ARULMIGU PALANIANDAVAR ARTS COLLEGE FOR WOMEN

PALANI

(AUTONOMOUS)

(Re-Accredited with 'A' by NAAC)

MASTER OF SCIENCE

(COMPUTER SCIENCE & INFORMATION TECHNOLOGY)

SYLLABUS

2016-17 and 2017-18 Batches

PG DEPARTMENT OF COMPUTER SCIENCE

Under Choice Based Credit System

M.Sc (Computer Science & Information Technology)

REGULATIONS:

1. OBJECTIVES

➢ To prepare students to become professional computer scientist with the knowledge, capabilities and attitudes that they will need to participate in solving problems in society, science or institutions.

➢ To train the student to understand innovative computer technologies.

➢ To make the students to design and implement IT systems for a wide range of organization.

2. QUALIFICATION

➢ Candidates for admission to the M.Sc(Computer Science and Information Technology) course (Full-Time) should possess a Bachelor's degree of this university or an examination accepted as equivalent thereto, with a minimum aggregate of 55% marks, in Part III subjects with atleast one Mathematics paper at degree level / +2 level, other than languages.

3. DURATION OF THE COURSE:

➢ Full-Time M.Sc (Computer Science and Information Technology) Degree course shall be divided into four semesters of two years duration.

4. ELIGIBILITY OF THE DEGREE

➢ The candidate requires 75% of attendance to attend the semester examination.

➢ Three internal tests will be conducted and best of two will be considered for the internal mark consolidation.

➢ The passing minimum is 40% in each paper.

➢ To get Graduation, the students should gain minimum of 140 credits.

5. EVALUATION:

➢ 75% of marks are allotted for external evaluation and 25% of the marks are allotted for internal evaluation in each of the theory subjects.

➢ 60% of marks are allotted for external evaluation and 40% of the marks are allotted for internal evaluation in each of the theory and practical subjects.

➢ For each course there will be continuous Internal Assessment (CIA) and Final Semester Examination.

PATTERN OF EVALUATION

For each paper there will be Internal Assessment (IA) and Semester Examination (External).

	Int.	Ext.	Total
Theory	25	75	100
Practical	40	60	100
Project	50	150	200

INTERNAL ASSESSMENT COMPONENTS

Theory

Test	-	15
Assignment	-	5
Seminar	-	5

		25

Practical

Lab Sessions	-	10
Record	-	10
Model Test	-	20

		40
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6. PATTERN OF THE QUESTION PAPER (EXTERNAL)

Maximum : 75 marks   **Time: 3 hours**

Part-A

I.   Answer any FIVE out of EIGHT questions   (5 x 3 = 15)
Each unit must have ONE or TWO questions

Part-B

II.   Answer any THREE out of FIVE questions   (3 x 10 = 30)

One Questions from each unit.

Part-C

III. Answer any TWO questions (Either or Choice)   (2 x 15 = 30)

All Questions carry equal marks.

ARULMIGU PALANIANDAVAR ARTS COLLEGE FOR WOMEN, PALANI

COMMON ACADEMIC STRUCTURE IN AUTONOMY
CBCS – PG M.SC (CS&IT)
Syllabus for 2016-17 and 2017-18 batches

Semester	Title of paper	Hours	Credits	Marks		
				CIA	CE	Total
I	**Core Paper I :** Programming in C++	5	5	25	75	100
	Core Paper II : Digital Electronics & Computer Organization	5	5	25	75	100
	Core Paper III : Computer Algorithm	5	**4**	25	75	100
	Core Paper IV Lab I: Programming in C++	5	3	40	60	100
	Core Paper V Lab II: Web Technology	5	3	40	60	100
	Elective I	5	4	25	75	100
	TOTAL	**30**	**24**			**600**
II	**Core Paper VI :** Discrete Mathematics	5	5	25	75	100
	Core Paper VII : Relational Database Management System	5	5	25	75	100
	Core Paper VIII : Operating System	5	4	25	75	100
	Core Paper IX Lab III: Visual Programming	5	3	40	60	100
	Core Paper X Lab IV: Relational Database Management System	5	3	40	60	100
	Elective II	5	4	25	75	100
	TOTAL	**30**	**24**			**600**

Semester	Title of paper	Hours	Credits	Marks		
				Int.	Ext.	Total
III	**Core Paper XI :** Computer Graphics	5	5	25	75	100
	Core Paper XII : Java Programming	5	5	25	75	100
	Core Paper XIII : Data Mining	5	4	25	75	100
	Core Paper XIV Lab V : Programming in Java	5	3	40	60	100
	Core Paper XV Lab VI : Scientific Computational Tools	5	3	40	60	100
	Elective III	5	4	25	75	100
	TOTAL	**30**	**24**			**600**
IV	**Core Paper XVI :** Software Engineering	5	4	25	75	100
	Elective IV	5	4	25	75	100
	Core Paper XVII : Project Work	20	10	50	150	200
		30	**18**			**400**
Grand Total		**120**	**90**			**2200**

TOTAL NUMBER OF CORE PAPERS   **: 16 (10 Theory + 6 Lab)**

                     ELECTIVE   **: 04**

                     PROJECT   **: 01**

TOTAL MARKS   **: 2200**

TOTAL CREDITS   **: 90**

Elective papers:

Elective-I
1. Web Technology
2. E-Commerce & its applications
3. System Simulation

Elective-II
1. System Software
2. Compiler Design
3. Neural Networks

Elective-III
1. Computer Networks
2. Mobile Communication
3. Digital Image Processing

Elective-IV
1. Multimedia and its Applications
2. Embedded system
3. Client Server Computing

CORE PAPER I

PROGRAMMING IN C++

Hours: 5   **Credits   : 5**

                                                   Semester: I

Objectives:

1. *To discuss Oops Concepts.*
2. *To deal with I/O facilities, control structures which are important for a OOPs programming language.*
3. *To develop programming skills in writing simple programs.*

UNIT I

Principles of OOP: OOP Paradigm – Basic Concepts of OOP – Benefits of OOP – Object Oriented Languages – Applications of OOP.

Token, Expressions and Control Structures: Introduction – Tokens - Keywords, - Identifiers and Constants – Data Types – Variables – Operators – Manipulators - Expressions - Control Structures in C++.

UNIT II

Functions in C++: Introduction - Main Function – Function Prototyping – Call by Reference –Return by Reference - Inline Functions - Function Overloading – Friend and Virtual Functions.

UNIT III

Classes and Objects – Constructors and Destructors – Operator Overloading – Type Conversions.

UNIT IV

Inheritance: Introduction - Single Inheritance – Multilevel Inheritance –Multiple Inheritance- Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes – Abstract Classes.

Pointers - Virtual Functions - Polymorphism – Managing Console I/O Operations.

UNIT V

Working with Files – Classes for File Stream Operations – Opening and Closing a File – Detecting end-of-file – File Pointers – Updating a File – Error handling During File Operations – Command Line Arguments. Templates – Class Templates - Function Templates – Member Function Templates – Templates Arguments – Exception Handling.

TEXT BOOK:

1. Object Oriented Programming with C++ by E. Balagurusamy, Tata McGraw Hill, and New Delhi 2009. 4th edition.

REFERENCE BOOK:

1. Object oriented programming with ANSI &Turbo C++, Ashok N.Kamthane, Pearson education.

CORE PAPER II

DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION

Hours: 5   **Credits : 5**

                                                              Semester: I

Objectives:

1. To give knowledge on digital principles and digital circuits.

2. To give a knowledge on memory organization.

UNIT I

Number Systems: Binary – Octal – Decimal – Hexa Decimal number system – Conversion: Decimal to Binary – HexaDecimal to Binary – Hexa Decimal to Octal and vice – versa.

Arithmetic Operation: Binary arithmetic operation – Boolean algebra – Logic Gates – Boolean Simplification – Karnaugh Map – Sum of the product method – I‟s and 2‟s complement.

UNIT II

Combinational Circuits: Arithmetic Circuits: Half Adder – Full Adder – Half Subtractor – Full Subtractor – Multiplexer – Demultiplexer.

Sequential Circuits: Flip Flops: RS,JK, Flip-Flop.

UNIT III

Basic structure of computer hardware and software: Functional units-Basic operational concepts-Bus structures- Addressing modes.

The processing unit: Fundamental concepts.

UNIT IV

Input Output Organization: Accessing I/O devices-Interrupts-Direct memory access

UNIT V

Memory organization: Semiconductor RAM memories – Read only memories-cache memories –mapping functions, Replacement algorithms - virtual memory .

TEXT BOOK:

1. Digital Circuits and Design by S.Salivahanan and S.Arivazhagan, Vikas Publishing House Pvt. Ltd., New Delhi, 2000.3rd edition.

2. Computer Organization by V.Carl Hamacher, Zvonko G. Vranesic,Safwat G. Zaky- 4th Edition, McGraw Hill Publication, 1996.

REFERENCE BOOK:

1. Computer System Architecture by Moris Mano. M –, Prentice Hall of India, 1983. 3rd edition

CORE PAPER III

COMPUTER ALGORITHMS

Hours: 5   **Credits : 4**

                                                          Semester: I

Objectives:

1. *To know about Basic terminology, notations and operators.*

2. *To Learn to develop algorithms.*

UNIT I

INTRODUCTION: Algorithm-pseudo code for Expressing Algorithms-Analysis-Time complexity and Space Complexity-Efficiency of Algorithms –O-notation-Omega notation and Theta notation. **DIVIDE AND CONQUER**: General method-Binary search-Merge sort-Quick sort.

UNIT II

GREEDY METHOD: General method –Knapsack problem-job sequencing with deadlines-minimum-cost spanning trees: Prim"s and Kruskal"s algorithms-single source shortest paths: Dijkstra"s algorithm.

UNIT III

DYNAMIC PROGRAMMING: General method-Multistage Graphs-All pairs shortest paths, Single source shortest paths -Traveling sales person problem.

UNIT IV

BACK TRACKING: General method-8 queen problem-sum of subsets problem-graph coloring-Hamiltonian cycles.

UNIT V

BRANCH AND BOUND: Least Cost(LC) search, Bounding-LC branch and bound –FIFO branch and bound.

TEXT BOOK:

1. Fundamentals of Computer Algorithms by Ellis Horrowitz and Sahini – GalgotiaPublicaitons, 1998.

REFERENCE BOOK:

1. Fundamentals of algorithm by Gilles Brassard and Paul Bratley 1997 -, Prentice Hall of India Pvt .Ltd.

2. Mark Allen Weiss.2000.Data Structures and Algorithms analysis in c, Addition-wesley, Third Indian Reprint.

CORE IV - LAB I

PROGRAMMING IN C++

Hours: 5

Credits : 3

Semester: I

PROGRAM LIST:

1. Print the Student Name, Register Number, Marks, Total and Average using Array of Objects.
2. Sum of the given numbers using Function Overloading
    a. Two Integer Values
    b. Three Integer Values
    c. Two double Values
3. Banking Operations using Constructors.
4. Sum of the two values using „+‟ operator overloading using
    a. Two integer values   b. Two floating values
5.   Find the Arithmetic operations using Inline function.
6. Write a C++ program to apply single inheritance and assume the fields by your own.
7. Write a C++ program to apply multiple inheritances and assume the fields by your own.
8. Write a C++ program to apply the THIS pointer to greatest age among them.
9. Write a C++ program to apply run time polymorphism to display the book details.
10. Create a sequential file with fields with student name, register number C++ Mark, Maths mark, Science mark and write another program to access the file and calculate total mark, average and result.
11. Binary Search
12. Merge Sort.
13. Quick sort.

CORE V - LAB II

WEB TECHNOLOGY

Hours: 5   *Credits   : 3*

Semester: I

PROGRAM LISTS

1. Simple HTML Pages using formatting tags.

2. Simple HTML Pages using Frames.

3. Simple Web page using Tables.

4. Website Design for a Department, College, Company etc.

5. Java Script for a Mathematical Calculator.

6. Java Script – Number Puzzle.

7. Java Script -Magic Square.

8. Java script-Games using Random number generation.

9. Online quiz using Java Script.

10. Validation of name, mobile number, date of birth, email id using Java Script.

11. Arithmetic operations using Java script.

ELECTIVE   1.1

WEB TECHNOLOGY

Hours: 5   **Credits   : 4**

                                                         Semester : I

Objectives:

1. To Know the Internet Protocols and HTML tags.
2. To teach Java Script and JSP concepts.

UNIT I

     INTRODUCTION: Internet Basics- History of internet - Internet services and accessibility – Uses of the internet – Protocols – Web concepts

UNIT II

     INTERNET PROTOCOLS: Internet protocols – IP,TCP,UDP – Internet Applications and application protocols – datagram vs stream – TFTP – FTP – Telnet – HTTP – E-Mail – Protocols – SMTP – POP

UNIT III

     HTML: Introduction – outline of an HTML document – Head section, Prologue, link, Base Meta, script, style – Body section, linking headers, paragraph, text formatting

UNIT IV

     JAVASCRIPT: Introduction – Language elements – Objectives of JavaScript – Other objects – arrays

UNIT V

     JSP: Introduction – advantages of JSP – developing first JSP – Components of JSP – Reading Requesting information – retrieving the data posted from a HTML file to a JSP file – JSP sessions – cookies – Disabling sessions

TEXT BOOK:

     1. Web Technology: A Developers Perspective, N.P.Gopalan, PHI learning 2007

REFERENCE BOOK:

     1. Teach yourself web technologies, ivon bayross , BPB publications
       `11

ELECTIVE 1.2

E-COMMERCE AND ITS APPLICATIONS

Hours: 5   *Credits   : 4*

Semester: I

Objectives:

1. To inculcate knowledge on E-Commerce concept in the present IT world.

2. To know the internet basics.

UNIT I

Introduction: Electronic Commerce Frame Work – The anatomy of E-Commerce Applications – Electronic Commerce Consumer Applications – Electronic Commerce Organization Applications – The Network infrastructure for electronic Commerce: Components of the Highway – Network Access Equipment – Global Information Distribution Networks.

UNIT II

The internet as a Network Infrastructure: The Internet Terminology Chronological History of the Internet – NSFNET – Architecture and Components – National Research and Education Network – National independent ISPs-Regional Level ISPs-Local Level ISPs-Service Provided Connectivity – internet Connectivity Options.

UNIT III

Network Security and Firewalls: Client Server Network Security – Firewalls & Network Security – Date & Message Security – Challenge Response System – Encrypted Documents & Electronic Mail – Electronic Commerce & World Wide Web: Architectural Framework for Electronic Commerce – Technology Behind the Web – Security and the Web.

UNIT IV

Electronic Payment System: Types of Electronic Payment Systems – Digital Token Based: Electronic Payment Systems Smart Card & Electronic Payment Systems – Credit Card Based

Electronic Payment Systems – Risk & Electronic Payment Systems –Designing Electronic Payment Systems – Inter Organizational Commerce & EDI.

Electronic Data Interchange – EDI Applications in Business – EDI – Implementations, MIME and value Added Networks: EDI Software Implementations – EDI Envelope for Message Transport – Value – Added Networks (VANS) –Internet – Based EDI.

UNIT V

Information search and Retrieval – Electronic Commerce Catalogues or Directories – Information Filtering – Consumer Data Interface Emerging Tools – On Demand Education and Digital Copyrights: Computer Based Education on Demand – Software Agents: Characteristics and Properties of Agents – The Technology Behind Software Agents – Applets, Browsers and Software Agents.

TEXT BOOK

1. Ravikalakota& Andrew Whinston, "Froniters of Electornic Commerce", Addision Wesley, 2000.

REFERENCE BOOK

1. Pete Loshin, & Paul A.Murphy, "Electronic Commerce", 2ndE.d., Jaico Publishing House, 2000.

ELECTIVE 1.3

SYSTEM SIMULATION

Hours: 5   **Credits   : 4**

                                                                Semester: I

Objectives:

1. To give the basic knowledge on various types of a system models.

2. To know the concepts of acceptance rejection techniques and programming languages.

UNIT I

Introduction to Discrete Event System Simulation: Areas of applications – System and system environment. Components of a system – Discrete and Continuous systems, models of a system – types of a model.

UNIT II

Random Number Generation: Techniques for generating random numbers – test for numbers – frequency tests – Runs tests – test for Auto Correlation – Gap tests – Poker tests.

UNIT III

Random Variable Generation: Inverse transform techniques – Exponential distribution – uniform distribution, Weibull distribution – Triangular distribution – Empirical continuous distribution – Discrete distribution.

UNIT IV

Acceptance Rejection Techniques: Poisson distribution, Gamma distribution – Design and evaluation of simulation experiments, Variance reduction techniques, Verification and Validation of simulation models.

UNIT V

  Programming considerations and languages: S, GASP, SIMSCRIPT, SIMULA, DYNAMO, GPSS.

TEXT BOOK

1. Jerry Banks – Discrete Events System Simulation, 2nd Edition.

REFERENCE BOOK

1. NarsinghDeo – System Simulation with Digital Computers Garden. G – System Simulation.

CORE VI

DISCRETE MATHEMATICS

Hours: 5   **Credits   : 5**

                                                              Semester: II

Objectives:

1. *To give the basic knowledge on mathematics*

2. *To solve the variety of discrete mathematical problems*

UNIT I

   Mathematical Logic: Introduction – Propositions – Connectives – Order of Precedence for Logic Connectives – Conditional and Biconditional Propositions – Tautology and Contradiction – Equivalence of Propositions – Duality Law – Algebra of Propositions – Tautological Implication – Normal Forms .

UNIT II

   Set Theory: Introduction – Basic Concepts and Notations – Ordered Pairs and Cartesian Products – Set Operations.

   Relations: Type of Relations – Some Operations on Relations – Composition of Relations – Properties of Relations – Partition of a Set - Matrix Representation of Relations by Graphs – Representation of Relations by Graphs.

UNIT III

   Functions: Introduction – Representation of a Function – Types of Functions – Classification of Functions –Composition of Functions – Inverse of Function – Binary n-ary Operations –Properties of Binary Operations.

UNIT IV

     Graph Theory: Introduction –Basic Definitions –Degree of a Vertex – Some Special Simple Graphs - Matrix Representation of Graphs – Paths, Cycles and Connectivity – Eulerian and Hamiltonian Graphs – Connectedness in Directed Graphs – Shortest Path Algorithms.

UNIT V

     Formal Languages and Automata Theory: Introduction –Phrase – Structure Grammar – Types of Phrase –structure Grammar – Backus-Naur Form (BNF) .

Finite State Machine: Input and Output Strings for FSM – Finite State Automata(FSA)-Push down Automaton – Turing Machine.

TEXT BOOK:

    1. „DISCRETE MATHEMATICS with GRAPH THEORY and COMBINATORICS",
       T.VEERARAJAN, McGraw Hill, 2007.

REFERENCE BOOK:

    1. C.L.Liu, „Elements of Discrete Mathematics", McGraw Hill, 1985.

CORE PAPER VII

RELATIONAL DATABASE MANAGEMENT SYSTEM

Hours: 5   *Credits   : 5*

                                                 Semester: II

Objectives:

1. *To know the core concepts of RDBMS.*
2. *To create and connect the multiple tables.*
3. *To have knowledge on Normalization Techniques.*

UNIT I

Introduction: Database System Applications – Purpose of Database Systems – View of Data – Database Languages – Transaction Management – Database users and Administrators – Overall System Structure.

UNIT II

Relational Model: Entity – Relationship Model: Basic Concepts – Design Issues – Mapping cardinalities – Keys – E-R Diagrams – Weak entity sets – Extended E-R feature

UNIT III

Data Normalization: Pitfalls in Relational Database Design Entity – Decomposition-Functional Dependencies – Normalization – First Normal Form – Second Normal Form – Third Normal Form – Boyce-Codd Normal Form – Fourth Normal Form – Fifth Normal Form – De-normalization

UNIT IV

PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators.

Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQ L in PL/SQL – Data Manipulation – Transaction Control statements.

PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT…FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.

UNIT V

PL/SQL Composite Data Types: Records – Tables – Varrays.

Named Blocks: Procedures – Functions – Packages –Triggers – Data Dictionary Views.

Text Books:

- ❖ Database System Concepts, Abraham Silberschatz, Henry F.Korth, S.Sudarshan , TMH 5th Edition *(UNIT s – I, II, III-Chapter -7(7.1,7.2,7.3)*
- ❖ Database Management Systems, Alexis Leon, Mathews Leon , Lieon Vikas *(UNIT – III – Chapter -11)*
- ❖ Database Systems Using Oracle, Nilesh Shah, 2nd edition, PHI.
  (UNIT – IV: Chapters 10 & 11 UNIT – V: Chapters 12, 13 & 14)

Reference Book:

- ❖ Database Management Systems, Gerald V. Post, 3rd Edition, TMH.

CORE PAPER VIII

OPERATING SYSTEM

Hours: 5   **Credits : 4**

                                                                Semester: II

Objectives:

1. To teach the fundamental aspect of operating system.
2. To give sufficient knowledge on various system resources.
3. To know about security and production policies.

UNIT I

      Introduction: What is an Operating System– Mainframe Systems– Distributed Systems **Processes:** Process Concept – Process Scheduling – Interprocess communication

UNIT II

      Threads: Overview – Multithreading Models. **CPU Scheduling:** Basic Concepts– Scheduling Criteria – Scheduling Algorithms.

UNIT III

      Process Synchronization: Background – The Critical Section Problem – Synchronization Hardware – Semaphores.

      Deadlock: System Model – Deadlock Characterization – Methods For Handling Deadlocks – Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock

UNIT IV

      Memory Management: Swapping – Contiguous Memory allocation –Paging – Segmentation – Segmentation with Paging – Virtual Memory: Demand Paging

UNIT V

      Security: User Authentication – Cryptography

File System Interface: File Concept – File Access Methods – Directory Structure.

TEXT BOOK:

1. Operating Systems Concepts – Silberschatz, Galvin, gagne, Sixth Edition, John Wiley& Sons, Inc.

REFERENCE BOOK:

1. Operating Systems (Concepts and Design), Milan Milenkovic, Second Edition, Tata McGraw -Hill

CORE IX - LAB III

VISUAL PROGRAMMING

Hours: 5   *Credits   : 3*

                                                       Semester: II

PROGRAM LIST

1. Simulating Calculator using control arrays.
2. Quick Search in List/Combo box.
3. Building a Color Panel for Red, Green and Blue using Scroll bars.
4. Program to perform string copy and concatenation.
5. Program to perform an animation of a picture using Timer Control.
6. Create a "Text Styler" with font, Size and Style utilities.
7. Database creation using Data Manager.
8. Program to maintain Library books.
9. Program to prepare a payroll.
10. Program to prepare an electricity bill.
11. Program to prepare students mark sheet.
12. Program for inventory control.
13. Program for Student grade list using DAO/ADO
14. Program for online quiz
15. Report Generation

CORE X - LAB IV

RELATIONAL DATABASE MANAGEMENT SYSTEM

Hours: 5   **Credits : 3**

Semester: II

PROGRAM LIST:

1. DDL, DML, DCL Commands

2. Logical, Comparison, Conjunctive & Arithmetic Operators.

3. **Retrieving rows with Characters functions:**
   i)   CONCAT (Concatenation)
   ii)   REPLACE
   iii)   SUBSTR (Substring)
   iv)   LENGTH

4. **Retrieving rows with Aggregate functions:**
   i)   GROUP BY
   ii)   HAVING

5. **Retrieving rows with date functions & number function:**
   i)   SYSDATE
   ii)   ABS, FLOOR, CEIL, ROUND, POWER

6. **JOINS:**
   i)   Union, Intersection & Union all
   ii)   Simple Join
   iii)   Self Join
   iv)   Outer Join

7. **CONSTRAINTS:**
   i)   Domain Integrity (Not Null, Check)
   ii)   Entity Integrity (Unique & Primary Key)
   iii)   Referential Integrity (Foreign Key)

8. VIEW: **PL/SQL**

9. PL/SQL Programs with Control Structures

10. PL/SQL Programs with Exception Handling

11. PL/SQL Programs with Cursors

12. Creating & Calling Procedures

13. Creating & Calling Functions, Creating & Calling Packages, Triggers

ELECTIVE 2.1

SYSTEM SOFTWARE

Hours: 5   **Credits : 4**

                                                                Semester : II

Objectives:

1. *Enable the student to get sufficient knowledge on various system resources.*

UNIT I

Introduction: System Software and Machine Architecture – SIC, CISC-RISC machines.

UNIT II

Assemblers: Basic Assembler Functions – Machine Dependent, Independent Assembler Features – Assembler Design Options.

UNIT III

Loaders and Linkers: Basic loader functions – Machine Dependent, Independent Loader Features – Loader Design Options.

UNIT IV

Macro Processors: Basic Macro processor functions – Machine Independent Macro processor features – Macro processor Design options.

UNIT V

Compiler: Basic Compiler functions – Machine Dependent, Independent Compiler Features - Compiler Design options.

TEXT BOOK:

1. System Software (An Introduction to System Programming) – III Edition – 1997 – Addison Wesley.

REFERENCE BOOK:

1. System software: an introduction to system programming, Leland L.Beck, 3rd edition

ELECTIVE 2.2

COMPILER DESIGN

Hours: 5   **Credits : 4**

                                                                            Semester: II

Objectives:

1. To impart the knowledge on Parsing Techniques.
2. To know the concept on code optimization and code generation.

UNIT I

Introduction to compiler – Phases in compilation – Finite automats and lexical analysis – syntactic specification of programming language.

UNIT II

Basic parsing techniques - Parsers – Shift reduce parsing – Operator precedence parsing – Top down parsing – Predictive parsing.

UNIT III

Syntax Directed Translation – Intermediate code – Postfix notation – Three address code – Quadruple and triples – Translation of assignment statements – Boolean expressions – Statements that alter the flow of control.

UNIT IV

Symbol Tables – Content – Data Structure - Introduction to code optimization – Loop optimization - DAG representation of basic blocks – Value numbers – Algebraic laws.

UNIT V

Code generation – Problems in code generation – Simple code generator – Register allocation and Assignment – Code generation from DAG – Peephole optimization.

TEXT BOOK

1. Alfred v Aho – principles of compiler design.

REFERENCE BOOK

1.   Alfred v Aho, jeffreydulman „principles of compiler design" – narosa new delhi.

ELECTIVE 2.3

NEURAL NETWORKS

Hours: 5   **Credits   : 4**

                                                       Semester: II

Objectives:

1. *To understand the fundamental on Pattern Recognition.*

2. *To inculcate the knowledge on Neural Network Techniques.*

UNIT I

Introduction: Humans and Computers: The structure of the Brain, Learning in Machines, the Differences.

UNIT II

Pattern Recognition: Introduction, Pattern Recognition in Perspective, Pattern recognition – a definition, feature vectors and feature space, discriminate functions, classification techniques. Linear classifiers statistical techniques, Pattern Recognition – a summary.

UNIT III

The Basic Neuron: Introduction - Modeling the single neuron, learning in simple neurons, the perception a vectorial perspective, the perception learning rule, proof, and limitations of perception.

The Multilayer Perceptron: Introduction, altering the perception model, the new model the learning rule, the multiplayer perception algorithm, the XOR problem revisited applications of multiplayer perception.

UNIT IV

Kohenen Self – Organizing Networks: Introduction, the kohenen algorithm, weight training neighborhoods, reducing the neighborhoods, learning vector quantization, the Phonetic typewriter.

Hopfield Networks: The Hopfield model, the energy landscape, the Boltzsman machine, constraint satisfaction.

UNIT V

Adaptive Resonance Theory: Adaptive resonance theory, architecture and operation, ART algorithm, training the ART network, clarification, conclusion, summary of ART. Hardware and Software implementations, Optical Computing, Optical Computing and neural networks.

TEXT BOOKS:

1. Neural Computing: An introduction R.Beale&T.Jackson, Adam Hilger, 1900.

2. JamesA.Freeman,David, M.Skapura-"Neural Networks-Algorithm, Application and Programming techniques" Pearson Education.

REFERENCE BOOK:

1. Fredic M.Ham,IvicalKostanic,"Principles of Neuro computing for science of engineering"TMCH.

CORE PAPER XI

COMPUTER GRAPHICS

Hours: 5   **Credits   : 5**

Semester: III

Objectives:

1. To learn the concepts of Graphics.
2. To learn the concepts of output primitives and its attributes.
3. To know about transformations and viewing

UNIT I

Application of Computer Graphics-Video Display Devices-Raster-scan systems-random-Scan system-Graphics Monitor-Input Devices-Hard –Copy Devices.

UNIT II

Output Primitives

Points and lines-DDA and Bresenhams lime algorithm-Circle generation algorithm -Circle generating algorithms-Ellipse Generating algorithm.

UNIT III

Attributes of output primitives

Line attributes-Curve attributes-Color levels Area-Fill attributes-Character attributes

UNIT IV

Geometric Transformations

Translation – Rotation – Scaling – Matrix representations and Homogeneous coordinates – composite Transformation – Reflection and Shear.

UNIT V

Viewing: The Viewing pipeline – Viewing coordinate Reference Frame – Window to View port coordinate transformation – Viewing functions – Clipping functions – point clipping – Line clipping – Curve clipping – Text clipping – Exterior clipping.

TEXT BOOK:

    1. Computer Graphics – Donald Hearn and M.Pauline Baker PHI, Second Edition – 1994.

REFERENCE BOOK:

    1. Computer graphics: principles and practice- Foley, VanDam, Feiner, and hughes, 3rd

      edition

CORE PAPER XII

PROGRAMMING IN JAVA

Hours: 5   *Credits   : 5*

Semester: III

Objectives:

1. To inculcate knowledge on Java Programming Concepts.

2. To create wide range of Applications and Applets using Java.

UNIT I

Fundamentals of Object Oriented Programming: Introduction – Object Oriented Paradigm – Basic concepts of OOP – Benefits of OOP – Applications of OOP. Java Evolution.

Over View of Java Language:

Introduction-Simple Java Program – Java Program Structure - Java Tokens - Java Statements - Implementing a Java Program - Java Virtual Machine - Command Line Arguments - Constants, Variables and Data Types.

UNIT II

Classes, Objects and Methods: Introduction-Defining a Class- Static Members-Overriding Methods-Final Variables and Methods-Final Classes- Finalizer Methods-Abstract Methods and Classes –Visibility Control.

Interfaces: Introduction-Defining Interfaces-Extending Interfaces - Implementing Interfaces-Accessing Interface Variables.

UNIT III

Packages: Java API Packages-Using System Packages-Creating Packages-Accessing a Package-Using a Package-Adding a Class to Package-Hiding Classes.

Multithreading Programming: Creating Threads - Extending the Thread Class-Stopping and Blocking a Thread - Life Cycle of a Thread-Thread Exceptions-Thread Priority-Synchronization-Implementing the „Runnable" Interface - Managing Error and Exceptions.

UNIT IV

Applet Programming: Introduction-Preparing to Write Applets-Applet Life Cycle-Designing a web page-Passing Parameters to Applets. Event Handling.

Graphics Programming: The Graphics Class-Lines and Rectangles-Circle and Ellipses-Drawing Arcs-Drawing Polygons-Line Graphs-Using Control Loops in Applets.

UNIT V

Managing Input/Output Files in Java: Introduction - Concept of Streams - Stream Classes - Byte Stream Classes - Character Stream Classes - Input/Output Exceptions - Creation of Files - Reading/Writing Characters - Reading/Writing Bytes - Random Access Files.

TEXT BOOK

1. Programming with JAVA-E.Balagurusamy,4th Edition. Tata McGraw-Hill, New Delhi 2010.

REFERENCE BOOK

1. The complete Reference JAVA 2 Herbert Schildt 3rd edition.

CORE PAPER XIII

DATA MINING

Hours: 5   *Credits   : 4*

                                                       Semester: III

Objectives:

    1. To present the fundamentals of Data Warehousing.

    2. To understand the concept of Data Mining.

    3. To learn Classification, Clustering and Data Warehousing and neural Networks

UNIT I

  Data Warehousing : Introduction – Definition – Multidimensional Data Model OLAP operations – Warehouse Schema – Architecture – Metadata – OLAP Engine -backend process.

UNIT II

 Data Mining – Definition – Comparison with other Related Areas – Techniques – Issues and Challenges - Application Areas.

UNIT III

  Association rules – Methods – A Priori algorithm – Partition Algorithm – Princer Search Algorithm – Border Algorithm – Generalized association rules –Association Rules with Item constraints.

UNIT IV

    Clustering Techniques – Paradigms – Algorithms – CLARA – CLARANS - Hierarchical clustering – DBSCAN – Categorical Clustering Algorithms – STIRR Decision Trees – Tree construction principle – Best split – Splitting indices – CART – ID3.

UNIT V

    Web Mining – Introduction – Web Content mining – Web Structure Mining – Web Usage Mining – Text Mining – Hierarchy of Categories – Text Clustering

TEXT BOOK:

1. "Data Mining techniques" by Arun K Pujari – Universitites Press – 2001.

REFERENCE BOOK:

1."Data Mining introductory and Advanced Topics" by Margaret H.Dunham, S.Siridhar"Pearson Education 2003,.

2. C.S.R.Prabhu,"Data Warehousing Concepts techniques", Products and Application PHI 2nd Edition.

CORE XIV - LAB V
PROGRAMMING IN JAVA

Hours: 5   *Credits   : 3*

                                                      Semester: III

PROGRAM LIST

1. Develop a Java program using Inheritance and method overriding.
2. Create and import packages.
3. Create and implement interfaces.
4. Apply Exception handling.
5. Inter thread communication.
6. Applet coding for Simple Drawing.
7. Applet coding to create different controls.
8. Applet coding to apply Graphics Methods.
9. Applet coding to design a webpage.
10. Write a Java Program which open an existing File and append text to that file.

CORE XV - LAB VI

SCIENTIFIC COMPUTATIONAL TOOLS

Hours: 5   *Credits   : 3*

                                                                Semester: III

PROGRAM LIST (USING MATLAB)

1. Plotting

2. Adding Two Images

3. Crop Image

4. Comparison Of Two Values

5. Gray Scale To Binary Image

6. Flipping An Image

7. Image Complement

8. Adding And Reducing Noise In An Image

9. Color Space Conversion

10. Image Reduction

11. Multiply And Divide An Image

12. Image Transformation By Dct

13. Shearing An Image

14. Enhance Contrast In An Image

15. Edge Detection In An Image

ELECTIVE 3.1

COMPUTER NETWORKS

Hours : 5   **Credits : 4**

Semester: III

Objectives:

1. *To impart knowledge on network concepts like layers wireless concepts, transmission and security.*
2. *To give knowledge on networking technologies like broadband and Bluetooth.*

UNIT I

Introduction: Uses of Computer Networks – Network Hardware : LAN- MAN – WAN- Wireless Networks –Network Software – Reference Models : OSI – TCP/IP- Comparison of OSI and TCP/IP.

UNIT II

Physical Layer : Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics – Wireless Transmission : Electromagnetic Spectrum – Radio Transmission – Microwave – Infrared and Millimeter – Lightwave Transmission – Telephone Network: Structure of the Telephone System - Switching - Communication Satellites.

UNIT III

Data Link Layer: Services Provided to the Network Layer- Framing- Error Control – Flow Control- Error Detection and Correction - Elementary Data Link Protocols: An Unrestricted Simplex Protocol- A Simplex Stop-and-Wait Protocol- A Simplex Protocol for a Noisy Channel- Sliding Window Protocols: A One-Bit Sliding Window Protocol- A Protocol Using Go Back N- A Protocol Using Selective Repeat.

UNIT IV

Network Layer: Network Layer Design Issues- Routing Algorithms: The Optimality Principle- Shortest Path Routing- Flooding- Distance Vector Routing- Link State Routing-Hierarchical Routing- Routing for mobile Hosts - Broadcast Routing- Multicast Routing.

UNIT V

Transport Layer: The Transport Service: Services Provided to the Upper Layers-Transport Service Primitives- Elements of Transport Protocols: Addressing- Connection Establishment-Connection Release- Flow Control and Buffering -Multiplexing.

Application Layer: DNS- The Domain Name System: The DNS Name Space- Resource Records- Name Servers- Electronic Mail: Architecture and Services- The User Agent- Message Formats- Message Transfer.

TEXT BOOK:

1.   Computer Network by Andrew S.Tanenbawm PHI, III Edition, 1996.

REFERENCE BOOK:

1.   Data Communications and Networking-BehrouzA.Forouzan,Four EditionTMH,2006.

ELECTIVE 3.2

MOBILE COMMUNICATION

Hours: 5　　　　　　　　　　　　　　　　　　　　　**Credits : 4**

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Objectives:

1. To know the concept of various communication devices.

2. To impart knowledge on internet protocols and formats.

3. To offer concepts of wireless Technology.

UNIT I

Introduction: Applications – A Short history of wireless Communication – A Market of Mobile Communications – Some open Research topics – A simplified reference model.

Wireless transmission: Frequencies for radio transmission – signals – Antennas - Signal Propagation. Multiplexing – Modulation – spread spectrum – Cellular system.

UNIT II

Medium Access control: Motivation for a specialized MAC – SDMA - FDMA – TDMA – CDMA – comparision of S/T/F/CDMA.

Telecommunication systems: GSM – DECT – TETRA – UMTS and IMT-2000

UNIT III

Satellite systems: History – applications- basics. Broadcast systems: cyclical repetition of data – Digital audio broadcasting – Digital video broadcasting – Convergence of broadcasting and mobile communications.

UNIT IV

Wireless LAN: Infrared vs radio transmission – Infrastructure and ad-hoc network – IEEE 802.11 – HIPERLAN – Bluetooth.

Mobile Network layer: Mobile IP – Dynamic host configuration protocol – Mobile ad-hoc networks.

UNIT V

Mobile transport layer: Traditional TCP – Classical TCP improvements – TCP over 2.5/3G wireless networks – Performance enhancing proxies.

TEXT BOOK:

1. Principles of Mobile Computing – UweHansmann, LotherMerk, Martin S.Nicklous, Thomas Stober, Springer – Second Edition – 2003.

REFERENCE BOOKS:

1. "Mobile Communications" Addison Wesely, 2003, JochenH.SchillerIInd Edition.
2. Raffat A Dayen" Mobile Data & Wireless Lan Technologies" Prentice Hall, 1997.

ELECTIVE 3.3

DIGITAL IMAGE PROCESSING

Hours: 5   **Credits   : 4**

                                                          Semester: III

Objectives:

1. *To understand the fundamentals steps in Digital image processing.*

2. *To inculcate knowledge on image compression and image segmentation.*

UNIT I

Digital Image Processing: Definition – The Origin of Digital Image Processing – Elements of digital image processing – Steps involved in DIP – Fundamental Steps in DIP – Structure of the Human Eye – Brightness Adaptation and Discrimination – Image Acquisition using a single sensor – Image Acquisition using sensor arrays.

UNIT II

Basic concepts in image sampling and Quantization – Representing Digital Images – Spatial and Gray level resolution – Zooming and shrinking digital images – Neighbors of a pixel – Adjacency, Connectivity – Regions and Boundaries – Distance Measures, Image Operations on a pixel basis.

UNIT III

Image Enhancement in Spatial Domain – Gray level transformation – Image Negatives – Log Transformations – Enhancements using arithmetic/logical operations – Image Subtraction – Image Averaging.

UNIT IV

Image Compression: Coding Redundancy – Inter pixel redundancy – Psycho visual redundancy – Image compression models – The source encoder and decoder – The channel Encoder and Decoder.

UNIT V

Image Segmentation: Detection of discontinuous – Point detection – Line Detection – Edge Detection – Representation of Images: Chain Codes – Polygonal approximation – Signatures – Boundary segments – Skeletons.

TEXT BOOK:

1. Digital Image Processing Rafael C. Gonzalez & Richard. E. Woods Addison – Wesely publishing Company Inc.(Third Indian Reprint, 2000).

REFERENCE BOOKS:

1. Anil K.jain,"Fundamentals Digital Image Processing",Pearson Education.
2. B.Chandra and D.Dutta Majundar,"Digital Image Processing and Analysis",Prentice Hall of India private Ltd.,New Delhi.

CORE PAPER XVI

SOFTWARE ENGINEERING

Hours: 5   *Credits   : 4*

                                                          Semester : IV

Objectives:

   1.   To know the concept of computer based system and products.

   2 . To present the role of software, system analysis, design concepts, testing
methods and strategies.

UNIT I

The Evolving Role of Software – Definition of Software Engineering – The Changing Nature of Software – Software Myths – Terminologies – Software Life Cycle Models: Build and Fix Model – Evolutionary Process Models – Selection of a Life Cycle Model.

UNIT II

Requirements: Analysis and Specifications: Type of Requirements – Feasibility Studies – Requirement Elicitation: interviews, brain storming sessions, FAST – Requirement analysis: Data flow diagram, Data Dictionaries - Requirements Validation

UNIT III

Project Planning: Size Estimation – The Constructive Cost Model (COCOMO) – The Putnam Resource Allocation Model.

UNIT IV

Software Design: Design: Conceptual and Technical designs, Objectives of design – Modularity - Function Oriented Design – Software reliability: Basic concepts, software reliability, maturity levels - Software Testing: A Strategic Approach to Software Testing – Testing – Functional Testing – Structural Testing – Levels of Testing – Validation Testing.

UNIT V

   Software Maintenance: Categories of Maintenance – Problems during Maintenance –
Maintenance is Manageable – Potential Solutions to maintenance problems – Maintenance process
– Estimation of maintenance cost

Text Book:

❖ **"**Software Engineering" by K.K.Agarwal, Third Edition 2008

Reference Book:

❖ "Software Engineering Concepts", Richard e.Fairley, McGrawHill,

ELECTIVE 4.1

MULTIMEDIA AND ITS APPLICATIONS

Hours: 5   *Credits   : 4*

                                                     Semester: IV

Objectives:

1. *To know the components of multimedia.*
2. *To know more about Images and Animation*
3. *To have idea on multimedia project planning and costing*

UNIT I

Multimedia Definition – Use Of Multimedia – Delivering Multimedia – Text: About Fonts and Faces – Using Text in Multimedia – Computers and Text – Font Editing and Design Tools – Hypermedia and Hypertext.

UNIT II

Images: Plan Approach – Organize Tools – Configure Computer Workspace – Making Still Images – Color – Image File Formats. Sound: The Power of Sound – Digital Audio – Midi Audio – Midi vs. Digital Audio – Multimedia System Sounds – Audio File Formats –Vaughan‟s Law of Multimedia Minimums – Adding Sound to Multimedia Project.

UNIT III

Animation: The Power of Motion – Principles of Animation – Animation by Computer – Making Animations that Work. Video: Using Video – Working with Video and Displays – Digital Video Containers – Obtaining Video Clips – Shooting and Editing Video.

UNIT IV

Making Multimedia: The Stage of Multimedia Project – The Intangible Needs – The Hardware Needs – The Software Needs – An Authoring Systems Needs. Multimedia Production Team.

UNIT-V

     Planning and Costing: The Process of Making Multimedia – Scheduling – Estimating – RFPs and Bid Proposals. Designing and Producing – Content and Talent: Acquiring Content – Ownership of Content Created for Project – Acquiring Talent 46 .

TEXT BOOK:

1. Multimedia: Making It Work‖ – Tay Vaughan(Eight Edition)

REFERENCE BOOK:

1. Ralf Steinmetz & Klara Nahrstedt – ―Multimedia Computing, Communication & Applications ― Pearson Education

ELECTIVE 4.2

EMBEDDED SYSTEM

Hours: 5   **Credits : 4**

                                                           Semester: IV

Objectives:

1. To know the principles and programming concepts of Embedded system
2. To have knowledge on Real-time Embedded systems

UNIT I

Introduction to Embedded System: An Embedded System – Processor in the System – Other Hardware Units – Software Embedded into a System – Exemplary Embedded Systems.

UNIT II

Processor and Memory Organization: Structural Units in a Processor – Processor Selection for an Embedded System – Memory Selection for an Embedded system – Direct Memory Access – Devices and Buses for Device Networks: I/O Devices – Timer and Counting Devices – Serial Communication and Parallel Communication – Device Drivers and Interrupts Servicing Mechanism: Device Drivers – Device Drivers for Internal Programmable Timing Devices – Interrupt Servicing (Handling) Mechanism – Context, Latency and Deadline.

UNIT III

Programming Concepts and Embedded Programming in C and C++: Software Programming in Assembly Language (ALP) and in High Level Language „C‟ – Embedded Programming in C++ - Embedded Programming in Java – Optimization of Memory needs – Inter-Process Communication and Synchronization of Processes, Tasks and Threads: Multiple

Processes in an Application – Problem of Sharing Data by Multiple Tasks and Routines – Inter Process Communication.

UNIT IV

Real Time Operating Systems: Real-Time and Embedded System Operating Systems – Interrupt Routines in RTOS Environment: Handling of Interrupt Source Call by the RTOSs - RTOS Task Scheduling Models, Interrupt Latency and Response Time of the Tasks as Performance Metrics – Performance Metric in Scheduling model for Periodic, Sporadic and Aperiodic Tasks – List of Basic Actions in a Preemptive Scheduler and Expected Times taken at a Processor – Fifteen-Point Strategy for Synchronization between the Processors, ISRs, OS Functions and Tasks and for Resource Management – Embedded Linux Internals: Linux Kernel for the Device Drivers and Embedded System – OS Security Issues.

UNIT V

Case Study of an Embedded System for a Smart Card – Hardware & Software Co-Design in an Embedded System: Embedded System Project Management – Embedded System Design and Co-Design Issues in System Development Process – Design Cycle in the Development Phase for an Embedded System – Users of Target System or its Emulator and In-Circuit Emulator(ICE) – Use of Software Tools for Development of an Embedded System – Use of Scopes and Logic Analyzers for System Hardware Tests – Issues in Embedded System Design.

TEXT BOOK:
    1. Raj Kamal, Embedded Systems – Architecture, Programming and Design,   Tata McGraw-Hill,2003.

REFERENCE BOOKS:
1. David E. Simson, An Embedded Software Primer, AddisonsWesley-2001.
2. Steve Heath, Embedded Systems Design, Elsevier, 2003.

Frank Vahid and Tony Givargis, Embedded System Design, John Wiley And Sons, Inc, 2002.

ELECTIVE 4.3

CLIENT SERVER COMPUTING

Hours : 5   **Credits : 4**

                                          Semester: IV

Objectives:

1. To inculcate knowledge on Client / Server concepts

UNIT I

Basic concepts of Client/Server – Characteristics – File Servers – Database servers – Transaction servers- Groupware servers – Objective servers – Web servers – Fat servers or fat clients – 2 tier versus 3 tier – Client/Server building blocks – Operating system services. Base services – Extended services – Server scalability – Client Anatomy.

UNIT II

NOS Middleware – Peer-to-peer communications – RPC – MOM Middleware – MOM versus RPC - The fundamentals of SQL and relational databases – Server architecture – Stored procedures, triggers and rules.

UNIT III

Online transaction processing – Decision support systems – OLTP versus DSS: programming effort, database needs – Data warehouses – Elements - Hierarchies – Replication versus Direct access – Replication mechanism – EIS/DSS Tools – Client/server transaction processing – transaction models – TP Monitors – Transaction management standards.

UNIT IV

Groupware – Components – Distributed objects and components – CORBA: components – Object Management Architecture – Services – Business objects.

UNIT V

Client/server Distributed system management – components – Management application – The Internet Management Protocols – OSI Management Framework – The Desktop Management Interface – X/Open Management Standards – Client/server application development tools – Client/Server Application Design.

TEXT BOOK:

1.Robert Orfali, Dan Harkey and Jeri Edwards, The Essential Client Server Survival Guide, 2nd edn. Galgotia

REFERENCE BOOK:

1.Dawna Travis Dewire, Client/Server computing, Tata McGraw Hill.

2. Jafferey D. Schank, Novell‟s guide to Client/Server Application and Architecture, BPB Publications.

CORE PAPER XVII

PROJECT WORK

Hours: 20   **Credits   : 10**

                                                 Semester: IV

The objective of the project is to motivate the students to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

The project is of 18 hours/week for one (semester IV) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic
- Data Flow Diagram
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future applications

- For the project work, the guide(internal) evaluate the work for 50 marks based on the performance of the candidates during the development of the project and the external examiner will evaluate the project work for 150 marks.