ECA21001

I SEMESTER

DSC 1A: Computer Fundamentals & MIS
Credit (L: T: P = 4: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to

CO1. Deliberate the details of computer system
CO2. Learn the classification and characteristics of computer system
CO3. Understand in details with examples software
CO4. Identify the characteristics of devices
CO5. Learn the classification and characteristics of software
CO6. Understand the classification and characteristics of Memory units
CO7. Learn the classification and characteristics of CPU
CO8. Identify the characteristics of Computer Components
CO9. Understand the classification and characteristics of Computer Technologies
CO10. Learn the details of Computer Application in Education and research
CO11. Identify in details with examples MIS
CO12. Specify in depth MIS

Unit - 1   15 Hours

Introduction: Introduction to computer system, uses, types.
Human Computer Interface: Types of software, Operating system as user interface, utility programs
Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter

Unit - 2   15 Hours

Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks
Computer Organization and Architecture: C.P.U., registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.

Unit - 3   15 Hours

Overview of Emerging Technologies: Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems.
Use of Computers in Education and Research: Data analysis, Heterogeneous storage, e-Library, Google Scholar, Domain specific packages such as SPSS, Mathematical etc.

Unit - 4   **15 Hours**

MANAGEMENT INFORMATION SYSTEM: Introduction to data and information, Types of Information, Types of information System. Impact of MIS, Role and Importance, Managers and Activities in IS, Types of Computers Used by Organizations in Setting up MIS, Hardware support for MIS.

Reference Books:

1. A. Goel, Computer Fundamentals, Pearson Education, 2010.
2. P. Aksoy, L. DeNardis, Introduction to Information Technology, Cengage Learning, 2006
3. P. K.Sinha, P. Sinha, Fundamentals of Computers, BPB Publishers, 2007

ECA21101

I SEMESTER

DSC 1A: Computer Fundamentals & MIS Lab
Credit (L: T: P = 0: 0: 2)

LIST OF EXPERIMENTS

1. Study and Identification of standard desktop personal computer
2. Understanding of Motherboard and its interfacing components
3. Install and configure computer drivers and system components.
4. Disk formatting, partitioning and Disk operating system commands
5. Install, upgrade and configure Windows operating systems.
6. Remote desktop connections and file sharing.
7. Identify, Install and manage network connections Configuring IP address andDomain name system
8. Install, upgrade and configure Linux operating systems.
9. Installation Antivirus and configure the antivirus.
10. Installation of printer and scanner software.
11. Disassembly and Reassembly of hardware.
12. Trouble shooting and Managing Systems

ECA22001

I SEMESTER

DSC 2A: Discrete Mathematics & Logic Computation

Credit (L: T: P = 6: 0: 0)

Course Outcomes

CO 1. To understand set and their application.
CO 2. To study the basic concepts in graph theory.
CO 3. To understand vectors and functions and to distinguish between them.
CO 4. To understand the difference between and open statement and mathematical statement.
CO 5. To study logic and its importance.
CO 6. To study Boolean algebra and its application.

Unit - 1   15 Hours

Basics of Set Theory: Notation, Inclusion and Equality of Sets, The Power set, Operations on sets, Venn diagram, Set identities ,Number of elements in a finite set ,Ordered pairs and Cartesian Products.
Graph Theory: Basic Definitions, Paths and Connectedness, Matrix Representation of Graphs, Trees.

Unit - 2   15 Hours

Relations and ordering – Properties of binary relations in a Set, Relation Matrix and the Graph of a Relation, Equivalence Relations, Compatibility Relations, Composition of Binary Relation

Unit – 3   15 Hours

Functions: Definition and Introduction, Composition of Functions, Inverse Functions.

Unit - 4   15 Hours

Mathematical Logic: Statements and Notation, Connectives, Negation, Conjunction, Disjunction, Statement Formulas and Truth Tables, Conditional and Bi-conditional, Tautologies, Equivalence of Formulas, Tautological Implications.

Unit - 5   15 Hours

Boolean algebra: Boolean algebra - Application of Boolean Algebra to switching theory. Languages - Recognition and generation - Phase structure grammars and languages – Finite state Machine - Recognition in regular languages.

Unit – 6   **15 Hours**

Analytical Geometry: Cartesian co-ordinates – Distance and Section formulae (without proof) – Slope and intercepts - Equation of line (without proof) – Circle - Centre and radius - general and standard form of the equation of a circle (only problems) – Conic section – Equation in standard form and problems.

Reference Books:

1. Discrete Mathematical Structures with Applications to Computer Science by J.P. Tremblay, R Manohar 3rd Edition – Tata McGraw Hill.
2. Discrete mathematical structures by B. Kolman, R.C. Busby and S. Ross, 3rd edition.
3. Introduction to discrete mathematics by Liu, C.L., McGraw Hill, 2nd edition, 1985.
4. Discrete mathematics by S.A. Witala, McGraw Hill, 1987.
5. Discrete mathematical structures by Dr.D.S.Chandrasekharaiah.
6. Business mathematics by D.C.Sancheti and V.K.Kapoor .

ECA23001

I SEMESTER

DSC 3A: Object Oriented Programming in C++
Credit (L: T: P = 4: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to

CO1. Deliberate the classification and characteristics of Basic of Problem Solving Techniques
CO2. Understand the details of Basic of Problem Solving Techniques
CO3. Learn in depth Basic concepts of OOPs and C++ Programming Language
CO4. Deliberate the details of Control Structures & Arrays in C++
CO5. Deliberate the details of Functions in C++
CO6. Learn the details of strings & pointers in C++
CO7. Learn the details of Structures and Unions in C++
CO8. Deliberate the details of Program Development using OOPs Concepts

Unit - 1   15 Hours

Problem solving aspects: Introduction, Problem definition, Problem analysis, Design of problem solution, Algorithm, Flowchart, Coding, Debugging, Types of errors in programming, Program Documentation and Program maintenance.
Techniques of Problem Solving: Flowchart, algorithm, structured programming concepts, Programming methodologies viz- top-down and bottom-up programming
Introduction to C++: Structure of C++ program, Tokens, Keywords, Identifiers and constants, Basic Data Types, User-defined data types, Derived data Type, Symbolic constants, Declaration of variables, input-output Statements.
Operators: Introduction, types of operator,Scope resolution operator, Memory management operators, Manipulators, Expressions and their types, Operator precedence and Evaluation

Unit - 2   15 Hours

Control structures: Selection statements: if statement, if-else, nested if, else-if ladder, switch statement with examples **Iteration/ Looping statements**: for loop, while loop, do-while loop with examples Jumping Statements: Break, continue, goto, exit with examples
Arrays: Definition, declaration, initialization of 1D – 2D arrays with example programs.

Unit – 3   15 Hours

Functions: Function definition, types of functions, categories of function, main function, Function prototype, Call by Value. Recursion, Inline functions, default arguments, const arguments, math - built-in function, passing array as an argument, function overloading.
Strings: Declaration, initialization, operations on Strings and String functions
Pointers: Definition, Declaration, initialization, void pointer, pointervariables, pointer arithmetic, Accessing variable through pointers.

Unit –4   **15 Hours**

Structures and Unions: Definition, Declaration, initialization, Memory representation, Accessing structure members, Nesting of Structures, Array of structures

Union: Definition, Declaration, Difference between structures and unions

Object Oriented Concepts: Concept of OOPS, Benefits of OOPS and Applications of OOPS

Classes and Objects: Specifying a Class, Defining data member and member functions, declaring member function outside the class, Access Specifies. Object Definition, Creating an object, Accessing members inside and outside the class. Difference between structure and class

Reference Books:

1. P. K. Sinha&PritiSinha, "Computer Fundamentals", BPB Publications, 2007.
2. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
3. Object Oriented Programming with C++, M.T. Somashekara, D.S. Guru H.S.Nagendraswamy, K.S. Manjunatha, PHI Learning, New Delhi, 2012
4. Object Oriented Programming with C++ by E. Balagurusamy
5. Richard Johnson, An Introduction to Object-Oriented Application Development, Thomson Learning, 2006
6. B. Stroupstrup, the C++ Programming Language, Addison Wesley, 2004.

ECA23101

I SEMESTER

DSC 3A: Object Oriented Programming in C++ Lab
Credit (L: T: P = 0: 0: 2)
Part-A

1. Program to find the roots of a quadratic equation
2. Program to find whether given number is even or not
3. Program to find largest of 3 no's using nested if
4. Program to display rainbow colours using switch statement
5. Program to calculate simple & compound interest
6. Program to find minima & maxima in 1-dimensional array
7. Program to generate Fibonacci series of a given no
8. Program to find factorial of a given no
9. Program to search an element in 1-dimensional array
10. Program to display n natural numbers & their sum

Part-B
1. Program to swap two no's using call by reference
2. Program to illustrate inline function
3. Program to illustrate friend function
4. Program to illustrate operator overloading
5. Prog program to illustrate inline function
6. Program to illustrate multiple inheritances
7. Program to create a class called employee. Accept program to illustrate inline function using array of objects.
8. Program to create a class called student & to accept & display necessary details of a student using nested class.
9. Program to create a class called bank & accept customer data.
10. Program to illustrate function over loading.

ECB21001

II SEMESTER

DSC 4A: Data Structures and File Processing
Credit (L: T: P = 4: 0: 0)

Course Outcome:
After successful completion of the course, the student is able to
CO1.   Learn the classification, characteristics and understanding of Data structures
CO2.   Understand in depth Primitive & non Primitive Data structures with its Applications
CO3.   Specify the details of Searching Techniques
CO4.   Specify the details of Sorting Techniques
CO5.   Deliberate in details with examples Basic Concepts of Memory Management Techniques
CO6.   Understand in depth File System Operations
CO7.   Specify the characteristics of File Organization Methods
CO8.   Deliberate in details with examples of Storage Devices

Unit – 1   **15 Hours**

Basic Data Structures: Introduction- Primitive and non-primitive, Abstract data structure, Operations, Data representation, Arrays - Memory representation of one and two dimensional arrays, Stack – Operations, Applications – Recursion, infix to postfix conversion, evaluation of postfix expression, **Sets:** Dictionary implementation, Queues – Operations, Applications, circular queue-Operations, D-queue, priority queue – uses of priority queues,

Unit - 2   **15 Hours**

Pointers and operations, Dynamic memory allocation: Linked list - Singly linked list – Operations, Circular linked list – Operations, Applications of linked list, doubly linked list – memory representation and Operations.
Trees: terminologies, Types,Memory Representation(using Arrays and Linked List) and Operations on binary trees, Introduction to Graphs

Unit - 3   **15 Hours**

Searching and sorting – sequential and binary search, sorting - bubble, insertion, quick sort and merge sort, comparison of different sorting techniques, Memory management: Garbage collection algorithm for equal sized blocks, storage allocation of objects with mixed size, buddy system,

Unit - 4   **15 Hours**

Physical Devices: Characteristics of storage devices such as disks and tapes, I/O buffering.
Basic File System & Operations: Introduction to File, Create, open, close, extend/Modification, delete, read-block, write-block, protection mechanisms.

File Organizations: Sequential, indexed sequential, direct, inverted, multi-list, directory systems

Reference Books:

1. M.T. Goodrich, R. Tamassia and D. Mount, Data Structures and Algorithms in C++, John Wiley and Sons, Inc., 2004.
2. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, Introduction to Algorithms, 2nd Ed., Prentice-Hall of India, 2006.
3. Robert L. Kruse and A.J. Ryba, Data Structures and Program Design in C++, Prentice Hall, Inc., NJ, 1998.
4. B. Stroupstrup, The C++ Programming Language, Addison Wesley, 2004
5. 0D.E. Knuth, Fundamental Algorithms (Vol. I), Addison Wesley, 1997
6. . E.Horowiz and S.Sahani, *Fundamentals of Data structures*, Galgotia Book source Pvt. Ltd., 2003.

ECB21101

II SEMESTER

DSC 4A: Data Structures and File Processing Lab
Credit (L: T: P = 0: 0: 2)
Part - A

1. Program to find lower triangular and upper triangular matrices for the given matrix.
2. Write an interactive program to insert an element at the given position and delete an element at the specified position in the given array.
3. Program to search an element identifies the number of occurrences with locations in linear array.
4. Program to sort the given M x N matrix row-wise and column-wise using bubble sorting technique.
5. Write an interactive program to search an element in the given linear array using linear and binary searching technique.
6. Write a program to merge two sorted arrays.

Part – B

7. Write an interactive program to implement the following operations on stack using arrays
   a. PUSH   b. POP
8. Program to implement Tower of Hanoi problem.
9. Write an interactive program to perform insertion and deletion operations in Linear Queue using arrays.
10. Write an interactive program to perform insertion and deletion operations in Circular Queue using arrays.
11. Write an interactive program to insert a node in a linked list at the front, delete a node from the rear and display.
12. Write an interactive program to implement pre order, post order and in order traversal of a binary tree using linked list.

Note: Lecturer May Change the Programs without deviating Theory Paper

ECB22001

II SEMESTER

DSC 5A: Computer System Organization and Architecture
Credit (L: T: P = 4: 0: 0)

Course Outcome:
 After successful completion of the course, the student is able to

CO1. Deliberate in details with examples Boolean algebra and logic circuits
CO2. Learn the details of Data Representation and Computer Arithmetic
CO3. Learn in depth Computer Organization and Design
CO4. Learn the details of architecture of CPU
CO5. Deliberate the classification and characteristics of Basic Computer Programming Concepts
CO6. Write down in depth Basic Computer Programming Concepts
CO7. Learn the classification and characteristics of Input -Output organization

Unit - 1   **15 Hours**

Introduction: Logic gates, Boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexors, registers, counters and memory units.
Data Representation and basic Computer Arithmetic: Number systems, complements.

Unit - 2   **15 Hours**

Fixed and floating point representation, character representation, addition, subtraction, magnitude comparison.
Basic Computer Organization and Design: Computer registers, bus system, instruction set

Unit - 3   **15 Hours**

Timing and control, instruction cycle, memory reference, input-output and interrupt.
Central Processing Unit: Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control.

Unit - 4   **15 Hours**

Programming the Basic Computer: Instruction formats, addressing modes, instruction codes, Machine language, and Assembly language, input output programming.
Input-output Organization: Peripheral devices, I/O interface, Modes of data transfer, direct memory access.

Reference Books:
1.   M. Mano, Computer System Architecture, Pearson Education 1992.
2.   A. J. Dos Reis, Assembly Language and Computer Architecture using C++ and JAVA, Course Technology, 2004

3.   W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India, 2009
4.   Digital Design, M.M. Mano, Pearson Education Asia, 1979

ECB22101

II SEMESTER
DSC 5A: Computer System Organization and Architecture Lab
Credit (L: T: P = 0: 0: 2)

1.   Verification of Basic gates(AND,OR,NOT)
2.   Verification of Universal gates(NAND,NOR,EX-OR)
3.   Verification of NAND gate as a Universal gate
4.   Verification of NOR gate as a Universal gate
5.   Verification of DeMorgan's theorem
6.   Verification of Half adder & Full Adder
7.   Verification of Half subtractor& Full Subtractor
8.   Verification of Half adder & Half subtractor using NAND gate
9.   Conversion of Binary to Gray &gray to Binary Code
10. Simplification of Boolean Expressions
11. Simplification of Boolean Expressions using K-Map
12.   Flip-Flops: SR FF (clock, without clock)
13. JK FF
14. Toggle FF
15. Delay FF
16. Multiplexer
17. De-multiplexer
18. Simulate the machine for the following memory-reference instructions with I= 0 and address part = 082. The instruction to be stored at address 022 in RAM. Initialize the memory word at address 082 with the operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.

a.	ADD	c.	LDA	e.	BUN	g.	ISZ
b.	AND	d.	STA	f.	BSA		

19. Simulate the machine for the memory-reference instructions referred in above question with I= 1 and address part = 082. The instruction to be stored at address 026 in RAM. Initialize the memory word at address 082 with the value 298. Initialize the memory word at address 298 with operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.

20. Modify the machine created in Practical 1 according to the following instruction format:

Instruction format

0	2	3	4	15
Opcode		I		Address

a.   The instruction format contains a 3-bit opcode, a 1-bit addressing mode and a 12-bit address. There are only two addressing modes, I = 0 (direct addressing) and I = 1(indirect addressing).

b.   Create a new register I of 1 bit.

c. Create two new microinstructions as follows:

i.   Check the opcode of instruction to determine type of instruction (Memory Reference/Register Reference/Input-Output) and then jump accordingly.

ii.   Check the I bit to determine the addressing mode and then jump accordingly.

ECB23001

II SEMESTER

DSC 6A: Operating Systems with Linux
Credit (L: T: P = 4: 0: 0)

Course Outcome:
After successful completion of the course, the student is able to
CO1.   Learn in details with examples system software
CO2.   Learn the details of Operating System organization
CO3.   Understand the classification and characteristics of Process Management and Scheduling mechanisms
CO4.   Understand in depth Memory Management and allocation strategies
CO5.   Learn in details with examples basic concepts of shell scripting
CO6.   Understand in depth basic Linux environment

Unit - 1   **15 Hours**

Introduction: System Software, Resource Abstraction, OS strategies. Types of operating systems - Multiprogramming, Batch, Time Sharing, Single user and Multiuser, Process Control & Real Time Systems.
Operating System Organization: Factors in operating system design, basic OS functions, implementation consideration; process modes, methods of requesting system services – system calls and system programs.

Unit - 2   **15 Hours**

Process Management: System view of the process and resources, initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model

Unit - 3   **15 Hours**

Scheduling: Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive strategies.
Memory Management: Mapping addresses space to memory space.

Unit - 4   **15 Hours**

Memory allocation strategies, fixed partition, variable partition, paging, virtual memory

Shell introduction and Shell Scripting: What is shell and various type of shell, Various editors present in Linux, Different modes of operation in vi editor, What is shell script, Writing and executing the shell script, Shell variable (user defined and system variables), System calls, Using system calls, Pipes and Filters, Decision making in Shell Scripts (If else, switch), Loops in shell, Functions, Utility programs (cut, paste, join, tr , unique utilities), Pattern matching utility (grep)

Reference Books:

1. A Slberchatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
2. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.
3. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.
4. W. Stallings, Operating Systems, Internals & Design Principles, 5th Edition, Prentice Hall of India. 2008.
5. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

ECB23101

II SEMESTER
DSC 6A: Operating Systems with Linux Lab
Credit (L: T: P = 0: 0: 2)
Software Lab based on Operating Systems

Note: Following exercises can be performed using Linux or UNIX
1. Usage of following commands: ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.
2. Usage of following commands: cal, cat (append), cat (concatenate), mv, cp, man, date.
3. Usage of following commands: chmod, grep, tput (clear, highlight), bc.
4. Write a shell script to check if the number entered at the command line is prime or not.
5. Write a shell script to modify "cal" command to display calendars of the specified months.
6. Write a shell script to modify "cal" command to display calendars of the specified range of months.
7. Write a shell script to accept a login name. If not a valid login name display message – "Entered login name is invalid".
8. Write a shell script to display date in the mm/dd/yy format.
9. Write a shell script to display on the screen sorted output of "who" command along with the total number of users.
10. Write a shell script to display the multiplication table any number,
11. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
12. Write a shell script to find the sum of digits of a given number.
13. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
14. Write a shell script to find the LCD (least common divisor) of two numbers.
15. Write a shell script to perform the tasks of basic calculator.
16. Write a shell script to find the power of a given number.
17. Write a shell script to find the factorial of a given number.
18. Write a shell script to check whether the number is Armstrong or not.
19. Write a shell script to check whether the file have all the permissions or not.
20. Program to show the pyramid of special character "*".

ECB24001

II SEMESTER

SEC 1A: Elective: Mathematics
Credit (L: T: P = 2: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to
CO 1. Understand in details with examples trigonometry
CO 2. Understand the classification and characteristics of Analytic geometry
CO 3. Deliberate in details with examples straight lines
CO 4. Specify in details with examples pair of lines
CO 5. Specify the classification and characteristics of conics

Unit - 1   15 Hours

TRIGONOMETRY:
Radians-Trigonometric functions and identities-Allied angles-Trigonometric functions of
compound angles and multiple angles-Transformation formulae.

Unit - 2   15 Hours

ANALYTICAL GEOMETRY
Co-ordinates-distance formula –section formula-area of a triangle.
Equation of lines-Equation of circles-conic section.

Reference Books:

1. Theory and Problems in Mathematics – I by BOSCO Publications 2004.
2. Theory and Problems in Mathematics – II by BOSCO Publications 2005.
3. Engineering Mathematics, Volumes I–IV by S Chandrasekhar.

ECB24201

II SEMESTER

SEC 1B: Elective: Business Mathematics

Credit (L: T: P = 2: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to
CO 1. Specify the characteristics of matrices and determinants
CO 2. Write down in details with examples matrices and determinants
CO 3. Deliberate the characteristics of algebra
CO 4. Learn the classification and characteristics of permutation and combination
CO 5. Deliberate in details with examples mathematical induction

Unit - 1   15 Hours

Matrices and Determinants- Order-Types of matrices-Addition and subtraction of matrices and multiplication of a matrix by a scalar-Product of matrices. Evaluation of determinants of order two and three-Properties of determinants (Statements only)-Cramer's rule-Singular and non-singular matrices-Inverse of a non-singular matrices-Product of two determinants.

Unit - 2   15 Hours

Algebra- Partial fraction- Proper and improper fractions-Permutation-Circular permutation-Combination-Standard derivation .Mathematic induction-Summation of series using$\sum n$, $\sum n^2$ and $\sum n^3$.Binomial theorem for a positive integral index-Binomial coefficients.

Reference Books:
1.   Mathematics for Economics and Business by R.S. Bhardwaj .
2.   Business Mathematics by PadmalochanHazarika.
3.   Business Mathematics by D.C. Sancheti and V.K. Kapoor.
4.   Mathematical Economics by Dowling, T. Edword.
5.   Mathematical Analysis for Economics by Allen, RGD.
6.   Algebra by Natarajan, Manicavasagam Pillay and Ganapathy

ECB24401

II SEMESTER

SEC 1C: Elective: Accountancy & Financial Management

Credit (L: T: P = 2: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to
CO 1. Deliberate the details of Basic Accounting Concepts
CO 2. Specify in depth Examples of Accounting
CO 3. Understand the detail Concepts of Costing
CO 4. Learn in details with examples Budgetary Control

Unit - 1   **15 Hours**
ACCOUNTING:
Introduction: Principles, concepts and conventions, double entry system of Accounting, ledger keeping.
Subsidiary books with special reference to simple cash book and three columns cash book.
Trial balance and final accounts of sole trader: Preparation trial balance, adjusting entries, including revenue for bad debts, revenue for discount on debtors and creditors, preparation of final accounts.

Unit - 2   **15 Hours**
COSTING & BUDGETARY CONTROL:
Funds flow statement: Meaning and concepts of funds, preparation of fund flow statement.
Unit costing: Preparation of cost sheet and tender price statement.
Marginal costing: Concepts, Marginal cost equations, P/V ratio, B.E.P., Margin of safety, Sales to earn a desired profit, Problems on the above.

Reference Books:

1. Accountancy Vol. 1 by B.S. Raman.
2. Accountancy Vol. 2 by B.S. Raman.
3. Management Accounting by R.K. Sharma and Gupta.
4. Financial Management by I.M. Pandey.

ECB24601

II SEMESTER
SEC 1D: Elective: Entrepreneurship Development
Credit (L: T: P = 2: 0: 0)

Course Outcome

After successful completion of the course, the student is able to
CO1. Specify the characteristics of Entrepreneurship
CO2. Deliberate the details of identification of opportunities
CO3. Understand in depth Feasibility and financial management of the Project
CO4. Write down the details of Project Report
CO5. Learn the characteristics of SWOT Techniques
CO6. Learn the details of Enterprise Rules and regulations

Unit - 1　　　　　　　　　　　　　　　　　　　　　　15 Hours

Need - scope and characteristics of entrepreneurships special schemes for a technical entrepreneur STED.

Identification of opportunities: Exposure to Demand based, Resource based, Service based important substitutes and expert promotion industries. Market surveys techniques.

Need scope and approaches for the project formulation. Criteria for the principles of products selection and development. Structure of the project report, Choice of technology, plant and equipment. Institutions financing procedure and financial incentives. Financial ratios and their significance.

Unit - 2　　　　　　　　　　　　　　　　　　　　　　15 Hours

Books of accounts, financial statements and funds flow analysis. Resource management, man machine and material. Planning tools for establishing SSI
  a. CREATIVITY AND INNOVATION
  B. ROBLEMSOLVING APPROACH
  c. STRENGTH AND WEAKNESS OPPORTUNITY AND THREAT (SWOT) TECHNIQUES.
Techno economics feasibility of the project. Plan layout and process planning for the product. Quality control / quality assurances and testing of the products. Costing and pricing. Management of self and understanding human behavior.Sickness in small-scale industries and their remedial measures.

Reference Books:

1. Entrepreneurship Development – Kanaka
2. Entrepreneurship Development – VasanthDesa

ECC21001

III SEMESTER

DSC 7A: Programming in JAVA
Credit (L: T: P = 4: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to
 CO1.   Deliberate in depth java programming fundamental
 CO2.   Specify in details with examples Basic java OOPs Concepts
 CO3.   Understand in depth OOPs Concepts
 CO4.   Understand in depth java Interface and packages
 CO5.   Deliberate the details of Exception handling in java
 CO6.   Deliberate the details of Multithreading & I/Ooperations in java
 CO7.   Identify the classification and characteristics of File handling in java
 CO8.   Learn the details of File handling in java
 CO9.   Learn the characteristics of Applet Programming

Unit - 1   15 Hours

Introduction to Java: Features of Java, JDK Environment, Object Oriented Programming Concept Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA,JDK Environment
Java Programming Fundamental: Structure of java program, Data types, Declaration of Variables, scope of variables, Keywords, operators, separators, literals, Machine neutral, JVM, Command line arguments, Decision Making statements, iterative statements, jumping statement, type conversion and casting

Unit - 2   15 Hours

Classes and Objects: Defining a Class, Field Declaration, Methods Declarations, Creating an Object, Accessing class members, Assigning Object Reference Variables, Access specifies, Constructor, Type of Contractors, this keyword instance variable hiding, Garbage Collection, Finalize method, method overloading, overloading Constructor, Understanding Static, Introducing final, Recursion.
Inheritance: Definition, Types of Inheritance, Member Access, Uses of Super, Method Overriding, Dynamic Method Dispatch, Abstract class and Methods, Uses final, Object Class, Nested and Inner classes
Arrays and Strings: Arrays, Creating an array, Types of Arrays, arrays accessing methods/operations String class Methods, String Buffer methods.

Unit - 3   15 Hours

Abstract Class, Interface and Packages: Modifiers and Access Control, Abstract classes and methods, Interfaces, Packages Concept- definition, JAVA API packages, naming conventions, creating packages, Accessing Packages using packages, adding a class to a package, hiding class static import

Interface: Introduction, Defining Interfaces, implementing Interfaces, Nested Interfaces, Extending Interfaces, accessing interface variables

Exception handling: Introduction, Types of Errors, Exception, Syntax of Exception handling, try and catch statement, multiple catch Statements, Nested try Statements, throws, throwing our own exception, finally statement, java built in exception classes

Unit - 4   15 Hours

Multithreading: Introduction, Creating Threads, Extending the thread Classes, implementing runnable interface, Declaring the Class, implementing the run () Method, starting new thread, stopping and blocking thread, thread life cycle, thread Priority

Input and Output: Concept of Streams, Stream Classes, Byte Stream classes, Character Stream classes, reading Console input, Writing Console Output, wrapper Classes.

Applet Programming: Introduction, Types of Applet, How applets differ from applications, Applet Life cycle, Creating Applet, Applet tag

Reference Books:

1. Ivan Bayross, Web Enabled Commercial Application Development Using Html, Dhtml,javascript, Perl Cgi , BPB Publications, 2009.
2. Cay Horstmann, BIG Java, Wiley Publication , 3rd Edition., 2009
3. Herbert Schildt , Java 7, The Complete Reference, , 8th Edition, 2009.
4. E Balagurusamy , Programming with JAVA, TMH, 2007

ECC21101

III SEMESTER

DSC 7A: Programming in JAVA Lab
Credit (L: T: P = 0: 0: 2)
Software Lab based on Java

PART A

1. Write a java program to find whether given number is positive, negative or zero
2. Write a java program to find the largest of three number using ternary operator
3. Write a java program to find out roots of the quadratic Equation
4. Write a java program to check whether given date is valid or not
5. Write a java program to implement ATM Transaction Using Switch statement
6. Write a java program to generate the following pattern

```
            A
         A  B  A
      A  B  C  B  A
   A  B  C  D  C  B  A..
```

7. Write a java program to find sum of all digits of a given number until given number become a single digit

8. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.

9. Write a java program to sort the given element using selection sort

10. Write a java program to find the trace and norm of the given square matrices

PART B

1. Write a java program to Generate Employee Salary slip Using Class and Object
2. Write a java program to check whether entered character is a vowel or consonant using Constructor
3. Write a java program to Demonstrate Method Overloading
4. Write java program to generate Student marks card Using Inheritance
5. Write a java program to calculate bonus for different departments using abstract class
6. Write a java program to Demonstrate Method Overriding
7. Write a java program to that reads two integer numbers for the variables a and b. If any other character except number (0-9) is entered then the error is caught by Number Format Exception object. After that ex. getMessage () prints the information about the error occurring causes
8. Write a java program to Demonstrate multiple Inheritance using Interface
9. Write a java program to Demonstrate multithreading
10. Write a applet program to generate the following pattern

ECC22001

III SEMESTER
DSC 8A: Database Management Systems
Credit (L: T: P = 4: 0: 0)

Course Outcome

After successful completion of the course, the student is able to

CO 1. Understand the characteristics of DBMS with examples

CO 2. Deliberate the details of types of database languages with examples

CO 3. Learn the details of ER- Diagrams and Relationship

CO 4. Understand in depth Basic concepts of Relational Model

CO 5. Learn in details with examples MYSQL Commands

CO 6. Learn in details with examples in PL-SQL

Unit - 1   **15 Hours**

Introduction to Database Management Systems: Definition of Data, Information, DBMS, Data base system application, Purpose of database systems, Characteristics of DB – Self describing nature, Insulation between programs, data and data Abstraction (data Independence), support of multiple views of the data, sharing of data and multiples transaction processing, Storage management, Database language – DDL, DML,DCL. File processing system v/s DBMS, Data models, Levels of Abstraction in a DBMS, Three Schema architecture, Characteristics of database approach,, data models, DBMS architecture and data independence.

Unit - 2   **15 Hours**

Entity Relationship and Enhanced ER Modelling: Entity   types,   Entity   Sets, Attributes, and Keys, Relationships, Relationship Types, Roles, and Structural Constraints, Weak Entity Types, ER Diagrams, Naming Conventions, SQL99: Schema Definition, constraints, and object modelling

Unit - 3   **15 Hours**

Relational Data Model: Basic concepts, Relational Constraints and Relational Database Schemas, Update Operations and Dealing with Constraint Violations, Basic Relational Algebra Operations.

Database design: ER and EER to relational mapping, functional dependencies, normal forms-first normal form, second normal forms. Third normal form BCNF

Unit - 4   **15 Hours**

MYSQL (SQL/PL-SQL): sql vs. Sql * plus: sql commands and data types, operators and expressions, introduction to sql * plus.

Managing tables and data: Creating and altering tables (including constraints)

Data manipulation command like insert, update, delete

Select statement with where, group by and having, order by, distinct,   special operator like - in, any, all between, exists, like SQL Wildcards

joins, built in functions other database objects

Views

Synonyms, index transaction control statements
Commit, rollback, save point
Introduction to pl/sql: sql v/s pl/sql, pl/sql block structure
Language construct of pl/sql (variables, basic and composite data type, conditions, looping ...
% type and % row type using cursor (implicit, explicit)
Trigger and its types

Reference Books:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
4. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education,2013.

ECC22101

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III SEMESTER
DSC 8A: Database Management Systems Lab
Credit (L: T: P = 0: 0: 2)

</div>

Software Lab based on Database Management Systems

The following concepts must be introduced to the students: **Note:** MS Access / MySQL may be used.

DDL Commands
• Create table, alter table, drop table
DML Commands
• Select, update, delete and insert statements
• Condition specification using Boolean and comparison operators (and, or, not,=,<>,>,<,>=,<=)
• Arithmetic operators and aggregate functions (Count, sum, avg, Min, Max)
• Multiple table queries (join on different and same tables) • Nested select statements
• Set manipulation using (any, in, contains, all, not in, not contains, exists, not exists, union, intersect, minus, etc.)
• Categorization using group by……..having
• Arranging using order by

Relational Database Schema - COMPANY
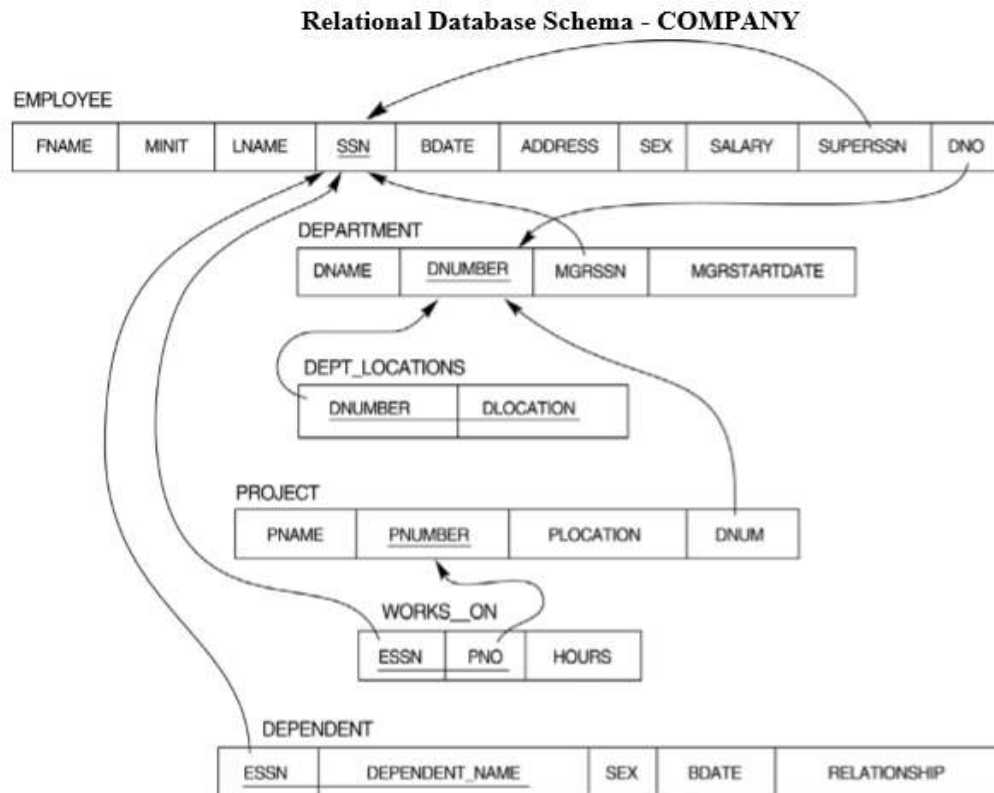
1.   Create tables with relevant foreign key constraints
2.   Populate the tables with data
3.   Perform the following queries on the database:
      a.   Display all the details of all employees working in the company.
      b.   Display ssn, lname, fname, address of employees who work in department no 7.
      c.   Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong'
4.   Retrieve the name and salary of every employee
5.   Retrieve all distinct salary values
6.   Retrieve all employee names whose address is in 'Bellaire'
7.   Retrieve all employees who were born during the 1950s
8.   Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
9.   Retrieve the names of all employees who do not have supervisors
10.   Retrieve SSN and department name for all employees
11.   Retrieve the name and address of all employees who work for the 'Research' department 12. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.
13.   For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
14.   Retrieve all combinations of Employee Name and Department Name

15. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan' either as a worker or as a manager of the department that controls the project. 16. Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees.

17. Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name.

18. Select the names of employees whose salary does not match with salary of any employee in department 10.

19. Retrieve the name of each employee who has a dependent with the same first name and same sex as the employee.

20. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.

21. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.

22. Find the sum of the salaries and number of employees of all employees of the 'Marketing' department, as well as the maximum salary, the minimum salary, and the average salary in this department

23. Select the names of employees whose salary is greater than the average salary of all employees in department 10.

24. For each department, retrieve the department number, the number of employees in the department, and their average salary.

25. For each project, retrieve the project number, the project name, and the number of employees who work on that project.

26. Change the location and controlling department number for all projects having more than 5 employees to 'Bellaire' and 6 respectively. 27. For each department having more than 10 employees, retrieve the department no, no of employees drawing more than 40,000 as salary.

28. Insert a record in Project table which violates referential integrity constraint with respect to Department number. Now remove the violation by making necessary insertion in the Department table.

29. Delete all dependents of employee whose ssn is '123456789'.

30. Delete an employee from Employee table with ssn = '12345' (make sure that this employee has some dependents, is working on some project, is a manager of some department and is supervising some employees). Check and display the cascading effect on Dependent and Works on table. In Department table MGRSSN should be set to default value and in Employee table SUPERSSN should be set to NULL 31. Perform a query using alter command to drop/add field and a constraint in Employee table.

ECC23001

III SEMESTER

DSC 9A: Web Technologies
Credit (L: T: P = 4: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to

CO 1. Learn the details of HTML tags
CO 2. Understand in details with examples Document object Model
CO 3. Understand the details of Basic CSS and implements
CO 4. Understand the details of Basic Concepts of Java Scripts
CO 5. Write down in details with application and Usage of Java scripts
CO 6. Deliberate in depth JQuery& Bootstrap with Examples

Unit - 1   **15 Hours**

Introduction to Web Design: Introduction to HyperText Markup Language (HTML), header, footer, formatting tags, graphical elements, inserting images, lists, hyperlinks, tables. **Frames-** Introduction, frameset. Forms- attributes of forms. Creating web pages
DOM: Basics of DOM, DOM methods, functions Forms collection, table collections Inner HTML.

Unit - 2   **15 Hours**

Cascading Style Sheets: Introduction, Understanding the Basic CSS syntax, Types of style sheets, multiple sheets, and Background properties, Text properties, Font properties, and Border properties, Margin properties padding list & table properties. DIV, SPAN, CSS Layout - The position Property, float and clear, the display-inline-block Property, Overflow
CSS Advanced - Rounded Corners, Border Images, Backgrounds, Colors, Gradients, Shadows, Text Effects, Web Fonts, 2D & 3D Transforms, Transitions, Animations

Unit - 3   **15 Hours**

JavaScript: Introduction, Java script in HTML, Java script statement, comments, Expressions, Data types, operators, Conditional statements, Loop statements, functions, Popup boxes ,Array & Boolean Objects Math & Date Objects String & Number Objects, events and event handling & form document object.

Unit - 4   **15 Hours**

JQuery: Introduction, Syntax, Selectors, Events, Effects, Hide/Show, Fade, Slide, Animate, stop (), Callback, Chaining
JQuery HTML Interface: Get, Set, Add, Remove, CSS Classes, css (), Dimensions
JQuery Traversing: Ancestors, Descendants, Siblings & Filtering
Bootstrap 4: Introduction, Grid Basic, Typography, Colors, Tables, Images, Jumbotron, Alerts, Buttons, Badges, List Groups, Cards, Dropdowns, Collapse, Navs, Navbar, Forms, Inputs, Input Groups, Custom Forms, Carousel, Modal, Tooltip, Popover, Toast, Scrollspy, Utilities, Flex, Icons, Media Objects, Filters

Reference Books:

1. M.Deitel, P.J.Deitel, A.B.Goldberg: Internet & World Wide Web How to program, 3rd Edition, Pearson Education / PHI, 2004.
2. Chris Bates: Web Programming Building Internet Applications, 3rd Edition, Wiley India, 2006.
3. 3. XueBai et al: The Web Warrior Guide to Web Programming,   Thomson, 2003.
4. Learning jQuery Fourth Edition-Jonathan Chaffer.
5. Web Development with jQuery -Richard York
6. Bootstrap-Jake Spurlock
7. Mastering Bootstrap4- Benjamin Jakobus, Jason Marah

ECC23101

III SEMESTER

DSC 9A: Web Technologies Lab
Credit (L: T: P = 0: 0: 2)

1. Program for formatting tags.
2. Creating a Webpage having Hyperlink.
3. Creating Types of Lists (Ordered, Unordered, Definition).
4. Creating a Nested List.
5. Creating a Time Table.
6. Creating a HTML document having vertical frames.
7. Creating Student Application Form.
8. Program to insert audio & video files
9. Creating Internal & External Style Sheets.
10. Program to Margin & Padding.
11. Program to create a Greeting card
12. Program to Image Transparency
13. Program to generate Fibonacci series in JavaScript.
14. Program to display Rainbow Colors in JavaScript.
15. Program to create Pop-Up Boxes.
16. Program to generate multiplication table.
17. Program to find even and odd numbers.
18. Program to add 2 numbers.
19. Program to find factorial of a numbers.
20. Program to generate 2 different patterns.
21. Program to change background color after 5 sec of page load.
22. Display reverse of a given number.
23. Display Time Using Jquery
24. Design Simple Department web Site Using Bootstrap
25. Design Web page using Bootstrap and Jquery

ECD21001

IV SEMESTER
DSC 10A: Numerical Analysis and Statistics
Credit (L: T: P = 4: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to

CO1.　Understand the details of Computer Numerical data and arithmetic

CO2.　Understand the classification and characteristics of Iterative Methods in numerical analysis

CO3.　Deliberate in details with examples Matrices and linear system of Equations

CO4.　Specify in details with examples Interpolation

CO5.　Understand in depth Numerical integration and differentiation

CO6.　Learn the details of Importance and limitations of statistics

Unit - 1　　　　　　　　　　　　　　　　　　　　　　　　**15 Hours**

Computer Arithmetic: Fixed and Floating point representation, Normalization of numbers. Errors in numbers.

Iterative methods: Bisection method, Regula-Falsi method, Secant method, Newton-Raphson method

Unit - 2　　　　　　　　　　　　　　　　　　　　　　　　**15 Hours**

Matrices and Linear System of Equations: LU decomposition method, Gauss elimination, Gauss serial and Gauss Jordan for solving system of equations

Interpolation: Polynomial interpolation, Newton-Gregory forward and backward interpolation, Newton's divided differences interpolation formulae.

Unit - 3　　　　　　　　　　　　　　　　　　　　　　　　**15 Hours**

Numerical Integration: Trapezoidal rule, Simpson's 1/3rd and 3/8th rule,

Numerical Differentiation: Euler's, modified Euler's and Runge-Kutta (RK) 2nd order and 4th order.

Unit - 4　　　　　　　　　　　　　　　　　　　　　　　　**15 Hours**

Statistics: Definition, Importance, Functions and Limitations of statistics.

Graphic presentation: Frequency distribution, Histogram, Frequency polygon, frequency curve and O gives Measures of central tendency: (Mean, Median, Mode) Dispersion, Correlation, Regression.

Reference Books:

1.   K.E. Atkinson, W. Han, Elementary Numerical Analysis, 3rd Ed., Wiley, 2003.
2.   C. Xavier, S.S. Iyengar, Introduction to Parallel Algorithms, Wiley-Interscience, 1998.
3.   A. Kharab, R.B. Guenther, An Introduction to Numerical Methods: A MATLAB
      Approach,1st Ed. Chapman and Hall/CRC, 2001.
4.   B. Bradie, A Friendly Introduction to Numerical Analysis, Pearson Education, 2007.
5.   S.R. Otto and J.P. Denier, An Introduction to Programming and Numerical Methods in
      MATLAB, Springer, 2005.
6.   M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and
      Engineering Computation, 7th Ed., New Age International Publishers, 2007.
7.   Computer oriented numerical methods by V Rajaraman
8.   Statistics Theory and Practice by R S N Pillai, Bagavathi
9.   Practical statistics by S P Gupta

ECD21101

IV SEMESTER
DSC 10A: Numerical Analysis and Statistics Lab
Credit (L: T: P = 0: 0: 2)
Software lab based on numerical techniques and statistics

1.   Brute force method
2.   Bisection method
3.   regula –falsi method
4.   NewtonRaphson
5.   Secant
6.   LU decomposition
7.   Gauss elimination
8.   GaussJordan
9.   Gauss seidal
10.   Euler's
11.   modified Euler's
12.   Runge Kutta ii order
13.   Runge Kutta iv order
14.   Trapezoidal
15.   Simpson's 1/3 rd Rule
16.   Simpson's 3/8 th Rule
17.   Finding the mean, median and mode of a set of data
18.   Finding the range of a set of data
19.   Finding the standard deviation of a set of data
20.   Newton's forward and backward interpolation
21.   Newton's divided difference

ECD22001

IV SEMESTER
DSC 11A: J2EE
Credit (L: T: P = 4: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to

CO 1. Learn the details of Basic elements of J2EE

CO 2. Deliberate the details of Concepts of Multi-Tier Architectures

CO 3. Understand the characteristics of Enterprise Application Strategy

CO 4. Write down in depth Basic Concepts of JDBC

CO 5. Identify in details with examples implementation of SQL Commands Using JDBC objects

CO 6. Learn in details with examples Basic Concepts of Servlets

CO 7. Learn in details with examples Basic Concepts of JSP

Unit - 1   15 Hours

Introduction: The ABC of Programming Languages, taking programming languages up a notch, the beginning of java, java byte-code, the advantages of Java, J2EE and J2SE.

J2EE Multi-Tier Architecture: Distributive systems, the Tier, J2EE Multi-Tier Architecture, Client Tier Implementation, Web Tier Implementation, Enterprise JavaBeans Tier Implementation, Enterprise Information Systems Tier Implementation, Challenges.

J2EE Nest Practices: Enterprise Application Strategy, The enterprise application, clients, Sessions Management, Web Tier and Java Server pages, Enterprise Java Beans Tier, The Myth of using inheritance, Maintainable classes, Performance Enhancements, The power of Interfaces, The power of threads, The power of Notification.

Unit - 2   15 Hours

J2EE Database Concepts: Data, Database, Database Schema, the Art of Indexing.

JDBC Objects: The concept of JDBC, JDBC Driver Types, JDBC packages, A Brief overview of the JDBC Process, Database Connection, Associating the JDBC / ODBC Bridge with the database, Statement Objects, Result Set, Transaction Processing, and Metadata.

Unit - 3   15 Hours

JDBC and Embedded SQL: Model Programs: Model A Program, Model B Program, Tables: Creating a Table, Dropping a Table, Indexing: Creating an Index, Dropping an Index, Inserting Data into tables: Inserting a Row, Inserting the systems date into a column, Inserting the system Time into a column, Inserting a Timestamp into a column, Selecting Data from a Table: Selecting all data from a Table, Requesting one column, Requesting Multiple column, Requesting rows, Requesting rows and columns, AND, OR, and NOT clauses, Joining multiple compound expressions, equal & not equal operators, Less than & greater than operators, Less than equal to & greater than equal to, BETWEEN, LIKE, IS NULL Operator, DISTINCT Modifier, IN modifier,

Unit - 4   **15 Hours**

Metadata: Number of columns in result set, Data type of a column, Name of a column, Column Size, updating Tables: Updating a row and column, updating multiple rows, Deleting Data from a table: Deleting a Row from a table, Joining tables, Calculating Data, Grouping and ordering data, sub queries, view.

Java Servlets: Java Servlets and common gateway interface programming: Benefits of using a Java servlet, A simple Java Servlets, Anatomy of a java Servlets: Development Descriptor, Reading Data from a client, Reading HTTP request Headers, Sending Data to a Client & writing the HTTP response Header, Working with cookies, Tracking Sessions, Quick reference guide.

JAVA Server Pages: JSP installation, JSP Tags: Variables & objects, Methods, Control Statements, Loops, Tomcat, Request string: Parsing other information, User sessions, cookies, Session objects, Quick reference guide.

Reference Books:

1.   The complete reference J2EE seventh edition - Java 2 Enterprise edition overview
2.   J2EE: The complete Reference - McGraw-Hill Education

ECD22101

IV SEMESTER
DSC 11A: J2EE Lab
Credit (L: T: P = 0: 0: 2)

1.   Program to Create Jdbc Connection
2.   Application to access the database using the Java Database Connectivity (JDBC).
3.   Perform a Database Query and View Results.
4.   Write a program to display a day of a given date
5.   Write a program to Display request header information.
6.   Write a program to calculate income tax of a customer using database
7.   Write a program to display cookie value, cookie age and cookie path.
8.   Write a program in JSP file to set and then display the cookie.
9.   Write a program for Java script validation.
10.   Write a JAVA Servlets Program to implement a dynamic HTML using Servlets(user name and password should be accepted using HTML and displayed using a Servlets).
11.   Write a JAVA Servlets Program to Download a file and display it on the screen(A link has to be provided in HTML, when the link is clicked corresponding file has to be displayed on Screen)
12.   Write a JAVA Servlets Program to implement Request Dispatcher object (use include () and forward () methods)
13.   Write a JAVA Servlets Program to implement and demonstrate get() and Post methods(Using HTTP Servlets Class).
14.   Write a JAVA Servlets Program to implement send Redirect () method (using HTTP Servlets Class).
15.   Write a JAVA Servlets Program to implement sessions (Using HTTP Session Interface).
16.   Write a JAVA JSP Program to print 10 even and 10 odd numbers.
17.   Write a JAVA JSP Program to implement verification of a particular user login and display a welcome page.
18.   Write a JAVA JSP Program to get student information through a HTML and create a JAVA Bean Class, populate Bean and display the same information through another JSP.
19.   Write a JAVA JSP Program which uses <jsp:plugin> tag to run a applet
20.   Write a JAVA JSP Program which implements nested tags and also use TagSupport Class.

ECD23001

IV SEMESTER

DSC 12A: Software Engineering and Software Testing
Credit (L: T: P = 4: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to

CO 1. Understand in details with examples Concepts of Software process

CO 2. Specify the details of Software requirements and analysis

CO 3. Learn in depth Design concepts and principles of software engineering

CO 4. Understand in depth software Configuration Management and Project Management

CO 5. Learn in details with examples Software Tastings

CO 6. Specify in depth trends in software engineering

Unit - 1   **15 Hours**

Software Process: Introduction, S/W Engineering Paradigm, life cycle models (water fall, incremental, spiral, evolutionary, prototyping, object oriented), System engineering, computer based system, verification, validation, life cycle process, development process, system engineering hierarchy.

Software requirements: Functional and non-functional, user, system, requirement engineering process, feasibility studies, requirements, elicitation, validation and management, software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping, S/W document.

Unit - 2   **15 Hours**

Software Analysis: Analysis and modeling, data, functional and behavioral models, structured analysis and data dictionary.

Design Concepts and Principles: Design process and concepts, modular design, design heuristic, design model and document, Architectural design, software architecture, data design, architectural design, transform and transaction mapping, user interface design, user interface design principles. Real time systems, Real time software design, system design, real time executives, data acquisition system, monitoring and control system.

Unit - 3   **15 Hours**

Software Configuration Management: The SCM process, Version control, Change control, Configuration audit, SCM standards.

Software Project Management: Measures and measurements, S/W complexity and science measure, size measure, data and logic structure measure, information flow measure. Estimations for Software Projects, Empirical Estimation Models, Project Scheduling.

Unit - 4   15 Hours

Testing: Taxonomy of software testing, levels, test activities, types of s/w test, black box testing, and testing boundary conditions, structural testing, test coverage criteria based on data flow, mechanisms, regression testing, testing in the large. S/W testing strategies, strategic approach and issues, unit testing, integration testing, validation testing, system testing and debugging.

Trends in Software Engineering: Reverse Engineering and Re-engineering – wrappers – Case Study of CASE tools.

Reference Books:

1. Roger S. Pressman, Software engineering- A practitioner's Approach, McGraw-Hill
2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
3. PankajJalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
4. James F Peters and WitoldPedryez, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
5. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxfor University Press, New Delhi, 1996.
6. Pfleeger, "Software Engineering", Pearson Education India, New Delhi, 1999.
7. Carlo Ghezzi, Mehdi Jazayari and Dino Mandrioli, "Fundamentals of Software Engineering", Prentice Hall of India, New Delhi, 1991.

ECD23101

IV SEMESTER
DSC 12A: Software Engineering and Software Testing Lab
Credit (L: T: P = 0: 0: 2)
Lab based on Software Engineering

1. Practical Title
    - Problem Statement,
    - Process Model
2. Requirement Analysis
    - Creating a Data Flow
    - Data Dictionary,
    - Use Cases
3. Project Management
    - Computing FP
    - Effort
    - Schedule, Risk Table, Timeline chart
4. Design Engineering
    - Architectural Design
    - Data Design, Component Level Design
5. Testing
    - Basis Path Testing

Sample Projects like
- DTC Route Information: Online information about the bus routes and their frequency and fares
- Car Pooling: To maintain a web based intranet application that enables the corporate
- Employees within an organization to avail the facility of carpooling effectively.
- Patient Appointment and Prescription Management System
- Organized Retail Shopping Management Software
- Parking Allocation System
- Wholesale Management System

ECE21001

V SEMESTER
DSE 1A: Elective: Data Communication and Computer Networks
Credit (L: T: P = 4: 0: 0)

Course Outcome:
After successful completion of the course, the student is able to
 CO1. Learn in depth Elements of Data Communications and network Systems
 CO2. Learn in depth Transmission Media
 CO3. Understanding the various classifications and characteristics of Signals
 CO4. Understand in details with examples Network Models
 CO5. Learn in depth Error Detection and Corrections Algorithms
 CO6. Deliberate in details with examples Switching Concepts
 CO7. Deliberate the classification and characteristics of networking and internetworking Devices

Unit - 1   15 Hours

Data Communications: Components, Data Representation, Dataflow
Networks: Network criteria, Physical Structures, Topology (Mesh, Star, Tree, Bus, Ring, Hybrid)
Categories of Network: LAN, MAN, WAN
History of Network: Protocols and Standards: Protocols (Standards organization),
Addressing: Physical, Logical, Port Specific.

Unit - 2   15 Hours

Transmission Media: Guided Media – Twisted pair cable, co-axial cable, optical fibre, Unguided Media – Radio waves, microwaves, Infrared.
Signals: Analog and Digital Data, Analog and Digital Signals, periodic and non periodic signals. Analog Signals – Sine wave, Peak Amplitude, Period and frequency, Phase, wave length, composite signals. Digital Signals – Band width, Bit length, Bit rate, base band transmission, Digital v/s Analog. Transmission Impairment, Data rate limits (Noisy and noiseless channel)

Unit - 3   15 Hours

Network Models: Layered tasks, OSI model (peer – to – peer), Layered Architecture. Functions of Layers (OSI), TCP / IP Protocol suite
Multiplexing: FDM (MUX and DEMUX process, Application of FDM), WDM, TDM (Interleaving, synchronizing, bit padding)
Switching Concept: Working principle of circuit switching and packet switching. Circuit switched networks, three phases' efficiency, delay. Data grams network, routing table, delay efficiency, virtual.
Error Detection and Correction: Types of Errors, Redundancy, Error detection virus Error Correction.
Error Detection: Parity check, Cyclic Redundancy Check (CRC), Check Sum. Error Correction - Retransmission, Forward Error Correction, Burst error Correction.

Unit - 4   **15 Hours**

Networking And Internetworking Devices: Connecting Devices - Hubs, Repeaters, Amplifiers, Bridges – LAN bridges, transparent bridges, Source-route bridges, Routers, Gateways, 2 layer and 3 layers switches.
Routing Concepts: Types, Shortest path, flooding.
Wireless Lan's: Blue tooth - Architecture, Blue tooth layers.
Network Layer: IPV4, IPV6 addresses
Transport Layer: UDP – user datagram, operations, Application. TCP - Services, TCP segment, SCTP - Services, packet format.
Application Layer: - SMTP, SNMP, HTTP, FTP

Reference Books:
1. Data Communication and Networking – Forouzan
2. Computer Network – Tanenbaurn – 3rd Editions
3. Computer Network – Larry L. Peterson & Bruce S. Davie

ECE21101

V SEMESTER
DSE 1A: Elective: Data Communication and Computer Networks Lab
Credit (L: T: P = 0: 0: 2)

1. Program for Identifying well known Ports
2. Program for Data Retrieval from Remote Database.
3. Program for Simulating SMTP Client.
4. Program for Simulating Telnet Client
5. Program for Simple file transfer between two systems, (without using Protocols)
6. Program for implementing HTTP.
7. Program for Downloading Image files.
8. Simulate Checksum Algorithm.
9. Simulate Stop & Wait   Protocol.
10. Simulate Go-Back-N Protocol.
11. Simulate Selective Repeat   Protocol.
12. Take an example subnet of hosts. Obtain broaECAst tree for it.
13. Network address with automatic subnet address generation:

ECE21201

V SEMESTER

DSE 1B: Elective: Computer Graphics
Credit (L: T: P = 4: 0: 0)

Course Outcome:
After successful completion of the course, the student is able to
CO1. Learn the classification and characteristics of Elements of Graphics Systems
CO2. Learn in depth Graphics Algorithms
CO3. Deliberate the classification and characteristics of 2D Graphics
CO4. Understand the characteristics of 3D Graphics
CO5. Deliberate the details of Transformation and Viewing Techniques
CO6. Learn the details of Illumination and Color Models

Unit - 1   15 Hours

INTRODUCTION: Survey of computer graphics, Overview of graphics systems – Video display devices, Raster scan systems, Random scan systems, Graphics monitors and Workstations, Input devices, Hard copy Devices, Graphics Software; Output primitives – points and lines, line drawing algorithms, loading the frame buffer, line function; circle and ellipse generating algorithms; Pixel addressing and object geometry, filled area primitives.

Unit - 2   15 Hours

TWO DIMENSIONAL GRAPHICS: Two dimensional geometric transformations – Matrix representations and homogeneous coordinates, composite transformations; Two dimensional viewing – viewing pipeline, viewing coordinate reference frame; widow-to-viewport coordinate transformation, Two dimensional viewing functions; clipping operations – point, line, and polygon clipping algorithms.

Unit - 3   15 Hours

THREE DIMENSIONAL GRAPHICS: Three dimensional concepts; Three dimensional object representations – Polygon surfaces Polygon tables- Plane equations – Polygon meshes; Curved Lines and surfaces, Quadratic surfaces; Blobby objects; Spline representations – Bezier curves and surfaces -B-Spline curves and surfaces.
TRANSFORMATION AND VIEWING: Three dimensional geometric and modeling transformations – Translation, Rotation, Scaling, composite transformations; three dimensional viewing – viewing pipeline, viewing coordinates, Projections, Clipping; Visible surface detection methods.

Unit - 4   15 Hours

ILLUMINATION AND COLOUR MODELS: Light sources – basic illumination models – halftone patterns and dithering techniques; Properties of light – Standard primaries and chromaticity diagram; Intuitive color concepts – RGB color model – YIQ color model – CMY colour model – HSV color model – HLS color model; Color selection.

Reference Books:

1. Computer Graphics C Version by Donald Hearn & M. Pauline Baker Pearson Education, New Delhi, 2004
2. Procedural Elements for Computer Graphics by David F. Rogers, Tata McGraw Hill Book Company, New Delhi, 2003
3. Computer Graphics: Principles & Practice in C by J. D. Foley, S. K Feiner, A Van Dam F. H John, Pearson Education, 2004
4. Computer Graphics using Open GL by Franscis S Hill Jr Pearson Education, 2004.

ECE21301

V SEMESTER
DSE 1B: Elective: Computer Graphics Lab
Credit (L: T: P = 0: 0: 2)

1. Implementation of Bresenham's Algorithm – Line, Circle, Ellipse.
2. Implementation of Line, Circle and ellipse attributes
3. Two Dimensional transformations - Translation, Rotation, Scaling, Reflection, Shear.
4. Composite 2D Transformations
5. Cohen Sutherland 2D line clipping and Windowing
6. Sutherland – Hodgeman Polygon clipping Algorithm
7. Three dimensional transformations - Translation, Rotation, Scaling
8. Composite 3D transformations
9. Drawing three dimensional objects and Scenes
10. Generating Fractal images

ECE21401

V SEMESTER

DSE 1C: Elective: Multimedia Systems and Applications
Credit (L: T: P = 4: 0:0)

Course Outcome:

After successful completion of the course, the student is able to

CO1.   Understand the details of Components of Multimedia with applications

CO2.   Identify in details with examples Text, Images, Sound and Videos

CO3.   Learn in depth Animation Techniques

CO4.   Understand the details of Multimedia in internet

CO5.   Deliberate the characteristics of Making Multimedia

CO6.   Deliberate in depth Multimedia Making Tools

Unit - 1   **15 Hours**

Multimedia: Introduction to multimedia, components, uses of multimedia, multimedia applications, virtual reality.

Text: Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia & Hypertext.

Images: Still Images – bitmaps, vector drawing, 3D drawing & rendering, natural light &colours, computerized colours, colour palettes, image file formats.

Unit - 2   **15 Hours**

Sound: Digital Audio, MIDI Audio, MIDI vs Digital Audio, Audio File Formats.

Video: How video works, analog video, digital video, video file formats, video shooting and editing.

Unit - 3   **15 Hours**

Animation: Principle of animations, animation techniques, animation file formats.

Internet and Multimedia: www and HTML, multimedia on the web – web servers, web browsers, web page makers and site builders.

Unit - 4   **15 Hours**

Making Multimedia: Stages of a multimedia project, Requirements to make good multimedia, Multimedia Hardware - Macintosh and Windows production Platforms, Hardware peripherals - Connections, Memory and storage devices, Multimedia software and Authoring tools.

Reference Books:

1.   Tay Vaughan, "Multimedia: Making it work", TMH, Eighth edition.
2.   Ralf Steinmetz and KlaraNaharstedt, "Multimedia: Computing, Communications Applications", Pearson.
3.   Keyes, "Multimedia Handbook", TMH.
4.   K. Andleigh and K. Thakkar, "Multimedia System Design", PHI.

ECE21501

V SEMESTER
DSE 1C: Elective: Multimedia Systems and Applications Lab
Credit (L: T: P = 0: 0: 2)

Practical exercises based on concepts listed in theory using Presentation tools in office automation tool/ GIMP/Blender / Audacity/ Animation Tools/ Image Editors/ Video Editors.

Implement the followings using Blender -

1. Create an animation using the tools panel and the properties panel to draw the following – Line, pie, oval, circle, rectangle, square, pencil, brush and lasso tool
2. Create an animation using text tool to set the font, size, colour etc.
3. Create an animation using free transform tool that should use followings-
    Move Objects
    Skew Objects
    Stretch Objects
    Rotate Objects
    Stretch Objects while maintaining proportion
    Rotate Objects after relocating the centre dot
4. Create an animation using layers having following features- Insert layer, Delete layer, guide layer, Mask layer.
5. Modify the document (changing background color etc.)using the following tools
    Eraser tool
    Hand tool
    Ink bottle tool
    Zoom tool
    Paint Bucket tool
    Eyedropper tool
6. Create an animation for bus car race in which both starts from the same point and car wins the race.
7. Create an animation in which text Hello gets converted into Good Bye (using motion/shape tweening).
8. Create an animation having five images having fade-in fade-out effect.
9. Create an scene to show the sunrise (using multiple layers and motion tweening)
10. Create an animation to show the ripple effect.
11. Create an animation (using Shape tweening and shape hints) for transforming one shape into another.
12. Create an animation for bouncing ball (you may use motion guide layer).

OR

Project:
Design a minimum 10 page interactive website using Joomla or WordPress.

ECE22001

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V SEMESTER

DSE 2A: Elective: ASP.Net

Credit (L: T: P = 4: 0: 0)

</div>

Course Outcome:

After successful completion of the course, the student is able to

CO 1. Learn the details of ASP.NET Framework

CO 2. Learn the details of ASP.NET working Environment

CO 3. Deliberate in details with examples Standard Control of ASP.NET

CO 4. Understand the details of Developing Simple Websites Using ASP.NET Controls

CO 5. Deliberate in depth Developing Simple Web Application Using ASP.NET Controls

CO 6. Learn the details of Database Access Controls

CO 7. Identify in details with examples Database Access Controls

Unit - 1   **15 Hours**

Overview of the ASP.NET: Introduction of different Web Technology, What is Asp.Net, How Asp.Net Works, Use of visual studio, Different Languages used in ASP.Net. Summary.
Framework: Common Language Runtime (CLR), .NET Framework Class Library, Summary

Unit - 2   **15 Hours**

Setting up and Installing ASP.NET: Installing Internet Information Server, Installation of Asp.Net, virtual directory, Application Setting in IIS, Summary.

Unit - 3   **15 Hours**

Asp.Net Standard Controls, Displaying information, Label Controls, Literal Controls, Bulleted List, Accepting User Input, Textbox controls, Radio Button and Radio Button List Controls, Checkbox and Checkbox List Controls, Button controls, Link Button Control, Image Button Control, Using Hyperlink Control, Dropdown List, List Box, Displaying Images, Image Control, Image Map Control, Using Panel Control, Using Hyperlink Control, Asp.Net, Page & State Management, Overview of events in page, Summary.

Unit - 4   **15 Hours**

Designing Websites with master pages, creating master pages, Creating default contents, nesting master pages, registering master pages in web configuration, Summary.
ASP.Net Theme: ASP.NET Website Theme, Named Skin and Default Skin in ASP.NET Theme, Style Sheet Theme and Theme Attributes of a Page Directive
Using the Rich Controls: Accepting File Uploads, Saving files to file system, Calendar Control, Displaying advertisements, Displaying Different Page view, Displaying a Tabbed Page View, Wizard Control, Summary.

Reference Books:

1. Mathew Mac Donald, ASP. Net The Complete Reference, McGraw –Hill, 2002.

ECE22101

V SEMESTER
DSE 2A: Elective: ASP.Net Lab
Credit (L: T: P = 0: 0: 2)

LAB MANUAL:

1.   Write a Program to generate the factorial operation.
2.   Write a Program to perform Money Conversion.
3.   Write a Program to generate the Quadratic Equation.
4.   Write a Program to generate the Login control.
5.   Write a Program to perform Asp.Net state.
6.   Write a Program to perform validation operation.
7.   Write a Program to perform Tree view operation.
8.   Write a Program to display the phone no of an author using database.
9.   Write a Program to insert the data in to database using Execute-Non Query.
10. Write a Program to bind data using template in data list.
11. Write a Program to bind data using Hyperlink column in data grid.

ECE22201

V SEMESTER
DSE 2B: Elective: Visual Programming
Credit (L: T: P = 4: 0:0)

{**Note:** Use any open source alternative such as Tkinter with Python /SharpDevelop/GAMBAS/OPENXAVA with JAVA}

Course Outcome:

After successful completion of the course, the student is able to
CO 1. Learn in details with examples Basic concept Of GUI Environment
CO 2. Deliberate the details of GUI Controls
CO 3. Learn in details with examples Data types and Operations in Visual Programming
CO 4. Learn in details with examples Control statements in Visual Programming
CO 5. Write down in details with examples Modular Programming
CO 6. Learn the details of Forms Handling in Visual Programming
CO 7. Understand in depth Database Connectivity in Visual Programming

Unit - 1   15 Hours

GUI Environment: Introduction to graphical user interface (GUI), programming language (procedural, object oriented, event driven), the GUI environment, compiling, debugging, and running the programs.
Controls: Introduction to controls textboxes, frames, check boxes, option buttons, images, setting borders and styles, the shape control, the line control, working with multiple controls and their properties, designing the user interface, keyboard access, tab controls, default & cancel property, coding for controls.
Operations: Data types, constants, named & intrinsic, declaring variables, scope of variables, val function, arithmetic operations, formatting data.

Unit - 2   15 Hours

Decision Making: If statement, comparing strings, compound conditions (and, or, not), nested if statements, case structure, using if statements with option buttons & check boxes, displaying message in message box, testing whether input is valid or not.

Modular programming: Menus, sub-procedures and sub-functions defining / creating and modifying a menu, using common dialog box, creating a new sub-procedure, passing variables to procedures, passing argument by value or by reference, writing a function/ procedure.

Unit - 3   15 Hours

Forms Handling: Multiple forms creating, adding, removing forms in project, hide, show method, load, unload statement, me keyword, referring to objects on a different forms
Iteration Handling: Do/loops, for/next loops, using msg box function, using string function
Arrays and Grouped Data Control: Arrays - 1-dimension arrays, initializing an array using for each, user-defined data types, accessing information with user-defined data types, using list boxes with array, two dimensional arrays.

Unit - 4 15 Hours

lists, loops and printing list boxes & combo boxes, filling the list using property window / add item method, clear method, list box properties, removing an item from a list, list box/ combo box operations.

Database Connectivity: Database connectivity of forms with back end tool like mysql, populating the data in text boxes, list boxes etc. searching of data in database using forms. Updating/ editing of data based on a criterion.

Reference Books:

1. Reference: Programming in Visual Basic 6.0 by Julia Case Bradley, Anita C. Millispangh (Tata Mcgraw Hill Edition 2000 (Fourteenth Reprint 2004))

ECE22301

V SEMESTER
DSE 2B: Elective: Visual Programming Lab
Credit (L: T: P = 0: 0: 2)

1. Print a table of numbers from 5 to 15 and their squares and Cubes.
2. Print the largest of three numbers.
3. Find the factional of a number n.
4. Enter a list of positive numbers terminated by zero. Find the sum and average of these numbers.
5. A person deposits Rs. 1000 in a fixed account yielding 5% interest. Complete the amount in the account at the end of each year for n years.
6. Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.
7. Read n numbers. Count the number of negative numbers, positive numbers and zeroes in the list. Use of arrays.
8. Read a single dimension array. Find the sum and average of these numbers.
9. Read a two dimension array. Find the sum of two 2D Array.
10. Create a database Employee and Make a form to allow data entry to Employee Form with the following command buttons:

ECE22401

V SEMESTER

DSE2C: PHP Programming with MySQL
Credit (L: T: P = 4: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to
CO1.   Learn in depth Elements of PHP
CO2.   Learn in depth Interaction Methods Between HTML and PHP
CO3.   Understand in depth PHP function
CO4.   Understand in depth String Manipulation
CO5.   Learn the characteristics of Regular Expression
CO6.   Learn the details of Developing PHP Web Application

Unit - 1   15 Hours

Introduction Basic PHP Development Control Structure: Introduction to www, History, Understanding client/server roles Apache, PHP, MySQL, XAMPP Installation PHP Basic syntax, PHP data Types, PHP Variables PHP Constants, PHP Expressions, PHP Operators Control Structures & Loop

Unit - 2   15 Hours

Working With the File System Working With Regular Expressions, Opening a File, Reading from a File, Writing to a File, File Locking, Uploading Files via an HTML Form, Getting File Information, Directory Functions, Getting a Directory Listing, The basic regular expressions, Matching patterns, Finding matches, Replace patterns
WORKING WITH FORMS: PHP Form handling, PHP GET/POST, PHP Form Validation, Accessing user input, Combine HTML and PHP code using hidden fields, Redirecting the user, File upload

Unit - 3   15 Hours

CLASSES AND OBJECTS: Object oriented concepts, Define a class, attributes, Object, Object properties, methods, constructors and destructors, Class constants, Static method, Class inheritance,   Abstract classes, Final keyword, Implementing Interface, Object serialization
Using Cookies: What are Cookies? – Setting Cookies – Using Cookie variables – Session Basics: What's a session? – Understanding Session variables – Managing User preferences with Sessions – Graphics: Drawing functions.

Unit - 4   **15 Hours**

INTRODUCTION TO DATABASE: What is RDBMS technology?, Introduction to SQL, Connecting to the MYSQL, Selecting a database, Adding data to a table, Displaying returned data on Web pages ,Finding the number of row, Inserting, Deleting , Entering and updating data, Executing multiple queries, Understanding Primary and Foreign Key, Understanding Database Normalization, Dealing with Dates and Times

Reference Books:

1. Complete Beginner's Guide to PHP: Programming & Web Development by Cedric Palmer (22 February 2014)
2. PHP and MySQL Web Development by Laura Thomson and Luke Welling
3. PHP Reference: Beginner to Intermediate PHP5 by Mario Lurig
4. PHP 4: A Beginner's Guide by William Mccarty
5. Julie Meloni and Matt Telles, PHP 6, Course Technology, CENGAGE Learning, India Edition, 2008.
6. Kevin Tatroe, Peter MacIntyre and RasmusLerdorf, Programming PHP, O'REILLY media, 3rd edition, 2013.

ECE22501

V SEMESTER

DSE2C: PHP Programming with MySQL Lab
Credit (L: T: P = 0: 0: 2)

1. Write a PHP program to find the factorial of a number.
2. Write a PHP program using Conditional Statements.
3. Write a PHP program to find the maximum value in a given multi-dimensional array.
4. Write a PHP program to find the GCD of two numbers using user-defined functions.
5. Design a simple web page to generate multiplication table for a given number using PHP.
6. Design a web page that should compute one's age on a given date using PHP.
7. Write a PHP program to download a file from the server.
8. Write a PHP program to store the current date and time in a COOKIE and display the 'Last Visited' date and time on the web page.
9. Write a PHP program to store page views count in SESSION, to increment the count on each refresh and to show the count on web page.
10. Write a PHP program to draw the human face.
11. Write a PHP program to design a simple calculator.
12. Design an authentication web page in PHP with MySQL to check username and password.

ECE23001

V SEMESTER

DSE 3A: Elective: Analysis and Design of Algorithms

(Credit L: T: P = 4: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to
CO1. Learn the details of Types of notion of Algorithm
CO2. Learn in details with examples Algorithm Design Techniques
CO3. Deliberate in depth Sorting Techniques
CO4. Deliberate in depth of Searching Techniques
CO5. Identify in details with examples Analysis of Graph Algorithms
CO6. Learn the details of Dynamic Programming Methods

Unit - 1   15 Hours

Introduction: Notion of Algorithm, Review of Asymptotic Notations, Mathematical Analysis of Non-Recursive and Recursive Algorithms Correctness of Algorithm
Algorithm Design Techniques: Iterative techniques Divide and conquer greedy algorithms.
Sorting Techniques: Selection sort, bubble sort, insertion sort, more sorting techniques-quick sort, merge sort. Radix sort,

Unit - 2   15 Hours

The Greedy Method: General Method - Container Loading - Knapsack Problem - Tree
Searching Techniques: Linear and Binary search, Complexity Analysis.
Graphs: Analysis of Graph algorithms -Depth-First Search Breadth-First Search and its applications, minimum Spanning Trees and Shortest Paths -PRIM 'S, KRUSKAL, Dijkstra's algorithm. Branching-Hamiltonian Circuit problem.

Unit - 3   15 Hours

Dynamic Programming: The General Method, Warshall's Algorithm, Floyd's Algorithm for the All-Pairs Shortest Paths, Single-Source Shortest Paths: The Travelling Salesperson problem.

Unit - 4   15 Hours

Vertex Splitting – Job Sequencing With Deadlines - Minimum Cost Spanning Trees - Optimal
Storage on Tapes – Optimal Merge Patterns - #Single Source Shortest Paths#.
Backtracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem Branch and Bound: The Method - 0/1 Knapsack Problem.

Reference Books:

1. Analysis & design of Algorithm-Padma Reddy
2. A.V. Levitin, Introduction to the Design and Analysis of Algorithms, Pearson Education, 2006.
3. J. Kleinberg and E. Tardos, Algorithms Design, Pearson Education, 2006.
4. Ellis Horowitz, SatrajSahni and SanguthevarRajasekaran, Fundamentals of Computer Algorithms,Universities Press, Second Edition, Reprint 2009.
5. A.A.Puntambekar, Analysis and Design Of Algorithms, Technical Publications, 2008

ECE23101

V SEMESTER

DSE 3A: Elective: Analysis and Design of Algorithms Lab

(Credit L: T: P = 0: 0: 2)

1. Implement Insertion Sort.
2. Implement Merge Sort.
3. Implement recursive algorithm
4. Implement Randomized Quick sort.
5. Implement Radix Sort.
6. Implement Searching Techniques (linear & Binary)
7. Implement selection sort
8. Implement Bubble sort
9. Implement Prim's Algorithm
10. Implement Dijkstra's Algorithm
11. Implement Krushkal's Algorithm
12. Implement Travelling Salesperson problem
13. Implement Floyd's Algorithm
14. Implement Depth First Search
15. Implement Binary Search tree.

ECE23201

V SEMESTER

DSE 3B: Elective: Mobile Applications

Credit (L: T: P = 4: 0: 0)

Course Outcome:

   After successful completion of the course, the student is able to

CO1. Deliberate the details of Concepts of Event Driven Programming
CO2. Learn in details with examples issues of Mobile applications
CO3. Specify the details of Mobile applications Development tools and Frameworks
CO4. Deliberate in details with examples common Mobile device UI's
CO5. Write down in depth Data persistence Remote data storage and communication
CO6. Learn in details with examples Code signing

Unit - 1   15 Hours

Event Driven Programming: UI event loop, Threading for background tasks, Outlets / actions, delegation, notification, Model View Controller (MVC) design pattern.
Mobile application issues: limited resources (memory, display, network, file system), input / output (multi-touch and gestures), sensors (camera, compass, accelerometer, GPS)

Unit - 2   15 Hours

Development tools: Apple iOS toolchain: Objective-C, Xcode IDE, Interface Builder, Device simulator.
Frameworks: Objective-C and Foundation Frameworks, Cocoa Touch, UI Kit, Others: Core Graphics, Core Animation, Core Location and Maps, Basic Interaction.

Unit - 3   15 Hours

Common UI's for mobile devices: Navigation Controllers, Tab Bars, Table Views, Modal views, UI Layout.
Data Persistence: Maintaining state between application invocations, File system, Property Lists, SQLite, Core Data.

Unit - 4   15 Hours

Remote Data-Storage and Communication: "Back End" / server side of application, RESTful programming, HTTP get, post, put, delete, database design, server side JavaScript / JSON.
Code signing: security, Keychain, Developers and App Store License Agreement

Reference:

1. Rajiv Ramnath, Roger Crawfis, and Paolo Sivilotti, Android SDK 3 for Dummies, Wiley, 2011.
2. Valentino Lee, Heather Schneider, and Robbie Schell, Mobile Applications: Architecture, Design, and Development, Prentice Hall, 2004.
3. Brian Fling, Mobile Design and Development, O'Reilly Media, 2009. Maximiliano
4. Firtman, Programming the Mobile Web, O'Reilly Media, 2010.
5. Christian Crumlish and Erin Malone, Designing Social Interfaces, O'Reilly Media, 2009.
6. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers, 2006.

ECE23301

V SEMESTER

DSE 3B: Elective: Mobile Applications Lab

Credit (L: T: P = 0: 0: 2)

Software Lab based on Mobile Applications:

1. Installing Android Environment
2. Create Hello World Application
3. Sample Application about Android Resources
4. Sample Application about Layouts
5. Sample Application about Intents
6. Sample Application I about user interfaces
7. Sample Application about Animations
8. Make a Project based on above labs
9. Sample Application about Android Data
10. Sample Application about SQLite I
11. Sample Application about SQLite II
12. Project Presentation

ECE23401

V SEMESTER

DSE 3C: Elective: Machine Learning

Credit (L: T: P = 4: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to

CO1. Deliberate the details of Concepts of Machine Learning
CO2. Learn in details with examples for Machine Learning Software
CO3. Specify the details of Linear Algebra
CO4. Deliberate in details with examples Linear & Logistic Regression
CO5. Write down in depth Regularization and its utility
CO6. Learn in details with methods of Neural Networks

Unit - 1   15 Hours

Introduction: Concept of Machine Learning, Applications of Machine Learning, Key elements of Machine Learning, Supervised vs. Unsupervised Learning, Statistical Learning: Bayesian Method, The Naive Bayes Classifier

Unit - 2   15 Hours

Softwares for Machine Learning and Linear Algebra Overview: Plotting of Data, Vectorization, Matrices and Vectors: Addition, Multiplication, Transpose and Inverse using available tool such as MATLAB.

Unit - 3   15 Hours

Linear Regression: Prediction using Linear Regression, Gradient Descent, Linear Regression with one variable, Linear Regression with multiple variables, Polynomial Regression, Feature Scaling/Selection.
Logistic Regression: Classification using Logistic Regression, Logistic Regression vs. Linear Regression, Logistic Regression with one variable and with multiple variables.

Unit - 4   15 Hours

Regularization: Regularization and its utility: The problem of Overfitting, Application of Regularization in Linear and Logistic Regression, Regularization and Bias/Variance.
Neural Networks: Introduction, Model Representation, Gradient Descent vs. Perceptron Training, Stochastic Gradient Descent, Multilayer Perceptrons, Multiclass Representation, Backpropagation Algorithm.

Readings
1. Ethem Alpaydin, "Introduction to Machine Learning" 2nd Edition, The MIT Press, 2009.
2. Tom M. Mitchell, "Machine Learning", First Edition by Tata McGraw-Hill Education, 2013.
3. Christopher M. Bishop, "Pattern Recognition and Machine Learning" by Springer, 2007.
4. Mevin P. Murphy, "Machine Learning: A Probabilistic Perspective" by The MIT Press, 2012.

ECE23501

V SEMESTER

DSE 3C: Elective: Machine Learning Lab

Credit (L: T: P = 0: 0: 2)

For practical Labs for Machine Learning, students may use software like MABLAB/Octave or Python. For later exercises, students can create/use their own datasets or utilize datasets from online repositories like UCI Machine Learning Repository (http://archive.ics.uci.edu/ml/).

1.   Perform elementary mathematical operations in Octave/MATLAB like addition, multiplication, division and exponentiation.
2.   Perform elementary logical operations in Octave/MATLAB (like OR, AND, Checking for Equality, NOT, XOR).
3.   Create, initialize and display simple variables and simple strings and use simple formatting for variable.
4.   Create/Define single dimension / multi-dimension arrays, and arrays with specific values like array of all ones, all zeros, array with random values within a range, or a diagonal matrix.
5.   Use command to compute the size of a matrix, size/length of a particular row/column, load data from a text file, store matrix data to a text file, finding out variables and their features in the current scope.
6.   Perform basic operations on matrices (like addition, subtraction, multiplication) and display specific rows or columns of the matrix.
7.   Perform other matrix operations like converting matrix data to absolute values, taking the negative of matrix values, additing/removing rows/columns from a matrix, finding the maximum or minimum values in a matrix or in a row/column, and finding the sum of some/all elements in a matrix.
8.   Create various type of plots/charts like histograms, plot based on sine/cosine function based on data from a matrix. Further label different axes in a plot and data in a plot.
9.   Generate different subplots from a given plot and color plot data.
10. Use conditional statements and different type of loops based on simple example/s.
11. Perform vectorized implementation of simple matrix operation like finding the transpose of a matrix, adding, subtracting or multiplying two matrices.
12. Implement Linear Regression problem. For example, based on a dataset comprising of existing set of prices and area/size of the houses, predict the estimated price of a given house.
13. Based on multiple features/variables perform Linear Regression. For example, based on a number of additional features like number of bedrooms, servant room, number of balconies, number of houses of years a house has been built – predict the price of a house.
14. Implement a classification/ logistic regression problem. For example based on different features of students' data, classify, whether a student is suitable for a particular activity. Based on the available dataset, a student can also implement another classification problem like checking whether an email is spam or not.
15. Use some function for regularization of dataset based on problem 14.
16. Use some function for neural networks, like Stochastic Gradient Descent or backpropagation - algorithm to predict the value of a variable based on the dataset of problem 14.

ECE24101

V SEMESTER

SEC 2A: Elective: Object Oriented Modelling& Design with UML
Credit (L: T: P = 0: 0: 2)

Course Outcome:

After successful completion of the course, the student is able to

CO1. Deliberate in details with examples Object Oriented Development
CO2. Write down the details of OO Modeling Concepts
CO3. Learn the details of OO process Overview
CO4. Identify in depth Design of System Using OO Model
CO5. Specify the details of Steps for Implementation of OO Modeling
CO6. Learn the details of Design a System Using UML Tool

Object Oriented Modeling& Design with UML Lab

Term Work / Assignment

 Each candidate will submit an approximately10-page written report on a case study or mini project. Students have todo OO analysis & design for the project problem, and develop use case model, analysis model and design model for it, using UML.

Practical assignment

Nine assignments, one on each of the diagrams learnt in UML.

Reference Books:

1.   Object –oriented modeling and design- Michael R Blaha and James R Rumbaugh
2.   Object Technology- David A.Taylor
3.   Designing Flexible Object Oriented systems with UML – Charles Ritcher
4.   Object Oriented Analysis & Design, Sat/.inger. Jackson, BurdThomson
5.   Object Oriented Modeling and Design - James Rumbaugh
6.   Teach Yourself UML in 24 Hours - Joseph Schmuilers

ECE24301

V SEMESTER

SEC 2B: Elective: JQuery
Credit (L: T: P = 0: 0: 2)

Course Outcome:
After successful completion of the course, the student is able to
CO1. Deliberate in details with examples JQuery
CO2. Learn the details of JQuery Overview
CO3. Specify the details of Steps for Implementation of JQuery
CO4. Learn the details of Design and use of JQuery

JQuery Lab

1. Test if jQuery is loaded.
2. Scroll to the top of the page with jQuery.
3. Disable right click menu in html page using jquery.
4. Blink text using jQuery.
5. Create a Zebra Stripes table effect.
6. Print a page using jQuery.
7. Limit character input in the text area including count.
8. Create a div using jQuery with style tag.
9. Move one DIV element inside another using jQuery.
10. Add a list element within an unordered list element.
11. Remove all the options of a select box and then add one option and select it.
12. How to get the value of a textbox using jQuery?
13. Remove style added with .css() function using jQuery.
14. Distinguish between left and right mouse click with jQuery.
15. Check if an object is a jQuery object.
16. How to detect whether the user has pressed 'Enter Key' using jQuery.
17. How to get textarea text using jQuery.
18. Access form input fields using jQuery.
19. Convert a jQuery object into a string.
20. How to detect a textbox's content has changed using jQuery?
21. Remove a specific value from an array using jQuery.
22. Add options to a drop-down list using jQuery.
23. Delete all table rows except first one using jQuery.
24. Count Child elements using jQuery.
25. Restrict "number"-only input for textboxes including decimal points.
26. Set value in input text using jQuery.
27. Set a value in a span using jQuery.
28. Find the class of the clicked element.
29. Set href attribute at runtime using jquery.
30. Find the total width of an element (including width, padding, and border) in jQuery.
31. Change options of select using jQuery.
32. Access HTML form data using jQuery.

ECE24501

V SEMESTER

SEC 2B: Elective: MongoDB
Credit (L: T: P = 0: 0: 2)

Course Outcome:

After successful completion of the course, the student is able to

CO1. Deliberate in details with examples MongoDB

CO2. Learn the details of MongoDB Overview

CO3. Specify the details of Steps for Implementation of MongoDB

CO4. Learn the details of Design and use of MongoDB

MongoDB Lab

1. Write a MongoDB query to display all the documents in the collection restaurants.
2. Write a MongoDB query to display the fields restaurant_id, name, borough and cuisine for all the documents in the collection restaurant.
3. Write a MongoDB query to display the fields restaurant_id, name, borough and cuisine, but exclude the field _id for all the documents in the collection restaurant.
4. Write a MongoDB query to display the fields restaurant_id, name, borough and zip code, but exclude the field _id for all the documents in the collection restaurant.
5. Write a MongoDB query to display all the restaurant which is in the borough Bronx.
6. Write a MongoDB query to display the first 5 restaurant which is in the borough Bronx.
7. Write a MongoDB query to display the next 5 restaurants after skipping first 5 which are in the borough Bronx.
8. Write a MongoDB query to find the restaurants who achieved a score more than 90.
9. Write a MongoDB query to find the restaurants that achieved a score, more than 80 but less than 100.
10. Write a MongoDB query to find the restaurants which locate in latitude value less than -95.754168.
11. Write a MongoDB query to find the restaurants that do not prepare any cuisine of 'American' and their grade score more than 70 and latitude less than -65.754168.
12. Write a MongoDB query to find the restaurants which do not prepare any cuisine of 'American' and achieved a score more than 70 and located in the longitude less than -65.754168.
    Note : Do this query without using $ and operator.
13. Write a MongoDB query to find the restaurants which do not prepare any cuisine of 'American ' and achieved a grade point 'A' not belongs to the borough Brooklyn. The document must be displayed according to the cuisine in descending order.
14. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which contain 'Wil' as first three letters for its name.
15. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which contain 'ces' as last three letters for its name.

16. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which contain 'Reg' as three letters somewhere in its name.

17. Write a MongoDB query to find the restaurants which belong to the borough Bronx and prepared either American or Chinese dish.

18. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which belong to the borough Staten Island or Queens or Bronxor Brooklyn.

19. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which are not belonging to the borough Staten Island or Queens or Bronxor Brooklyn.

20. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which achieved a score which is not more than 10.

21. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which prepared dish except 'American' and 'Chinees' or restaurant's name begins with letter 'Wil'.

22. Write a MongoDB query to find the restaurant Id, name, and grades for those restaurants which achieved a grade of "A" and scored 11 on an ISODate "2014-08-11T00:00:00Z" among many of survey dates..

23. Write a MongoDB query to find the restaurant Id, name and grades for those restaurants where the 2nd element of grades array contains a grade of "A" and score 9 on an ISODate "2014-08-11T00:00:00Z".

24. Write a MongoDB query to find the restaurant Id, name, address and geographical location for those restaurants where 2nd element of coord array contains a value which is more than 42 and upto 52..

25. Write a MongoDB query to arrange the name of the restaurants in ascending order along with all the columns.

26. Write a MongoDB query to arrange the name of the restaurants in descending along with all the columns.

27. Write a MongoDB query to arrange the name of the cuisine in ascending order and for that same cuisine borough should be in descending order.

28. Write a MongoDB query to know whether all the addresses contains the street or not.

29. Write a MongoDB query which will select all documents in the restaurants collection where the coord field value is Double

30. Write a MongoDB query which will select the restaurant Id, name and grades for those restaurants which returns 0 as a remainder after dividing the score by 7

31. Write a MongoDB query to find the restaurant name, borough, longitude and attitude and cuisine for those restaurants which contains 'mon' as three letters somewhere in its name.

32. Write a MongoDB query to find the restaurant name, borough, longitude and latitude and cuisine for those restaurants which contain 'Mad' as first three letters of its name.

ECF21001

VI SEMESTER

DSE 4A: Elective: Operation Research
Credit (L: T: P = 4: 0: 0)

Course Outcome

After successful completion of the course, the student is able to
CO1.   Write down the details of Origin and Development of Operation Research
CO2.   Understand the characteristics of Linear Programming Problems and Methods
CO3.   Deliberate in depth Transportation Problems
CO4.   Deliberate in depth Assignment Problem
CO5.   Identify in details with examples Network Analysis
CO6.   Learn in depth Application of Operation Research

Unit - 1   **15 Hours**

Linear Programming Problems: Origin and development of operations research, formulation of Linear Programming problem, Graphical solution.
Theory of simplex method, Use of artificial variables and their solution.

Unit - 2   **15 Hours**

Transportation Problem: Mathematical formulation of transportation problem, Initial basic Feasible solution, North West corner rule, Matrix minima method, Vogel's approximation method, MODI method to find optimal solution.

Unit - 3   **15 Hours**

Assignment Problem: Mathematical formulation of an Assignment problem, Assignment algorithm, Hungarian Method to solve Assignment Problem.

Unit - 4   **15 Hours**

Network Analysis: Basic components of Network, Rules for drawing Network diagram Time calculation in Networks. Critical Path Method and PROJECT Evaluation and Review Techniques. Algorithm and flow chart for CPM and PERT.

Reference Books:

1. Taha, "Operations Research", 7th edition, Pearson Education, 2007.
2. Billey E. Gillett, "Introduction to Operations Research", Himalaya Publishing House, Delhi,1979.
3. HamadyA.Taha "Operations Research" , Collin Mac Millan, 1982

ECF21101

VI SEMESTER

DSE 4A: Elective: Operation Research Lab
Credit (L: T: P = 0: 0:2)

Lab based on Operation Research

1. LPP
2. Simplex
3. Dual Simplex
4. Big – M
5. Vogel's
6. Maxima and Minima
7. North West corner
8. Sequencing Problems
9. Modi Method
10. Hugarian Method
11. Assignment Problem

ECE21201

VI SEMESTER
DSE 4B: Elective: Enterprise Resource Planning
Credit (L: T: P = 4: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to

CO1. Deliberate the details of ERP

CO2. Learn in depth Models of ERP

CO3. Write down in depth Business Process Mapping for ERP

CO4. Understand in details with applications of ERP and Related Technologies

CO5. Deliberate the details of ERP Modules

CO6. Specify in details with examples SAP

Unit - 1   **15 Hours**

Introduction to ERP, Evolution of ERP, What is ERP? Reasons for the growth of ERP, Scenario and Justification of ERP in India, Evaluation of ERP, Various Modules of ERP, Advantage of ERP and Disadvantage of ERP.

Unit - 2   **15 Hours**

An overview of Enterprise, Integrated Management Information, Business Modeling, ERP for Small Business, ERP for make to order companies, Business Process Mapping for ERP Module Design, Hardware Environment and its Selection for ERP Implementation.

Unit - 3   **15 Hours**

ERP and Related Technologies, Business Process Reengineering (BPR), Management Information System (MIS), Executive Information System (EIS), Decision support System (DSS), Supply Chain Management (SCM) (With Example)

Unit - 4   **15 Hours**

ERP Modules, Introduction to Finance, Plant Maintenance, Quality Management, Materials Management, ERP Market, Introduction, SAP AG, Baan Company, Oracle Corporation, People Soft, JD Edwards World Solutions Company, System Software Associates.

Reference Books:

1. C.S. V Murthy Enterprise Resource Planning
2. R.G. Saha – Enterprise Resource Planning - HPH
3. Alexis Leon, Leon Publishers: Enterprise Resource Planning
4. Ravi Anupindi, Sunil Chopra, Pearson Education". "Managing Business Process Flows
5. Altekar, PHI. Enterprise Resource Planning
6. Srivatsava, I.K. International Publishers, Enterprise Resource Planning
7. P. DiwanVinod Kumar Garg and N.K. Venkitakrishnan, PHI. Enterprise Resource Planning
8. Introduction to SAP, an Overview of SD: MM, PP, FI/CO Modules of SAP. 10. ZaveriJyotindra Enterprise Resource Planning

ECE21301

VI SEMESTER
DSE 4B: Elective: Enterprise Resource Planning Lab
Credit (L: T: P = 0: 0: 2)

Students should be Prepare ERP Solution Report for his / her Case Study under the supervision of Teacher/ Lecturer

ECF21401

VI SEMESTER
DSE 4C:　Elective: E-Commerce Technologies
Credit (L: T: P = 4: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to
CO1. Understand the details of E-Commerce
CO2. Learn the details of Basic Concepts Of Internet and WWW
CO3. Identify in depth Internet Security Methods
CO4. Learn in details with examples Concepts of Electronic Data Exchange and applications
CO5. Learn in details with examples Planning For E-Commerce
CO6. Understand in depth Features of Internet Marketing

Unit - 1　　　　　　　　　　　　　　　　　　　　　　　　　15 Hours

An introduction to Electronic commerce: What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, 9 Electronic Commerce and Electronic Business(C2C)(C2G,G2G, B2G, B2P, B2A, P2P, B2A, C2A, B2B, B2C)

The Internet and WWW: Evolution of Internet, Domain Names and Internet Organization (.edu, .com, .mil, .gov, .net etc.) , Types of Network, Internet Service Provider, World Wide Web, Internet & Extranet, Role of Internet in B2B Application, building own website, Cost, Time, Reach, Registering a Domain Name, Web promotion, Target email, Banner, Exchange, Shopping Bots.

Unit - 2　　　　　　　　　　　　　　　　　　　　　　　　　15 Hours

Internet Security: Internet Security Issues Overview –Computer Security Classifications- Intellectual Property threats- Threats to the security of client computers-Threats to the security of communication channels- Threats to the security of Server computers- digital Certificates
Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy, Computer Crime(Laws , Types of Crimes), Threats, Attack on Computer System, Software Packages for privacy, Hacking, Computer Virus(How it spreads, Virus problem, virus protection, Encryption and Decryption, Secret key Cryptography, DES, Public Key Encryption, RSA, Authorization and Authentication, Firewall, Digital Signature(How it Works)

Unit - 3　　　　　　　　　　　　　　　　　　　　　　　　　15 Hours

Electronic Data Exchange: Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model, Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash.
Online payment basics- Payment cards-E-cash-Holding Electronic cash: online and offline

Cash-Advantages and disadvantages of electronic cash system-electronic wallets-Microsoft.NET passport-yahoo Wallet-EGML standard-stored value cards-magnetic strip Cards-smart cards.

Unit - 4   15 Hours

Planning for Electronic Commerce: Planning Electronic Commerce initiates, linking objectives to business strategies, measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites.

Internet Marketing: The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce.

Technologies for Electronic Commerce: Web Server Hardware and Software- Web server Basics- Types of web sites- web clients and web servers-Software for Web servers-website and utility programs-Web server hardware-Web Hosting Choices.

Reference Books:

1. G.S.V.Murthy, E-Commerce Concepts, Models, Strategies- :- Himalaya Publishing House, 2011.
2. Kamlesh K Bajaj and DebjaniNag , E- Commerce , 2005.
3. Gray P. Schneider , Electronic commerce, International Student Edition, 2011,
4. HENRY CHAN, RAYMOND LEE, THARAM DILLON, ELIZABETH CHANG E COMMERCE, FUNDAMENTALS AND APPLICATIONS, Wiely Student Edition, 2011

ECF21501

VI SEMESTER
DSE 4C: Elective: E-Commerce Technologies Lab
Credit (L: T: P = 0: 0: 2)

Software Lab based on E-Commerce Technologies
E-commerce concepts are to be implemented in developing a website using a combination of following technologies:
1.   HyperText Markup Language (HTML)
2.   Cascading Style Sheets (CSS)
3.   JavaScript
4.   ASP
5.   PHP
6.   XML
7.   Joomla

ECF22001

VI SEMESTER

DSE 5A: Cloud Computing
Credit (L: T: P = 4: 0: 0)

Course Outcome

After successful completion of the course, the student is able to

CO1. Learn in depth Fundamentals of Cloud Computing

CO2. Understand the details of Cloud Services and File System

CO3. Learn in depth Concept of Collaborating with Cloud

CO4. Understand the details of Virtualization in cloud

CO5. Learn the classification and characteristics of Security challenges in Cloud Computing

CO6. Specify the classification and characteristics of Security challenges in Cloud Computing

CO7. Understand the details of Security challenges in Cloud Computing

CO8. Understand the Common standards of Cloud Computing

CO9. Deliberate in details with examples Various Application of Cloud Computing

Unit - 1   15 Hours

Cloud Introduction: Cloud Computing Fundamentals: Cloud Computing definition, Types of cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing , usage scenarios and Applications , Business models around Cloud– Major Players in Cloud Computing - Issues in Cloud - Eucalyptus - Nimbus - Open Nebula, CloudSim.

Cloud Services and File System: Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service – Communication as services.

Unit - 2   15 Hours

Service providers- Google App Engine, Amazon EC2, Microsoft Azure, Sales force.

Collaborating With Cloud: Collaborating on Calendars, Schedules and Task Management – Collaborating on Event Management, Contact Management, Project Management – Collaborating on Word Processing, Databases – Storing and Sharing Files- Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Collaborating via Social Networks – Collaborating via Blogs and Wikis.

Unit - 3   15 Hours

Virtualization For Cloud: Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization – System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

Unit - 4   15 Hours

Security, Standards, And Applications: Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium –The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud.

Reference Books:

1. Bloor R., Kanfman M., Halper F. Judith Hurwitz "Cloud Computing" Wiley India Edition,2010
2. John Rittinghouse& James Ransome, "Cloud Computing Implementation Management and Strategy", CRC Press, 2010
3. Antohy T Velte,Cloud Computing: "A Practical Approach", McGraw Hill,2009
4. Michael Miller, Cloud Computing: "Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, August 2008.
5. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers, 2006.

Online Reading/Supporting Material
1. Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing", Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008
2. Webpages.iust.ac.ir/hsalimi/.../89.../Cloud%20Common%20standards.pptop ennebula.org,
3. www.cloudbus.org/cloudsim/, http://www.eucalyptus.com/
4. hadoop.apache.org
5. http://hadoop.apache.org/docs/stable/hdfs_design.html
6. http://static.googleusercontent.com/external_content/untrusted_dlcp/research.google.com /en//archive /mapreduce-osdi04.pdf

ECF22101

VI SEMESTER

DSE 5A: Cloud Computing Lab
Credit (L: T: P = 0: 0: 2)

Software Lab based on Cloud Computing:
1. Create virtual machines that access different programs on same platform.
2. Create virtual machines that access different programs on different platforms.
3. Exploring Google cloud for the following
   - a) Storage
   - b) Sharing of data
   - c) Manage your calendar, to-do lists,
   - d) A document editing tool
4. Exploring Open source cloud (Any two)

ECF22201

VI SEMESTER
DSE 5B: Elective: Data Mining and Data Warehousing
Credit (L: T: P = 4: 0: 0)

Course Outcome:

After successful completion of the course, the student is able to

CO1.   Understand the characteristics of Data Warehousing
CO2.   Understand the details of Data Warehousing Architecture
CO3.   Deliberate in depth Data Mining
CO4.   Learn in details with examples Association Rule Mining
CO5.   Specify the details of Classification and Prediction Techniques
CO6.   Learn in depth Clustering Methods
CO7.   Write down in depth Application of Data Mining

Unit - 1 **15 Hours**

Data Warehousing: Introduction- Definition and description need for data ware housing need `for strategic information, failures of past decision support systems, OLTP v/s DWH-DWH requirements-trends in DWH-Application of DWH.

Data Warehousing Architecture: Reference architecture- Components of reference architecture - Data warehouse building blocks, implementation, physical design process and DWH deployment process.

Unit - 2 **15 Hours**

A Multidimensional Data, Model Data Warehouse Architecture.

Data Mining: Data mining tasks-Data mining vs KDD- Issues in data mining, Data Mining metrics, Data mining architecture - Data cleaning- Data transformation- Data reduction - Data mining primitives.

Unit - 3 **15 Hours**

Association Rule Mining: Introduction - Mining single dimensional Boolean association rules from transactional databases - Mining multi-dimensional association rules.

Classification and Prediction: Classification Techniques - Issues regarding classification and prediction - decision tree - Bayesian classification –Classifier accuracy.

Unit - 4 **15 Hours**

Clustering: Clustering Methods - Outlier analysis.

Applications and Other Data Mining Methods: Distributed and parallel Data Mining Algorithms, Text mining- Web mining.

Reference Books:

1.   Jiawei Han and MichelineKamber," Data Mining Concepts and Techniques", Morgan Kaufmann Publishers, USA, 2006.
2.   Berson,"DataWarehousing, Data Mining and OLAP", Tata McGraw Hill Ltd, New Delhi, 2004.
3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, , Pearson Education.

4. Arun K Pujari,"Data mining techniques", Oxford University Press, London, 2003.
5. Dunham M H,"Data mining: Introductory and Advanced Topics". Pearson Education, New Delhi, 2003.
6. MehmedKantardzic," Data Mining Concepts, Methods and Algorithms", John Wiley and Sons, USA, 2003.
7. Soman K. P., DiwakarShyam, Ajay V., Insight into Data mining: Theory and Practice, PHI 2006

ECF22301

VI SEMESTER
DSE 5B: Elective: Data Mining and Data Warehousing Lab
Credit (L: T: P = 0: 0: 2)
Software Lab based on Data Mining:

Practical List: Practical are to be done using Weka, and a report prepared as per the format*. The operations are to be performed on built-in dummy data sets of weka and/or the downloadable datasets mentioned in references below. Also wherever applicable, the parameter values are to be varied (upto 3 distinct values). The 'Visualize' tab is to be explored with each operation.

1. Pre-processing: Apply the following filters –
    a.   weka>filter>supervised>attributed> AddClassification,   AttributeSelection, Discretize, NominalToBinary
    b.   weka>filter>supervised>instance:
         StratifiedRemoveFolds, Resample
    c.   weka>filter>unsupervised>attribute>Add, AddExpression, AddNoise ,Center , Discretize , MathExpression ,MergeTwoValues , NominalToBinary , NominalToString, NormalizeNumericToBinary ,NumericToNominal , NumericTransform , PrincipalComponent, RandomSubset , Remove , RemoveType , ReplaceMissingValues , Standardize
    d.   weka>filter>unsupervised>instance>Normalize , Randomize , Standardize, RemoveFrequentValues, RemoveWithValues , Resample , SubsetByExpression
2. Explore the 'select attribute' as follows
         weka>attributeSelection> , FilteredSubsetEval , WrapperSubsetEval
3. Association mining
    weka>associations> , Apriori, FPGrowth
4. Classification**
    weka>classifiers>bayes>   ,   NaïveBayes   ,   weka>classifiers>lazy>   :   IB1, IBkweka>classifiers>trees , SimpleCart , RandomTree , ID3
5. Clustering**
    weka>clusters>   ,   SimpleKMeans   ,   FarthestFirst   algorithm,   DBSCAN, hierarchicalClusterer

ECF22401

VI SEMESTER
DSE 5C: Elective: Artificial Intelligence and Expert Systems
Credit (L: T: P = 4: 0: 0)

Course Outcome

After successful completion of the course, the student is able to

CO1.   Deliberate in details with examples Artificial intelligence system
CO2.   Learn the characteristics of Concepts of Representation of knowledge
CO3.   Understand in details with examples Concepts of Representation of knowledge
CO4.   Understand the details of knowledge inference methods
CO5.   Understand in details with examples Concepts of Machine Learning Techniques
CO6.   Learn the details of Expert System

Unit - 1   15 Hours

INTRODUCTION TO AI AND PRODUCTION SYSTEMS: Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics -Specialized production system-Problem solving methods - Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction - Related algorithms, Measure of performance and analysis of search algorithms.
REPRESENTATION OF KNOWLEDGE: Game playing - Knowledge representation, Knowledge representation using Predicate logic

Unit - 2   15 Hours

Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.
KNOWLEDGE INFERENCE: Knowledge representation -Production based system, Frame based system. Inference - Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning - Certainty factors, Bayesian Theory-Bayesian Network-Dempster -Shafer theory.

Unit - 3   15 Hours

PLANNING AND MACHINE LEARNING: Basic plan generation systems - Strips - Advanced plan generation systems - Kstrips -Strategic explanations -Why, Why not and how explanations. Learning- Machine learning, adaptive Learning.

Unit - 4   15 Hours

EXPERT SYSTEMS: Expert systems - Architecture of expert systems, Roles of expert systems -Knowledge Acquisition –Meta knowledge, Heuristics. Typical expert systems - MYCIN, DART, XOON, Expert systems shells.

Reference Books:

1. Kevin Night, Elaine Rich, Nair B., "Artificial Intelligence (SIE)",McGraw Hill- 2008. (Unit-1,2,4,5)
2. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007. (Unit-III)
3. Peter Jackson, "Introduction to Expert Systems", 3rd Edition, Pearson Education, 2007.
4. Stuart Russel, Peter Norvig "AI – A Modern Approach", 2nd Edition, Pearson Education 2007.

ECF22501

VI SEMESTER
DSE 5C: Elective: Artificial Intelligence and Expert Systems Lab
Credit (L: T: P = 0: 0: 2)

1. Implement Breadth First Search (for 8 puzzle problem or Water Jug problem or any AI search problem)
2. Implement Depth First Search (for 8 puzzle problem or Water Jug problem or any AI search problem)
3. Implement Best First Search (for 8 puzzle problem or Water Jug problem or any AI search problem)
4. Implement Single Player Game (Using Heuristic Function)
5. Implement Two Player Game (Using Heuristic Function)
6. Implement A* Algorithm
7. Implement Propositional calculus related problem
8. Implement First order propositional calculus related problem
9. Implement Certainty Factor problem
10. Implement Syntax Checking of English sentences-English Grammar
11. Develop an Expert system for Medical diagnosis.
12. Develop any Rule based system for an application of your choice.

ECF23001

VI SEMESTER

DSE 6: Elective: Dissertation / Project
Credit (L: T: P = 0: 0: 6) 12 Hours/Week

Course Outcome:

After successful completion of the course, the student is able to

CO1. Identify in details with examples Problem identification
CO2. Write down in depth System Analysis
CO3. Understand and Develop SRS for selected System Problem
CO4. Understand and Develop System Design for selected System Problem
CO5. Learn in details and Develop a Code and Test the System
CO6. Understand the details of Presentation and Demo of Project Work

- ✓ This option is to be offered only in 6th Semester.
- ✓ The students will be allowed to work on any project based on the concepts studied in
- ✓ Core/elective or skill based elective courses.
- ✓ The group size should be maximum of THREE (03) students.
- ✓ Each group will be assigned a teacher as a supervisor who will handle both their theory as Well as lab classes.
- ✓ A maximum of Four (04) projects would be assigned to one teacher.

ECF24101

VI SEMESTER

SEC 3A: Elective: AJAX
Credit (L: T: P = 0: 0: 2)

Course Outcome:

After successful completion of the course, the student is able to

CO1. Deliberate in details with examples AJAX
CO2. Learn the details of AJAX Overview
CO3. Specify the details of Steps for Implementation of AJAX
CO4. Learn the details of Design and use of AJAX

Term work: Design& Develop Small web application using AJAX

Reference Books:

1.   Steven Holzner, "Ajax A Beginner's Guide", The McGraw-Hill Companies.

2.   Edmond Woychowsky,"Ajax: Creating Web Pages with AsynchronousJavaScript and XML", Pearson Education, Inc.

3.   Thomas A. Powell, "Ajax: The Complete Reference", McGraw-Hill Companies.

ECF24301

VI SEMESTER

SEC 3B: Elective: Angular JS
Credit (L: T: P = 0: 0: 2)

Course Outcome:

After successful completion of the course, the student is able to

CO5. Deliberate in details with examples Angular JS
CO6. Learn the details of Angular JS Overview
CO7. Specify the details of Steps for Implementation of Angular JS
CO8. Learn the details of Design and use of Angular JS

Term work: Design & Develop Small web application using AngularJS

Reference Books:

1. Valeri Karpov, Diego Netto, "Professional AngularJS", WROX
2. Sheppard, Miller, Liptak, "Sams Teach Yourself-AngularJS for .NET Developer in 24 Hours", Pearson Education India; First edition

ECF24501

VI SEMESTER

SEC 3C: Elective: Wordpress
Credit (L: T: P = 0: 0: 2)

Course Outcome:

After successful completion of the course, the student is able to

CO1.   Deliberate in details with examples Word press
CO2.   Learn the details of Word pressOverview
CO3.   Specify the details of Steps for Implementation of Word press
CO4.   Learn the details of Design and use of Word press

Term work: Design & Develop Small Web Site usingWord press

Reference Books:

1. Lisa Sabin-Wilson, Cory Miller, Kevin Palmer, Andrea Rennick, and Michael Torbert, "
    WordPress® All-in-One For Dummies®", Wiley Publishing, Inc.
2. Tris Hussey, "WordPress Absolute Beginner's Guide", Que Publishing

ECF25101

VI SEMESTER

SEC 4A: Elective: Python Programming
Credit (L: T: P = 0: 0: 2)

Course Outcome:

After successful completion of the course, the student is able to

CO1. Learn the details of Python Programming Structure
CO2. Deliberate the characteristics of Python Programming
CO3. Understand in details with examples - Python Programming Languages
CO4. Specify in depth OOPs, Event Driven and GUI features in Python

Software Lab using Python

Section: A (Simple programs)

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria

    Grade A: Percentage >=80
    Grade B: Percentage>=70 and <80
    Grade C: Percentage>=60 and <70
    Grade D: Percentage>=40 and <60
    Grade E: Percentage<40

3. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. WAP to display the first n terms of Fibonacci series.
5. WAP to find factorial of the given number
6. WAP to find sum of the following series for n terms: $1 - 2/2! : 3/3! - - - - - n/n!$
7. WAP to calculate the sum and product of two compatible matrices.

Section: B (Visual Python)

All the programs should be written using user defined functions, wherever possible.

1. Write a menu-driven program to create mathematical 3D objects
    I.   Curve
    II.   Sphere
    III.   Cone
    IV.   Arrow
    V.   Ring
    VI.   Cylinder.
2. WAP to read n integers and display them as a histogram.
3. WAP to display sine, cosine, polynomial and exponential curves.

4. WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.

5. WAP to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula m=60/(t:2), where t is the time in hours. Sketch a graph for t vs. m, where t>=0.

6. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:

P(t) = (15000(1:t))/(15: e)

Where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t for the specified time interval.

7. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:

I.   Velocity wrt time (v=u:at)
II.   Distance wrt time (s=u*t:0.5*a*t*t)
III. Distance wrt velocity (s=(v*v-u*u)/2*a)

Reference Books:

1. P. K. Sinha&PritiSinha , "Computer Fundamentals", BPB Publications, 2007.
2. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
3. T. Budd, Exploring Python, TMH, 1st Ed, 2011
4. Python Tutorial/Documentation www.python.or 2010
5. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012

ECF25301

VI SEMESTER

SEC 4B: Elective: R Programming
Credit (L: T: P = 0: 0: 2)

Course Outcome:

After successful completion of the course, the student is able to

CO1. Learn the details of R Programming Structure
CO2. Deliberate the characteristics of R Programming
CO3. Understand in details with examples - R Programming Languages

Software Lab Based on R Programming

1. Write a program that prints 'Hello World' to the screen.
2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n
3. Write a program that prints a multiplication table for numbers up to 12.
4. Write a function that returns the largest element in a list.
5. Write a function that computes the running total of a list.
6. Write a function that tests whether a string is a palindrome.
7. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble Sort
8. Implement linear search.
9. Implement binary search.
10. Implement matrices addition, subtraction and Multiplication

Reference Books:

1. William N. Venables and David M. Smith, An Introduction to R. 2nd Edition. Network Theory Limited.2009
2. Norman Matloff, the Art of R Programming - A Tour of Statistical Software Design, No Starch Press.2011

ECF25501

VI SEMESTER

SEC 4C: Elective: CodeIgniter
Credit (L: T: P = 0: 0: 2)

Course Outcome:

After successful completion of the course, the student is able to

CO1. Learn the details of CodeIgniter - Application Development Framework
CO2. Deliberate the Features of CodeIgniter

Term work: Design & Develop Small web application using CodeIgniter framework

Reference Books:

https://www.guru99.com/codeigniter-tutorial.html
https://www.javatpoint.com/codeigniter-preventing-enabling-from-csrf

Question Paper Pattern
Theory (3 or 4 Credits)

Time: 3 Hours   Max. Marks: 70

Part – A

I.   Answer any Eleven Question out of given Twelve Questions.11 X 2 = 22

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.

Note: Three Questions each from the Units 1, 2, 3, and 4

Part - B
II.   Answer any Two Sub Questions from each main Question.
13. A)   **2 X 6 = 12**
      B)
      C)
14. A)   **2 X 6 = 12**
      B)
      C)
15. A)   **2 X 6 = 12**
      B)
      C)
16. A)   **2 X 6 = 12**
      B)
      C)

Note: Each Main questions contains 3 sub questions carries 06 Marks (may have internal Split-ups) and from Units 1, 2, 3 and 4 respectively

Question Paper Pattern

Theory (1 or 2 Credits)

Time: 2 Hours   Max. Marks: 35

Part – A

I.   Answer all Questions.   05 X 02 = 10

1.

2.

3.

4.

5.

Part - B

II.   Answer any Four Questions out of given Five Questions.   5 X 5 = 25

6.

7.

8.

9.

10.

Note: Each Main questions contains 3 sub questions carries 06 Marks (may have internal Split-ups) and from Units 1 & 2 respectively

Question Paper Pattern

Practical / Project (1 or 2 Credits)

Time: 3 Hours   Max. Marks: 35

Practicals

1. Two Experiments/ Programs 20 Marks Each   2 x 10 = 20 Marks

    a. Write-ups 5 X 2 = 10 Marks

    b. Conducting & Results 3 X 5 = 10 Marks (Any One for 2 Hours of Practical's)

2. Viva – Voice   10 Marks

3. Record   05 Marks

Project

1. Project Presentation   10% Marks

2. Project Demo   20% Marks

3. Viva – Voice   20% Marks

4. Record / Report   20% Marks

5. IA (C1 & C2)   30% Marks

Question Paper Pattern

Theory (SEC 1A/B: Mathematics / Business Mathematics)

Time: 2 Hours   **Max. Marks: 35**

Part – A

1. **Answer any five Questions.**   **5 X 2 = 10**

a.
b.
c.
d.
e.
f.

Part – B

2. **Answer any two Questions.**   **2 X 5 = 10**

a.
b.
c.

3. **Answer any two Questions.**   **2 X 5 = 10**

a.
b.
c.

4. **Answer any one of the following.**   **1 X 5 = 5**

a.
b.

Question Paper Pattern

Project (6 Credits)

Time: 3 Hours   Max. Marks: 70

IA (C1 & C2) = Max. Marks: 30

Practicals

Project

1. Project Presentation   10 Marks

2. Project Demo   30 Marks

3. Viva – Voice   20 Marks

4. Record / Report   10 Marks

5. IA (C1 & C2)   (15 & 15) Marks