suspended particulate matter, oxides of carbon, nitrogen, sulphur particulate         4       Air Pollution (5L)         5       Structures of the atmosphere, global temperature models, Greenhouse effect, global warming; acid rain: causes effects and control. Lapse rate and atmospheric stability; pollutants and contaminants; smog; depletion of ozon layer; standards and control measures of air pollution.         5       Water Pollution (5L)         6       Water Pollution (5L)         6       Land Pollution (5L)         7       Noise Pollution and classification; noise frequency, noise pressure, noise intensity, loudness of noise, nois threshold limit value; noise pollution effects and control.         7       Noise: definition and classification; noise frequency, noise pressure, noise intensity, loudness of noise, nois threshold limit value; noise pollution effects and control.         8       Environmental Studies, M.P. Poonia & S.C. Sharma, Khanna Publishing House.         6       Environmental Chemistry, A. K. De, New Age International.         6       Environmental Chemistry, A. K. De, New Age International.         6       Environmental Engineering G.M.Masters, Tata Mc Graw Hills         6       Environmental Chemistry with Green Chemistry, A. K. Das, Books and Allied P. Ltd.		and functions, Environmental perspectives, Montreal protocol
suspended particulate matter, oxides of carbon, nitrogen, sulphur particulate       Image: Suspended particulate matter, oxides of carbon, nitrogen, sulphur particulate         4       Air Pollution       (5L)         5       Structures of the atmosphere, global temperature models, Greenhouse effect, global warming; acid rain: causes effects and control. Lapse rate and atmospheric stability; pollutants and contaminants; smog; depletion of ozon layer; standards and control measures of air pollution.       (5L)         5       Water Pollution       (5L)         6       Land Pollution       (5L)         7       Noise Pollution       (5L)         7       Noise: definition and classification; noise frequency, noise pressure, noise intensity, loudness of noise, noise threshold limit value; noise pollution effects and control.       (5L)         8       Environmental Studies, M.P. Poonia & S.C. Sharma, Khanna Publishing House.       (5L)         9       Environmental Engineering and Elementary Biology, GourKrishna Das Mahapatra, Vikas Publishing House P. Ltd.       Environmental Chemistry, A. K. De, New Age International.         6       Environmental Chemistry, A. K. De, New Age International.       Environmental Chemistry, With Green Chemistry, A. K. Das, Books and Allied P. Ltd.		
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<ul> <li>Structures of the atmosphere, global temperature models, Greenhouse effect, global warming; acid rain: causes effects and control. Lapse rate and atmospheric stability; pollutants and contaminants; smog; depletion of ozon layer; standards and control measures of air pollution.</li> <li>Water Pollution (5L) Hydrosphere; pollutants of water: origin and effects; oxygen demanding waste; thermal pollution; pesticides salts. Biochemical effects of heavy metals; eutrophication: source, effect and control. Water quality parameters DO, BOD, COD. Water treatment: surface water and wastewater.</li> <li>Land Pollution (5L) Land pollution: sources and control; solid waste: classification, recovery, recycling, treatment and disposal.</li> <li>Noise Pollution (5L) Noise: definition and classification; noise frequency, noise pressure, noise intensity, loudness of noise, nois threshold limit value; noise pollution effects and control.</li> <li>Reference Books:         <ul> <li>Environmental Studies, M.P. Poonia &amp; S.C. Sharma, Khanna Publishing House.</li> <li>Basic Environmental Engineering and Elementary Biology, GourKrishna Das Mahapatra, Vikas Publishing House P. Ltd.</li> <li>Environmental Chemistry, A. K. De, New Age International.</li> <li>Environmental Engineering, G.M.Masters, Tata Mc Graw Hills</li> <li>Environmental Chemistry with Green Chemistry, A. K. Das, Books and Allied P. Ltd.</li> </ul> </li> </ul>		
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	CAN-E105B Hours / Week: 3	Paper: Management Accounting Total Contact Hours: 30	Credit: 3
Course Or		Total Contact Hours. 50	Creat. 5
		ourse, students will be able to:	
	derstand the basic concept		
		and functions of different discipline of business management.	
		nong the students inculcate with theoretical structures about banking system	
		actions and prepare annual financial statements; and analyse, interpret and o	communicate
	information contained in l		
	alyse and provide recomm nagement accounting tech	endations to improve the operations of Organisations through the application niques	n of Cost and
		and expert knowledge of Tally ERP with GST.	
UNITS		COURSE CONTENT	
	Introduction		(3L)
1	Basics of management;	Planning, scheduling, organizing, staffing, directing, controlling	
	Management		(3L)
2	Marketing Management	, Financial management, Operation management,	
	Human resource manag	ement, Management information System	
	Strategy		(3L)
3		ent, strategies and resources, industry structure and analysis, corporate s	strategies and it
		r growth and diversification, strategic planning	
	Business Trade and Ba	inking iness, Sole Proprietorship, Partnership, Limited company and cooperativ	(3L)
	characteristics.	mess, sole Frophetorship, Farmership, Emitted company and cooperativ	e society – the
4		nercial banks; credit creation and its importance in industrial functioning	. Role of centra
	bank: Reserve Bank of		
	International Business of	r Trade Environment.	
	Financial Accounting		(7L)
5		Balance, Profit & amp; Loss Account, Balance Sheet, Financial Reporting	
		alysis and Interpretation (Financial Ratio and Cash Flow analysis)	
6	Cost Accounting	tion of costs, Cost Sheet	(7L)
0		ariance Analysis, Cost-volume profit (CVP) relationship, Cash Budgeting	
	Packages	analice Analysis, Cost-volume pront (CVI) relationship, Cash Budgeting	(4L)
7		mputer package (Tally ERP with GST)	(HL)
Reference I			
		Managerial Perspective, R. Narayanswami, Prentice-Hall of India Private	Limited. New
	Delhi		
		Management, Horne, James C Van, Prentice-Hall of India Private Limited,	New Delhi
		, H. L. Ahuja., S. Chand. New Delhi.	
	Management Accounting,	Knan & Jain, 191 $H$	

Management Accounting, M.E. ThukaramRao, New Age International

	CAN-E105CPaper: Constitution of IndiaHours / Week: 3Total Contact Hours: 30	Credit: 3
Course O	Outcome:	
After succ	cessful completion of this course, students will be able to:	
	Understand the premises informing the twin themes of liberty and free	dom from a civil rights perspective.
✓ T	Fo address the growth of Indian opinion regarding modern Indian int	ellectuals' constitutional role and entitlement t
	civil and economic rights as well as the emergence of nationhood in the	
	Fo address the role of socialism in India after the commencement of t	
	on the initial drafting of the Indian Constitution.	1
UNITS	COURSE CONTEN	Т
	History of Making of the Indian Constitution	
1	History Drafting Committee, (Composition & Working)	
	Philosophy of the Indian Constitution	(5L)
2	Preamble Salient Features	()
	Contours of Constitutional Rights & Duties	(5L)
	Fundamental Rights, Right to Equality, Right to Freedom ,Rig	
3	Religion, Cultural and Educational Rights, Right to Constitutional	
	Fundamental Duties.	
	Organs of Governance	(5L
4	Parliament, Composition, Qualifications and Disqualifications,	
4	Governor, Council of Ministers, Judiciary, Appointment and T	
	Functions	
	Local Administration	(5L)
	District's Administration head: Role and Importance, Municipal	ities: Introduction, Mayor and role of Elected
5	Representative, CEO of Municipal Corporation. Pachayati raj: Int	
	and their roles, CEO ZilaPachayat: Position and role. Block	
	departments), Village level: Role of Elected and Appointed official	
	Election Commission	(5L
6	Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission:	
	Role and Functioning. Institute and Bodies for the welfare of SC/S	Γ/OBC and women.
eference		
	The Constitution of India, 1950 (Bare Act), Government Publication.	
	Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1	st Edition, 2015.
	M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.	15

• D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

Code: MO	CAN-E105D	Paper: Stress Management through Yoga	
Contacts	Hours / Week: 3	Total Contact Hours: 30	Credit: 3
Course O	outcome:		
After succ	cessful completion of this	course, students will be able to:	
✓ T	To achieve overall health	of body and mind	
√ T	To overcome stress		
UNITS		COURSE CONTENT	
1	Astanga		(8L)
1	Definitions of Eight pa	urts of Yoga ( Ashtanga )	
	Yam and Niyam		(8L)
2	Do's and Don't's in life. i) Ahinsa, satya, astheya, bramhacharya and aparigraha ii) Shaucha, santosh, tapa,		
	swadhyay, ishwarprani	Idhan	-
	Asan and Pranayam		(8L)
3		and their benefits for mind & body ii)Regularization of breathing te	
	Typesof pranayama		1
4	Meditation Techniqu	es	(6L)
Reference	Books:		`````````````````````````````````
•	Janardan Swami Yogabh	yasi Mandal- Yogic Asanas for Group Tarining-Part-I, Nagpur	
•	Swami Vivekananda- Ra	ajayoga or conquering the Internal Nature, AdvaitaAshrama (Public	cation Department),
	Kolkata		- //

	CAN-E105E	Paper: Ethics in Business Profession	
	Hours / Week: 3	Total Contact Hours: 30	Credit: 3
Course O			
		ourse, students will be able to:	
		work ethics, Learn to respect others and develop civic virtue.	1 1 1 T
		ponsibilities of the engineers, create awareness about the customs a	nd religions, Install
		d Loyalty and to appreciate the rights of others.	0.1 11 1
	e	become a social experimenter, Provide depth knowledge on framing	of the problem and
	etermining the facts.		. D. 1.
		ty, risk & risk benefit analysis, Provide knowledge on Intellectual Prop	
		lobal issues, Create awareness on computer and environmental ethics,	Analyze ethical
	roblems in research.		
UNITS		COURSE CONTENT	
	Human Values		(6L)
1		thics-Integrity-Work Ethic-Service learning, Civic Virtue, Respect	
		ing, Honesty, Courage-Cooperation, Commitment, Empathy, Self Cor	
	Professional Ethics		(6L)
2 Senses of 'Professional Ethics-Variety of moral issued, Types of inquiry, Moral dilemmas, M			
		gan's theory, Consensus and controversy, Models of professional ro	oles, Theories about
	right action, Self-interes		
	Professional As Social		(6L)
3		sperimentation, Framing the problem, Determining the facts, Codes of	
		ssues, Common Ground, General Principles, Utilitarian thinking respec	
		And Rights in Profession	(6L)
4		essment of Safety and Risk – Risk Benefit Analysis and Reducing	
		Bargaining – Confidentiality – Conflicts of Interest – Occupational C	rime – Professional
	Global Issues	tts – Intellectual Property Rights (IPR) – Discrimination	(6L)
Globalization, Cross culture issues-Environmental Ethics, Compu		ulture issues Environmental Ethics, Computer Ethics, Computers as	
5		mputers as the object of Unethical acts, Autonomous Computers,	
5		ip, Code of Conduct, Corporate Social Responsibility. Ethics and R	
	Ethical Problems in rese		cocuron, rmaryzing
Reference		** ***	
		n S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India,	New Delhi.
•	A. R. Aryasri, Dharanik	otaSuyodhana "Professional Ethics and Morals" Maruthi Publica	ations.
•	Mike W. Martin and Rola	nd Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delh	i.
•	John R Boatright, "Ethi	cs and the Conduct of Business", Pearson Education, New Delhi	

Widder	of Computer Application		
	AN-E105F	Paper: Managerial Economics	
	Hours / Week: 3	Total Contact Hours: 30	Credit: 3
Course Ou			
	essful completion of this cour		
	o understand applications of a		
	o understand and interpret de	ween short-run and long-run costs.	
		ve markets including substitution.	
		how it relates to price discrimination and total revenue.	
		sequences of different market conditions.	
		ce and output decisions of firms under various market structur	re.
UNITS		COURSE CONTENT	
	Introduction (2L)		
1		l Economics, Basic problems of an economic system; G	oals of managerial decision
	making; Resource allocatio		6
	Demand Analysis (6L)		
		w of Demand, Explaining the law of demand, Violations of t	theLaw of Demand, Shifts in
	Demand; Elasticity of Den	nand: Price Elasticity (at a point andover and interval), Fact	ors affecting price elasticity,
2		e in TotalRevenue, AR, MR and Price elasticity, Range of	
2		Superior and Normal goods, Income Elasticity and Share	in TotalExpenditure; Cross-
	Price Elasticity, Substitutes		
		t line and consumer equilibrium	
		demand estimation (concepts only)	
	Production and Cost Ana		
		rt Run and Long Run, Production with One Variable Input,	, I otal Product, Average and
	Marginal Products, Law of	Variable proportions, Relationship between TP, AP and MP.	
	Short Run Costs of Prod	luction, Fixed and Variable Costs, Short Run Total, Ave	rage andMarginal Cost and
		, Short Run Cost Curves, Relationshipbetween AVC, MC,	
3		en LAC and SAC, Economies of Scale and Scope.	The unit that, Doing ture cost
		, <b>1</b>	
	Production with Two Varia	ble Inputs, Isoquants – Characteristics, Marginal Rate of	
		vs of Returns to Scale, Isocost Curves, * # Finding the Optim	al
		duction of a given output at Minimum Cost, Production of	
		ven level of Cost, Expansion Path, Finding the Long Run	
	Cost Schedules from the Pr		
4	Alternate Goals of Manag		
		nue maximization; Managerial utility maximization	
		<b>king under Alternative Market Structures (6 L)</b> Competition, #Profit Maximization in Competitive Markets,	Output Decision in the Short
		ort Run Supply for the Firm and Industry; Output Decision i	
5		r the Perfectly Competitive Industry.	, 210001 21000
		· · ·	
		under different market structure – Monopoly, Monopolistic	
	Competition, Oligopoly – c	cartel, price leadership.	
	Pricing Decisions [4 L]		
6		Monopoly, Transfer Pricing.	
	Market Failure Game theory &Asymmetric	cinformation	
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•	Lipsey & Chrystal - Econom	nics – Oxford University Press	
•	Peterson & Lewis - Manager	rial Economics – Pearson Education.	
		cro Economics – Pearson Education	
	H.L. Ahuza- Managerial Eco		
٠	D.N. Dwivedi- Managerial E	conomics, Prentice Hall.	

Code: MCAN-190         Paper: Soft Skill and Interpersonal Communication Total Contact Hours / Week: 4         Credit: 2           Course Outcome:         After successful completion of this course, students will be able to: <ul> <li>Effectively communicate through verbal/oral communication and improve the listening skills</li> <li>Able to be self-confident with positive vibes</li> <li>Actively participate in group discussion / meetings / interviews and prepare &amp; deliver presentations</li> <li>Become more effective individual through poal/araget setting, self-motivation and practicing creative thinking.</li> <li>Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Interpersonal relationships, conflict management and leadership quality.</li> </ul> UNITS         Soft Skills& Interpersonal Communication An Introduction – Definition and Significance of Soft Skills; Process, Importance and Measurement of Soft Skill Development.           1         Inter personal relationships through effective communication; listening skills; essential formal writing skills; corporate communication styles –assertion, persuasion, negotiation.           2         Discovering the Self. Setting Goals; Beliefs, Values, Attitude, Virtue. Developing Positive Thinking and Attitude; Driving out Negativity; Meaning and Theories of Motivation; Enhancing Motivation Levels.           3         Corporate Communication         Fublic Speaking; Skills. Methods, Strategies and Essential tips for effective public speaking. Group Discovering the Self. Setting Goals; Beliefs, Values, Attitude, Virtue. Developing Positive Thinking Group Discovel	Master of C	omputer Application			
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<ul> <li>Summarizing and Attaining the Objective.</li> <li>Interview&amp; Presentation Skills: Interviewer and Interviewee– in-depth perspectives. Before, During and After the Interview. Tips for Success: Types, Content, Audience Analysis, Essential Tips – Before, During and After, Overcoming Nervousness.</li> <li>Non-Verbal Communication &amp; Personality Development Importance and Elements; Body Language. Concept, Essentials, Tipsc Meaning, Nature, Features, Stages, Models; Learning Skills; Adaptability Skills.</li> <li>Business Etiquette &amp; Team Work Concept of Teams; Building effective teams; Concept of Leadership and honing Leadership skills. Meaning, Nature, Features, Stages, Models; Learning Skills; Adaptability Skills.</li> <li>Reference Books:         <ul> <li>Managing Soft Skills for Personality Development – edited by B.N.Ghosh,McGraw Hill India, 2012.</li> <li>Effective Communication and Soft Skills, Nitin Bhatnagar, Pearson Education India, 2011</li> <li>English and Soft Skills – S.P.Dhanavel, Orient Blackswan India, 2010.</li> </ul> </li> </ul>		<b>Group Discussion</b> : Importance Planning Elements Skills assessed: Effectively disagreeing Initiating			
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MCA Syllabus

Code: MC	AN-191	Paper: Python Programming Lab	
	Hours / Week: 4	Total Contact Hours: 40	Credit: 2
Course Ou	itcome:		
		urse, students will be able to:	
		ating to different logical problems.	
		stand and debug syntax errors reported by the compile	er.
		ne native data types (Python in this course)	
	o implement conditional brain		
	o decompose a problem inte		
		m and write into simple text files.	
	o understand the basic conc		
	o understand and implement	t Python NumpyArrray operations	
UNITS		COURSE CONTENT	
1	<b>Python Basics:</b> Installin Program	g Python, Setting up Path and Environment Varial	bles, Running Python, First Python
2	<b>Python Data Types &amp; Input/output:</b> Keywords, Identifiers, Python Statement, Indentation, Documentation, Variables, Multiple Assignment, Understanding Data Type, Data Type Conversion, Python Input and Output Functions, Import command.		
3	<b>Operators and Express</b> Associative Operators.	ions: Operators in Python, Expressions, Precedenc	e, Associativity of Operators, Non
4	<b>Control Structures:</b> Dec	ision making statements, Python loops, Python contro	ol statements.
5	Python Native Data T	<b>ypes:</b> Numbers, Lists, Tuples, Sets, Dictionary, F r methods and operations).	
6	<b>Python Functions:</b> Built Reference, Recursion	-in Functions, User defined functions, Anonymous	functions, Pass by value, Pass by
7	<b>Exception Handling:</b> Ex	ceptions, Built-in exceptions, Exception handling, Use	er defined exceptions in Python.
8	<b>File Management in Python:</b> Operations on files (opening, modes, attributes, encoding, closing), read() & write() methods, tell() & seek() methods, renaming & deleting files in Python, directories in Python.		
9	<b>Python OOPs</b> Python OOPs Concepts, 0	Dbject Class, Constructors, Inheritance	
10	<b>Python Numpy</b> Numpy data types, Opera filter)	tions on Numpy Array (indexing,slicing, shape/resha	ppe, iteration, join, split, search, sort,

a i Mai	31.404		
Code: MCA	N-192 ours / Week: 4	Paper: Relational Database Management System Lab Total Contact Hours: 40	Credit: 2
Course Out		Total Contact Hours. 40	
		s course, students will be able to:	
		onship Diagram (ERD) model as a blueprint to develop the correspondin	g relational model in
	DBMS system like Or		8
		f Structured query language (SQL) to create a relational database from sc	ratch through
		s constraints in Oracle RDBMS system.	C
✓ App	ply DML component o	of Structured query language (SQL) for storing and modification of data i	n Oracle RDBMS
sys	tem.		
		f Structured query language (SQL) to construct complex queries for effic	ient retrieval of data
		per the user requirement specifications.	
		various P/L SQL concepts like cursor, trigger in creating database progra	
		latabase backend system using SQL and P/L SQL programming to establi	ish overall integrity
	he database system.		
	plement PL/SQL funct	ion, Procedure and Package and Apply Exception.	
UNITS	~	COURSE CONTENT	
1		ase based on given ERD Model:	
	SQL Data Definition		1
		ble structure, Apply (and Alter) constraints on columns/tables viz., prin	
		ck. Verify/ Review the table structure (along with applied constraints) to user_constraints, user_cons_columns, etc. Create view, materialized vi	
	table.	user_constraints, user_cons_columns, etc. Create view, materialized vi	ew using one or more
	SQL Data Manipulati	ion Language (DML)	
		e at a time/ and in bulk) from a table, Update existing rows of a table, De	elete rows (a few or all
	rows) from a table.	e a a anno, and in bank) nom a more, optage existing rows of a more, be	nete to wa (u tew of un
	Data Query Langua	ge (DOL)	
		here structure - Usage of Top, Distinct, Null keywords in query, Using	String and Arithmetic
		ing Where Clause with various Operators and logical combination of	
	Sorting data using Or	der By clause. Usage of IN, LIKE, ALL keywords.	
	Introduction to Joins,	Natural Joins, equi-join, non-equi-join, Self-Join, Inner Join, Outer (left,	right) Join.
	Set operations:		
2		nus set operations on table data using SQL.	
	Using single row fund		
		ndle ambiguity of null data), upper, lower, to_date, to_char functions, etc.	
		e row functions in Queries like Count, Sum, Min, Max, Avg, etc, using	Group By and Having
		By with Rollup and Cube.	
		with various nested structure of Sub Queries - use in from or where clau	se with more than one
		elated sub-query- Ranking table data using correlated sub-query.	
	PL/SQL Stored Procedures on	nd Functions- Basic programming constructs of PL / SQL like if, else, e	lea if loop while for
	structure	in Functions- basic programming constructs of TE7 SQL like II, else, e	ise-ii, ioop, wille, ioi
		edure variables with the data fetched from table using SQL command.	
		rs - Creating Cursors, parameterized cursor, Locks on cursors, Exploring a	advantages of cursors.
3		ers - Constraints Vs Triggers, Creating, Altering, Dropping triggers, use of	
		er to validate/ rollback a Transaction, Automatically populate integer da	
	columns (e.g., Id.) us		
		Procedure & Package – Create Function, Create Procedure and Create Pac	kage.
	Exception Handling.	-	