J.J.College of Arts and Science(Autonomous)
Pudukkottai

J.J.Nagar, Sivapuram Post, Pudukkottai - 622 422

REACCREDITED BY NAAC WITH 'A' GRADE

B.Sc Computer Science

Course Structure under Autonomous Status

Under Choice Based Credit System

For the candidates admitted from the academic year 2016 - 2017 onwards

Sem	Part	Course Code	Course Title	Hrs/ Week	Credit	Exam Hrs	Marks		Total
							Int	Ext	
I	I	U1RTL1/ HL1/ FL1/ SL1/ ABL1	**Language Course-I***	6	3	3	25	75	100
	II	U1REL1	**English Language Course-I****	6	3	3	25	75	100
	III	U1RCSCC1	**Core Course - I** Programming in C	7	5	3	25	75	100
		U1RCSCC2P	**Core Course - II** Programming in C Practical	4	5	3	40	60	100
		U1RCSAC1	**Allied Course (First) – I** Algebra and Calculus	7	3	3	25	75	100
Total				**30**	**19**				**500**
II	I	U2RTL2/ HL2/ FL2/ SL2/ ABL2	**Language Course-II***	5	3	3	25	75	100
	II	U2REL2	**English Language Course-II****	5	3	3	25	75	100
	III	U2RCSCC3	**Core Course - III** Digital Electronics	5	5	3	25	75	100
		U2RCSCC4P	**Core Course – IV** Computer Graphics and Animation Practical	3	5	3	40	60	100
		U2RCSAC2	**Allied Course (First) - II** Numerical Methods and Statistics	4	3	3	25	75	100
		U2RCSAC3	**Allied Course (First) - III** Operations Research	4	3	3	25	75	100
	IV	U2RES	Environmental Studies	2	2	3	25	75	100
		U2RVE	Value Education	2	2	3	25	75	100
Total				**30**	**26**				**800**
III	I	U3RTL3/ HL3/FL3/ SL3/ABL3	**Language Course-III***	6	3	3	25	75	100
	II	U3REL3	**English Language Course-III****	6	3	3	25	75	100
	III	U3RCSCC5	**Core Course - V** Java Programming	6	5	3	25	75	100
		U3RCSCC6P	**Core Course – VI** Java Programming Practical	3	5	3	40	60	100
		U3RAPHAC1	**Allied Course (Second) - IV** Applied Physics – I	6	3	3	25	75	100

			Second Allied Course –V Applied Physics –II Lab	3	-	-	-	-	-
Total				**30**	**19**				**500**
IV	I	U4RTL4/HL4/FL4/SL4/ABL4	**Language Course-IV***	6	3	3	25	75	100
	II	U4REL4	**English Language Course-IV****	6	3	3	25	75	100
	III	U4RCSCC7	**Core course – VII** Database System Concepts	5	5	3	25	75	100
		U4RCSCC8P	**Core Course - VIII** RDBMS Practical	3	5	3	40	60	100
		U4RAPHAC2P	**Second Allied Course – V** Applied Physics - II Practical	3	3	3	40	60	100
		U4RAPHAC3	**Second Applied Course – VI** Applied Physics - III	5	3	3	25	75	100
	IV	U4RCSSBE1	**Skill Based Elective – I Any one from Annexure-I**	2	2	3	25	75	100
Total				**30**	**24**				**700**
V		U5RCSCC9	**Core course – IX** Operating Systems	6	5	3	25	75	100
		U5RCSCC10	**Core course – X** Programming in ASP	6	5	3	25	75	100
		U5RCSCC11P	**Core Course – XI** ASP Practical	6	5	3	40	60	100
		U5RCSMBE1	**Major Based Elective – I Any one from Annexure-I**	6	4	3	25	75	100
		U5RCSSBE2	**Skill Based Elective – II Any one from Annexure-I**	3	2	3	25	75	100
		U5RCSIDC1	**Inter Disciplinary Course – I Marketing Management**	3	2	3	25	75	100
Total				**30**	**23**				**600**
VI	III	U6RCSCC12	**Core Course - XII** Microprocessor and its Applications	6	5	3	25	75	100
		U6RCSCC13P	**Core course – XIII** Microprocessor Practical	3	5	3	40	60	100
		U6RCSCC14	**Core Course – XIV** Data Communication and networks	6	5	3	25	75	100
		U6RCSMBE2	**Major Based Elective – II Any one from Annexure-I**	5	4	3	25	75	100
		U6RCSMBE3	**Major Based Elective – III Any one from Annexure-I**	6	4	3	25	75	100
		U6RCSSBE3	**Skill Based Elective – III Any one from Annexure-I**	2	2	3	25	75	100
	IV	U6RCSIDC2	**Inter Disciplinary Course – II Management Concepts**	2	2	3	25	75	100
		U6RGS	**Gender Studies**		1				100
	V		**Extension Activity**		1				
Total				**30**	**29**				**800**
Grand Total				**180**	**140**				**3900**

Major Based Elective Course I : (Any one from the list)

1. Software Engineering
2. System Analysis and Design
3. Software Project Management

Major Based Elective Course II :(Any one from the list)

1. Data Structures and Algorithms
2. Computer Graphics and Multimedia
3. Linux Administration

Major Based Elective Course III :(Any one from the list)

1. . Net
2. E-Commerce.
3. Software Application Practical

Skill Based Elective Course:

1. Visual Programming
2. Ruby on Rails
3. J2EE
4. Hardware Troubleshooting

Inter Disciplinary Course Offered by the Department:

1. Introduction to Internet Concepts
2. HTML and Web Design
3. Fundamentals of Multimedia

Inter Disciplinary Course Availed by the Department from Management Studies:

1. Marketing Management
2. Management Concepts
3. Entrepreneurial Development

Core Course I

Programming in C

Objectives:

- To provide a comprehensive study of the C programming language.
- To learn and acquire art of computer programming.
- To know how to choose programming language for solving a problem

UNIT – I Introduction to C

Evolution and Application of C – Structure of a C program – Character set – C tokens – constants – variables – Data types – Declaration – Operators – Expression – Type conversion – Data input and output – reading a character – writing a character – formatted input - formatted output.

UNIT – II Control statements and Looping

Decision Making and Branching: Decision making with if statement – the if else statement – nesting of if else statement – the else if ladder – the switch statement – the conditional operator – the goto statement – Decision making and looping: the while statement – the do statement – the for statement – jumps in loops.

UNIT – III Arrays and Strings

Arrays: Declaration and initialization of one dimensional arrays – two dimensional arrays – Multidimensional arrays – dynamic array – REDIM and PRESERVE keywords – **Strings:** Declaring and initializing string variables – reading and writing strings - String handling functions.

Unit – IV User defined functions ,Structure and Union

Functions: elements – Definition of function - function declaration – function call - category of function – Recursive functions – Storage classes - **Structures:** definition – declaration – accessing members – **Union**: size of structure.

Unit – V Pointers and File Management

Pointers: Pointer declaration – initialization, accessing – pointer expression, **Sequential files:** Defining and opening, closing a file – I/O operations on files.

Text Book:

1. Balagurusamy E, Programming in ANSI C , 4th edition, Tata McGraw-Hill, 2006

[Unit-1 (Chapters – 1.1, 1.2, 1.8, 2.2 – 2.8, 3.1 – 3.14, 4.1 – 4.5) ; Unit-2 (Chapters – 5, 6) ; Unit-3 (Chapters – 7,8.1 – 8.8) ; Unit-4 (Chapters – 9.1,9.4 – 9.9, 9.16,9.19, 10.1- 10.4, 10.12, 10.13); Unit-5 (Chapters – 11.1 -11.6 ,11.8, 12.1 - 12.4)]

Reference Book:

1. Byron S Gottfried,"Programming with C", Schaum"s Outline Series – Tata McGraw Hill Publications, New Delhi.

Core Course II

PROGRAMMING IN C Practical

1. Solution of a Quadratic Equation (all cases).
2. Sum of Series (sine, cosine, exponential).
3. Ascending and descending order of numbers using Arrays (Use it to find Largest and Smallest Numbers).
4. Sorting of names in Alphabetical order.
5. Matrix operations (Addition, Subtraction, Multiplication – using functions.
6. Finding factorials, generating Fibonacci Numbers using recursive functions.
7. String manipulations using string functions (string length, string comparison, string copy, palindrome checking, counting words and lines in strings).
8. Develop a program to create an employee details using structure and prepare a pay slip.
9. Creation and processing of Sequential files for Mark list preparation.

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Core Course III

DIGITAL ELECTRONICS

Objectives

- To analyze design, develop, debug and document combinational and sequential digital circuits.
- To analyze and design basic central processing units and memory system for general purpose computers.
- To analyze and design simple systems composed of programmable logic such as ROMs and PLAs.

UNIT – I Number Systems and Codes

The Binary Number System – Binary- to- Decimal Conversion –Decimal- to- Binary Conversion – Binary Addition – Binary Subtraction – Binary Multiplication and Division – Octal Numbers – Hexadecimal Numbers – Binary Codes –Error Detecting Codes – Error Correcting Codes.

UNIT – II Logic Gates and Circuits

Boolean Algebra and Logic Gates –AND,OR,NOT, NAND, NOR, and Exclusive OR Gates – Applications of XOR Gate – The Exclusive-NOR Gate – Positive and Negative Logic - Boolean Algebra: Definitions – Fundamentals of Boolean Algebra – Boolean Functions – Minterms and Maxterms – Laws and Theorems of Boolean Algebra – DeMorgan's Theorem –Universal Building Blocks (UBB) – NAND Gate as UBB – NOR Gate as UBB.

UNIT – III Boolean Algebra

Simplifying Logic Circuits – Sum of Products – AND-OR Networks –Sum of Products and Product of Sums Forms – Karnaugh Maps – Product of Sums Simplification – NAND and NOR Implementation – AND-OR-INVERT Implementation– OR-AND-INVERT Implementation – Don't Care Conditions – Overlapping Groups –Rolling the Map – Eliminating Redundant Groups.

UNIT – IV Combinational Logic Circuits

Introduction – Adders – The Half Adder – The Full Adder– Subtractors – BCD Adder – Multiplexers – Demultiplexers – Decoders – Encoders –Floating Point Number System – Range of Stored Numbers.

UNIT – V Sequential Logic Circuits

Flip Flops – RS Flip Flop – Clocked RS Flip Flop – D Flip Flop – JK Flip Flop – T Flip Flop – Triggering of Flip Flops – Master Slave Flip Flop –Conversion of D Flip Flop – Conversion of T Flip Flop – Transfer Circuit – Clock –Counters and Shift Registers: Counters – Asynchronous or Ripple Counter – Ring Counter – Twisted Ring Counters – Shift Register.

Text Book:

1. Principles of Digital Electronics, Dr. K. Meena, PHI Learning Private Limited, New Delhi 2009. **[Unit-1 (Chapters - 1) ; Unit-2 (Chapters – 2: 2.1 – 2.10), (chapter 3: 3.1 – 3.9) ; Unit-3 (Chapters 3 : 3.10 – 3.22) ;Unit-4 (Chapters – 4); Unit-5 (Chapters – 5,6:6.1 – 6.4, 6.8)]**

Reference Book:

1. Digital Design: M.Morris Mano , Prentice Hall of India.
2. Digital Electronics – William H Gothmann , PHI
3. Digital Fundamentals – Floyd, UBS

Core Course IV

COMPUTER GRAPHICS AND ANIMATION LAB

PHOTOSHOP:

1. (i) Handling different file formats and interchanging them, changing the resolution, color, grayscales and size of the images
   (ii) Using brushes and creating multicolor real life images
2. Cropping, rotating, overlapping, superimposing, pasting photos on a page
3. Creation of a single image from selected portions of many
4. Developing a commercial brochure with background tints
5. Creating an image with multi-layers of images and texts.
6. Applying masks and filtering on images

FLASH:

Develop an image(s) and do the following.

1. Basic Drawing and Painting.
2. Working with Strokes and Fills
3. Creating Custom Colors, Gradients, and Line Styles Transforming and Grouping Objects
4. Creating and Managing Multiple Layers
5. Converting Text into Shapes
6. Animate using motion, shape, Tweening , and actions

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Core Course V

JAVA PROGRAMMING

Objectives

- **Students will be able to program JAVA classes and methods.**
- **Students will learn how to use and manipulate several core data structures.**
- **Students will be able to construct simple JAVA user interfaces.**

UNIT – I Oops and Java

Introduction to Object Oriented Programming – Character set – tokens – constants – variables – operators and expressions – library methods – strings – I/O statements - control statements – if , switch, while, do, for statements- Arrays and Methods: One dimensional Array – two dimensional array – methods – method overloading – recursion.

UNIT – II Classes , Objects and Exception handling

Classes and Objects – general form of a Class – Objects – Constructors – constructors overloading – this keyword – finalize() method - Static methods - Inheritance and polymorphism: Inheriting the variables and methods in a class – Exception handling: Default, user- defined exception – try, catch, throw statements.

UNIT – III Interface and Package and Multithreading.

Interfaces and Packages: structure, implementation of an interface - Packages –placing the classes in a package - import statement- the java.lang package : the System, Object, Class, Math, and String classes and their methods– Multithreading: Life cycle of a thread-creating and running threads - methods in the thread class.

UNIT – IV Applets and AWT

Applets: Lifecycle - The Applet class - Development and execution - Abstract Windowing Toolkit: events – Listeners – Labels, Button, Checkbox, Radio button, Choice controls – Layouts: FlowLayout, GridLayout and BorderLayout..

UNIT – V IO streams and Database connectivity

IO Streams: InputStream and OutputStream classes - Reader and Writer classes - DataInputStream, DataOutputStreams - Database Connectivity: Establishing a connection-creating, entering, updating data into the tables.

Text Book:

1) “Programming with java” C.Muthu
   Unit-1 (Chapters - 1, 2,3,4); Unit-2 (Chapters – 5,6,12); Unit-3 (Chapters – 7,13,16); Unit-4 (Chapters – 8,9); Unit-5 (Chapters – 14,18)

Reference Books:

1. "Internet Programming", Kris James Ph.D., and Ken Cope, Galgotia Publication, Reprint 2000
2. "Complete Reference", 'Patrick Naughton and Herbert Schildt, 3rd Edition,Tata McGraw Hill Publishing Company Ltd., 1999.

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Core Course VI

JAVA PROGRAMMING LAB

1. Sort the given numbers using arrays.
2. Implement the FIND and REPLACE operations in the given multiple text.
3. Implement a calculator to perform basic arithmetic Operations.
4. Find the area of a rectangle using constructor
5. Find the student's percentage and grade using command line arguments.
6. Draw circle or triangle or square using polymorphism and inheritance.
7. Implement multiple inheritance concepts in java using interface, you can choose your own example of a company or education institution or a general concept which requires the use of interface to solve a particular problems.
8. Create threads and assign priorities to them
9. An applet to play multiple audio clips using multithreading.
10. Create a window with three check boxes called red, green and blue. The applet should change the colors according to the selection.

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Course VII

DATABASE SYSTEM CONCEPTS

Objectives

- **To analyze the difference between traditional file system and DBMS.**
- **Able to handle with different database languages.**
- **Able to write queries mathematically.**
- **To design database and normalize data.**

UNIT – I Introduction

Database-System Applications- Purpose of Database Systems - View of Data -Database Languages - Relational Databases - Database Design -Object-Based and Semi structured Databases - Data Storage and Querying Transaction Management -Data Mining and Analysis - Database Architecture - Database Users and Administrators - History of Database Systems.

UNIT – II Relational Model:

Structure of Relational Databases - Fundamental Relational-Algebra Operations Additional Relational-Algebra Operations- Extended Relational-Algebra Operations - Null Values - Modification of the Database.

UNIT – III SQL

Data Definition - Basic Structure of SQL Queries - S e t O p e r a t i o n s - Ag g r e g a t e Fu n c t i o n s - N u l l V a l u e s - Nested Sub queries – Complex Queries - Views -Modification of the Database - Joined Relations.

UNIT – IV Relational Languages

The Tuple Relational Calculus - The Domain Relational Calculus - Query-by- Example. Database Design and the E-R Model: Overview of the Design Process - The Entity-Relationship Model - Constraints - Entity-Relationship Diagrams - Weak Entity Sets - Database Design for Banking Enterprise

UNIT – V Relational Database Design

Features of Good Relational Designs - Atomic Domains and First Normal Form - Decomposition Using Functional Dependencies - Functional- Dependency Theory - Decomposition Using Functional Dependencies – Decomposition Using Multivalued Dependencies-More Normal Forms - Database-Design Process.

Text Book:

1. Database System Concepts, Fifth edition, Abraham Silberschatz , Henry F. Korth, S.Sudarshan, McGraw-Hill-2005.

[Unit-1 (Chapters - 1); Unit-2 (Chapters – 2); Unit-3 (Chapters – 3); Unit-4 (Chapters – 5, 6.1 – 6.4, 6.6, 6.8); Unit-5 (Chapters – 7)]

Reference Books:

1. “An introduction to database systems”, Bipin C. Desai, Galgotia Publications Pvt Ltd,1991.

2.“An Introduction to Database Systems”, C.J.Date, Third Edition Addison Wesley 1983.

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Core Course VIII

RDBMS Practical

Objective: To inculcate knowledge on RDBMS concepts and Programming with Oracle.

[Front-end tool – Visual Basic]

1. Data Definition Language commands.
2. Data Manipulation commands
3. Sub Queries and JOIN
4. High level language extensions – PL/SQL
5. PL/SQL Packages
6. Use of Cursors
7. Procedures and Functions.
8. Oracle or SQL Server Triggers – Block Level – Form Level Triggers
9. Database Connectivity.
10. Working with Forms, Menus and Report Writers for an application project in any domain.

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Core Course X

PROGRAMMING IN ASP

Objectives:

- Understand the development and deployment cycles of enterprise applications.
- Developing Web sites
- Learn about basic scripting languages.

Unit I Introduction

Introduction to ASP – Active Server Pages Model – ASP File – the process of serving an Active Server Page – Using Scripting Languages – Setting the Primary Scripting Language – Including other files – Understanding objects.

Unit II Components

Understanding components – Working with users – working with HTML forms – retrieving form data – using text boxes and text areas.

Unit III Cookies and ODBC

Cookies – working with cookies – applications of cookies – addressing the drawbacks of using cookies – using cookies in ASP applications. Working with connections and data sources – creating connections with OLEdb and ODBC – connecting to Microsoft SQL server – connecting to a Microsoft access database.

Unit IV Connection Object

About the connection object – executing a SQL statement with the connection object – understanding session and connection pooling – working with record sets – retrieving a record set – record set cursor and locking types – understanding ADO cursors – paging through a record set.

Unit V Stored Procedures

Working with the command object – creating stored procedures – executing stored procedures with the connection object – executing stored procedures with the command object – retrieving parameter information.

Text Books :

1. Practical ASP – Ivan Bayross, BPB Publications, 2000

2. Special Edition Using Active Server Pages – Scot Johnson, Prentice Hall of India Private Limited 2001.

Reference Book:

1. Mastering Active Server Pages 3, Russell Jones, Sybex Publishers

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CORE COURSE XI

ASP Practical

1. Display the message “Have a Good Weekend” if it is a Saturday otherwise “Hang in there, the week will get better”.
2. Get the name and favorite ice cream flavor. Respond with the price of the corresponding ice cream.
3. Create a login form, to expire, if the user does not type the password within 100 seconds.
4. Create an advertisement for a bookshop using Ad Rotator component.
5. Create a course registration form with name, address and list of available course. Reply with the corresponding course fees on selection of a single course or a collection of courses.
6. Manipulate cookies with the information between HTTP sessions such as i. Last Date visited ii. Last Time visited iii. Number of visits.
7. Create a student database and manipulate the records using the connection object in ASP.
8. Create an employee database and manipulate the records using command object in ASP.

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Core Course XII

MICROPROCESSOR AND ITS APPLICATIONS

Objectives:

- To analyze instruction set of 8085
- To apply programming techniques in designing simple assembly language programs
- To gain hands on experience in doing experiments on microprocessor(8085)

UNIT – I Introduction to Microprocessors

Evaluation of Microprocessors – Single Chip Microcomputer Microprocessor Applications – Programming Digital Computers – Memory – Buses – Memory addressing capacity and CPU – Microcomputers – Processor Architecture – Intel 8085 –Instruction Cycle – Timing diagram.

UNIT – II Intel 8085

Instruction set of Intel 8085 – Instruction and Data Formats – Addressing Modes – Status flags – Intel 8085 Instructions – Programming of Microprocessors – Assembly language – Assemblers – Stacks and Subroutines – MACRO – Microprogramming.

UNIT – III Examples of Assembly Language Programs

Assembly language Programming – Simple examples – Addition and Subtraction of Binary and Decimal Numbers – Complements – Shift – Masking – Finding the largest and smallest numbers in an Array – Arranging a series of numbers – Sum of a series of Numbers – Multiplication – Division – Multibyte Addition and Subtraction.

UNIT – IV Peripheral Devices and their Interfacing

Peripheral Devices and Interfacing – Address Space Partitioning – Memory and I/O Interfacing – Data transfer schemes – Interrupts of Intel 8085 – Interfacing memory and I/O devices – I/O ports – Programmable peripheral Interface – Programmable Counter / Interval Timer – A/D Converter and D/A Converter.

UNIT – V Microprocessor Applications

Microprocessor Applications – Delay Subroutines – Interfacing of 7 Segment Displays – Frequency measurement – Temperature measurement and Control – Water Level Indicator – Microprocessor based Traffic Control.

Text Book:

1. Fundamentals of Microprocessors and Microcomputers – Badri Ram – Fourth Revised and Enlarged Edition – Dhanpat Rai and Sons – 1993.

[Unit-1 (Chapters - 1, 3); Unit-2 (Chapters – 4, 5); Unit-3 (Chapters – 6); Unit-4 (Chapters – 7); Unit-5 (Chapters – 8)]

Reference Book:

Microprocessor Architecture, Programming and Applications with the 8085 / 8080A – Romesh S.Gaonkar – Wiley Eastern – 1990

Core Course XIII

MICROPROCESSOR Practical

1. Execute simple programs in assembly language using Intel 8085 microprocessor kit :
    i) 8-bit addition,
    ii) Separating out a hexadecimal digit,
    iii) Disassembly of a word,
    iv) Sum of series of data,
    v) Data transfer

2. Execute programs for display and for solving problems using subroutines on 8085 processor:
    i) Display of names,
    ii) Table of squares,
    iii) Length of a string,
    iv) Converting ASCII to decimal,
    v) ASCII to decimal using subroutines,

3. Applications of Microprocessor:
    i) Matrix display using 8255.
    ii) D/A & A/D converters using discrete component modules.
    iii) Traffic signal.

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Core Course XI

DATA COMMUNICATION AND NETWORKS

Objectives

- To explain the importance of data communication and the internet
- To explain how communication works in data networks.
- To explain the role of protocols in networking

UNIT – I Introduction

Need to study data communications –Data communications - Networks – Protocols and Standards – Standards organizations - Line configuration Topology – Transmission Mode – Categories of networks – Internet works.

UNIT – II The OSI Model

The Model – Functions of the layers – TCP/IP Protocol suite – Signals : Analog and Digital – Periodic and Aperiodic Signals – Analog Signals – Time and Frequency Domains – Composite signals - Digital Signals.

UNIT – III Transmission media

Guided Media – Unguided Media – Transmission Impairment – Multiplexing : Many to One / One to many - FDM – TDM - WDM. Error Detection and Correction – Types of errors – Detection – Vertical Redundancy Check(VRC) – Longitudinal Redundancy Check (LRC) – Cyclic Redundancy Check (CRC) Check sum – Error Correction.

UNIT – IV Switching

Switching – Circuit Switching: Space division switches – Time division switches – TDM Bus – Space and Time Division switching combinations - PSTN – Packet Switching – Message Switching-X.25 Layers: Physical Layer – Frame Layer – Packet Layer – PLP Packets.

Unit V Networking and internetworking Devices

Repeaters – Bridges: Types of Bridges – Bridges Connecting different LANs – Routers– Gateways - Routing Algorithms: – Distance Vector Routing: Sharing Information – Routing table– Link State Routing: Information Sharing – the Dijkstra Algorithm.

Text Book:

1. "Data Communications and Networking" – Behrouz A.Forouzan Second Edition, Tata McGraw Hill Edition, 2003

[Unit-1(Chapters – 1,2); Unit-2(Chapters – 3,4); Unit-3(Chapters – 7:7.1,7.2,7.3,chapter 8:8.1,8.2,8.3,8.4,8.5.chapter 9) ;Unit - 4(Chapter 14,Chapter 17 :17.1); Unit-5 (Chapter - 21)]

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MAJOR BASED ELECTIVE – I

SOFTWARE ENGINEERING

Objectives

- To define software engineering and explain its importance.
- To discuss the concepts of software products and software processes.
- To solve specific problems alone or in teams.
- To manage a project from beginning to end.
- To work independently as well as in teams.

UNIT I Introduction to Software Engineering

Introduction to Software Engineering: Definitions - Size factors – Quality and Productivity Factors – Managerial Issues. The Product: The evolving role of software – Software – characteristics - applications. The Process: Software engineering: A Layered Technology – The software process – Evolutionary software process models: Spiral model.

UNIT II Software Planning

Planning a Software Project: Defining the problem – Developing a solution Strategy – Planning the development Process – Planning an organizational structure – Other Planning Activities.

UNIT III Software Cost Estimation and Requirements Definition

Software Cost Estimation: Software Cost Factors – Software Cost Estimation Techniques – Staffing Level Estimation. Software Requirements Definition: The Software Requirements Specification – Formal Specification Techniques.

UNIT IV Design and Implementation Issues

Software Design: Fundamental Design Concepts – Modules and Modularization Criteria – Design Notation – Design techniques – Design Guidelines. Implementation Issues: Structured coding techniques – coding style – Documentation guidelines.

UNIT V Verification and Validation Techniques

Verification and Validation Techniques: Quality Assurance – Walkthroughs and inspections – Static analysis –Unit testing and debugging – System testing – Formal verification.

Text Book:

1. Richard E. Fairely – "Software Engineering Concepts", Tata McGraw Hill Publication, 1997 edition. [Unit-1 (Chapters - 1); Unit-2 (Chapters – 2); Unit-3 (Chapters – 3,4); Unit-4 (Chapters – 5, 6); Unit-5 (Chapters – 8)]

Reference book:

1. Roger S.Pressman – "Software Engineering A Practitioner‟s Approach", 5th edition, McGraw Hill, 2001.

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2. SYSTEM ANALYSIS AND DESIGN

Objectives:

- To present fundamental concepts such as systems, requirements, events, and objects;
- To present the system development life cycle as a basic concept for managing and controlling application development;
- To study the life cycle phases leading to the development of system requirements;

Unit I Business Organization overview

Business Problem & Computers : Overview of Business Organization – Information needs & Systems – Some typical problems – System life cycle – System study – Feasibility Study

Unit II System Analysis

System Analysis – Initiation of Analysis – The Process of Analysis – System Design –Design factors – Design Constraints – Processing Techniques – The Process of design – Output Design – input Design – Process Design – File Data Base Design

Unit III Analysis & Design Tools

Analysis & Design Tools – Data Flow Diagram – Data Dictionary – Entity Relationship Diagram – Decision Tree – Decision Table – Structured English – Structure Charts – Grid Charts – Layout Charts – Configuration Selection & Acquisition – Detailing the configuration – Storage requirements – Internal Memory – Processors – Terminals – Printers

Unit IV File Organization & Design

File Organization & Design : Functional Classification of Files – File Structure – File Organization – Inverted File – Security & Controls – Risk management – Physical Security –Access Control – Data Control – Other Security & control measures

Unit V Design phases

Post – Design phases – Develop Software – Installation & Changes-over-System Operation & maintenance – Systems Applications – Financial Accounting – Inventory Accounting System – Equipment Maintenance – Bank Operations – Production Planning & control – Process Control – Robotics

Text Book:

1. System Analysis & Business Applications – Rajesh Nalk & Swapna Kishore, Wheeler Publishing – 1st edition 1994

Reference Book:

1. Introducing Systems Analysis & Design – Ellas M. Awad – Galgotia Publications (P) Ltd.,(Second Edition)

3. SOFTWARE PROJECT MANAGEMENT

Objectives:

- Build a performing organization and project team
- Develop Work Breakdown Structures (WBS)
- Establish project estimates and project schedules
- Create project plans

Unit I SOFTWARE MANAGEMENT RENAISSANCE

Software Management Renaissance: Conventional Software Management – Evolution of Software Economics – Improving Software Economics – The Old Way and the new.

Unit II A SOFTWARE MANAGEMENT PROCESS FRAMEWORK

A Software Management Process Framework: Live-Cycle Phases –Artifacts of the Process – Model-Based Software Architectures – Work Flows of the Process – Check Points of the Process.

Unit III SOFTWARE MANAGEMENT DISCIPLINES – I

Software Management Disciplines – I: Iterative Process Planning –Project Organizations and Responsibilities – Process Automation.

Unit IV SOFTWARE MANAGEMENT DISCIPLINES – II

Software Management Disciplines – II: Project Control and Process Instrumentation – Tailoring the Process

Unit V RISK MANAGEMENT

Risk Management: Introduction – Risk – Categories of risk – A framework for dealing with risk – Risk Identification – Risk assessment – Risk Planning – Risk Management –valuating risks to schedule – Applying the PERT Technique – Monte Carlo Simulation – Critical Chain Concepts

Text Book:

1. "Software Project Management" - Walker Royce - Pearson Education
2. "Software Project Management" - Bob Hughes & Mike Cotterell - Fourth Edition - 2008 - ISBN: 978 - 0 - 07 - 061985-2

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MAJOR BASED ELECTIVE – II

1. DATA STRUCTURES AND ALGORITHMS

Objectives

- To understand the abstract properties of various data structures such as stacks, queues, lists, trees and graphs.
- To understand various sorting algorithms
- To understand and apply algorithmic problems including tree traversals, graph traversals and shortest path.

Unit I Introduction

Overview – Arrays – ordered list – Stacks and Queues: Evaluation of Expressions – Linked Lists: Singly Linked Lists – Linked Stacks and queues – The storage pool – Polynomial addition.

Unit II Trees

Trees: Basic Terminology– Binary Trees - Binary tree representations –Binary Tree Traversal – Threaded Binary Trees – Binary Tree Representation of Trees – Application of Trees – counting binary trees.

Unit III Graphs

Terminology and representations- Traversals, Connected Components and Spanning Trees – Shortest Paths and Transitive closure – Activity Networks – Topological Sort and Critical Paths.

Unit IV Algorithms

Introduction – Elementary data structures: Heaps and Heap sort – Divide –and – conquer: Binary search - Finding the Maximum and Minimum – Merge Sort – Quick Sort.

Unit V The Greedy Method and Backtracking

The Greedy Method: The general method – Knapsack Problem – Job sequencing – **Backtracking:** The general method – The 8-Queens Problem – Graph Coloring.

Text Books:

1. Fundamentals of Data Structures – Ellis Horowitz, Sartaj Sahni
[Unit I: (Chapter 1: 1.1, Chapter 2: 2,2 , Chapter 3: 3.3, Chapter 4: 4.1 – 4.4), Unit – II: (chapter 5), Unit III: (Chapter 6 : 6.1 – 6.4)]

2. Fundamentals of Computer Algorithms – Ellis Horowiz, Sartaj Sahni, Galgotia Publications, 2001.
[Unit IV – chapter 1: 1.1, chapter 2: 2.3, chapter 3: 3.1 – 3.5); Unit V – chapter 4: 4.1, 4.3, 4.3 – chapter 7: 7.1, 7.2, 7.4]

Reference Book:

1.Data Structures – LIPSCHUTA, Tata Mcgraw Hill, Schaum's Outline Series.

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2. COMPUTER GRAPHICS AND MULTIMEDIA

Objectives

- To create interactive graphics applications.
- To write programs that demonstrate geometrical transformations.
- To write programs that demonstrate 2D image processing techniques.
- To understand and differentiate text, image, video and audio.

Unit I Overview of graphics systems

Overview of graphics systems: Video display devices – Raster-scan systems – Random-scan systems – Graphics monitors and workstation – Input devices – Hard-copy devices – Graphics software.

Unit II Output primitives

Output primitives: Points and lines – Line-drawing algorithms – DDA algorithm Bresenham‟s line algorithm – Attributes of output primitives: Line attributes – Area-fill attributes – Character attributes – Bundled attributes.

Unit III Two-dimensional Geometric transformations

Two-dimensional Geometric transformations: Basic transformations – Matrix representations – Composite transformations – Other transformations.

Unit IV Multimedia in Use

Multimedia in Use : Introducing Multimedia for Today and Tomorrow – What is Multimedia –using Multimedia: Applications, Benefits and Problems – Technology : System Components –Multimedia Platforms.

Unit V Technology

Technology: Development Tools – Image – Audio – Video.

Text Books:

1. Computer Graphics C Version Second Edition, Donald Hearn and M.Pauline Baker, Pearson Education, 2006.
2. Multimedia in Practice : Technology and Practice. Judith Jeffcoate, Pearson Education, 2007.

Reference Books:

1. William M. Neuman, Robert R. Sprout, “Principles of interactive Computer Graphics”, McGraw Hill International Edition.
2. Buford J. F Koegel, Multimedia Systems, Twelfth Indian Reprint, Pearson Education

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3. LINUX ADMINISTRATION

Objectives

- Describe and use the Linux Operating System.
- Describe and use the fundamental Linux system tools and utilities.
- Describe and write shell scripts in order to perform basic shell programming.
- Describe and understand the Linux file system.

Unit I Linux Introduction

Linux Introduction and Installation: Linux-Advantages-Red Hat Linux-New Features Installation procedures and Methods. Using Desktop-GNOME-KDE-Linux Commands Accessing and Running Applications.

Unit II Installation

Installing Red Hat Linux Applications, Running Window Application, Running Window, DOS and Macintosh Applications –Tools for using Internet and Web.

Unit III Administration

Administration: Understanding System Administration: Root login-super user-GUI tools, commands and Log files-Configuring Hardware-File System and Disk Management Monitoring performances.

Unit IV Setting Up and Supporting users

Setting Up and Supporting users: Creating user accounts – Setting user defaults –Creating Desktops-Modifying and Deleting Accounts.

Unit V Security Issues

Security Issues: Hacker versus Cracker-Password Protection- Protection from break-in Filtering Network Access-Firewalls-Detecting Instructions – Encryption techniques

Text Book

1. Christopher Negus "Red Hat Linux 9 Bible", WILEY- Dreamtech India Pvt.Ltd,New Delhi, First Edition, 2003

Reference Book

1. Thomas Schenk, "Red Hat Linux System Administration", Techmedia, New Delhi,2003.

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MAJOR BASED ELECTIVE – III

1. . NET

Objectives:

1. The ability to effectively use visual studio .NET.
2. An understanding of the goals and objectives of the .NET Framework. .NET is a revolutionary concept on how software should be developed and deployed.
3. A working knowledge of the C# programming language.
4. An understanding of how how to use forms to develop GUI programs under .NET.

Unit I Introduction, .Net Objects

Introduction – The big Internet – Raising the bar – the best laid plans – what the Heck is . Net – **. Net Objects:** Solution Architecture – more on .Net namespaces – Assemblies – Object oriented programming features - .Net Memory Management – inter operation with COM – transactions in .Net – Structured Exception Handling.

Unit II . Net Web Services, Windows Forms

. Net Web Services – Problem Background – Solution Architecture – Writing XML web service clients – XML web service design considerations – XML web service security – XML web service enhancements – **Windows Forms** – more complex examples – Hosting ActiveX controls in windows forms – Form enhancements.

Unit III Data Access in . Net, Handling XML

Data Access in . Net – Problem Background – Solution Architecture – simplest examples - More complex example – visual studio support and typed dataset objects - **Handling XML -** Problem Background – Solution Architecture – simplest examples - More complex example – XML Schemas and Serialization.

Unit IV Events and Delegates, Threads.

Events and Delegates – Problem Background – Solution Architecture – simplest examples - More complex example – delegates – **Threads -** Problem Background – Solution Architecture – simplest examples - More complex example.

Unit V . Net Remoting, . Net Reflection

. Net Remoting – Problem Background – Solution Architecture – simplest examples - More complex example – Big simplification – activation types – Lifetime management –Hosting and deployment – security – performance – **. Net Reflection -** Problem Background – Solution Architecture – simplest examples - More complex example.

Text Book

1.David S Platt, "Introducing Microsoft .Net", Prentice Hall of India, NewDelhi,2003.

[Unit I – Chapter : 1, 2 Unit II – Chapter: 4, 5 Unit III – Chapter: 6, 7 Unit IV – Chapter: 8, 9 Unit V – Chapter: 10, 11]

Reference Book

1. David Chappell, Understanding .Net, Addison-Wesley Professional Edition,2006.

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2. E-COMMERCE

Objectives:

- To provide conceptual and theoretical knowledge of ECommerce.
- To understand the mechanisms involved in E-Commerce.

UNIT – I Introduction

E-commerce-Electronic Commerce – E-Commerce types – E-Commerce and world at the large-E-Commerce Case studies : Intel , Amazon.

UNIT – II E-Mail

Electronic Mail – The X.400 Message handling system –Internet Addresses – Multipurpose Internet Mail Extension – X.500 Directory Services – E-mail user agent.

UNIT – III Electronic Data Interchange

EDI- Costs and benefits – Components of EDI Systems – EDI implementation issues – EDIFACT – EDIFACT Message Structure.

UNIT – IV Security

Cyber Security – Cyber Attacks – Hacking- SSL - Authentication and assurance of data integrity – Cryptographic based solutions – Digital Signatures – VPN.

UNIT – V Electronic Payment Systems Internet Banking

Electronic Payment Systems – payment gateway – internet banking – the SET Protocol – E-cash – E-Cheque –Elements of electronic payments

Textbook:

1. "E-Commerce The Cutting Edge Of Business" 2-Edition by Kamalesh K Bajaj ,Debjani Nag – Tata Mc Graw Hill

[Unit-1 (Chapters - 2); Unit-2 (Chapters – 4); Unit-3 (Chapters – 7, 8);Unit-4 (Chapters – 14); Unit-5 (Chapters – 18)]

Reference Book

1. "Frontiers of E-commerce by "Ravi Kalakota and Andrew B.Whinston" –Pearson Education.

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Skill Based Elective – I

VISUAL PROGRAMMING

Objective:

- **To inculcate knowledge on Programming and Project Development using Visual Basic.**

UNIT-I Introduction to Visual Basic

Introduction – VB editor – Features of VB – Integrated Development Environment (IDE) features - customizing the IDE - Anatomy of a form - Working with form properties - setting form's properties - Introducing form events & form methods.

UNIT- II Variables, Data types and Arrays

Variables in Visual Basic: Declaring variables - Data types - Null value, Error value, Empty value - The scope of a variable - Module level variables - constants - Creating your own constants - scope of a constant - converting data types - arrays -declaring arrays - fixed size arrays - dynamic arrays -preserve keyword -REDIM

UNIT-III Control Structures

Writing code in Visual Basic: The anatomy of a procedure - subroutine and functions - language constructs: for, next, the while loop, select case, Exit statement, with structure.

UNIT-IV Standard Controls

Selecting & Using controls: Introducing to standard controls - label control - Text box – Command buttons - option buttons - check boxes - frame controls - list boxes - combo boxes - Image objects - picture boxes -Timer - scroll bars.

UNIT-V Advanced controls and Data Control

Advanced controls: File system controls - Rich textbox control - Menu Editor – Introduction to Data bases – Working with Data Controls

TEXT BOOK :

1. Mohammed. Azam, Programming with Visual Basic 6.0- VlKAS publishing House pvt. Ltd.,

Skill Based Elective – II

Ruby on Rails

Objectives:

- Create and run a Rails application on a personal computer.
- Describe the main features of Ruby on Rails.
- Use TDD (Test Driven Development) and BDD (Behavior Driven Development) techniques to develop Rails applications.
- Create and run testing code.

Unit I Introduction to Ruby

Welcome to Ruby: Creating a First Web Application-Getting started with Ruby- Checking the Ruby Documentation – Working with Numbers in Ruby – Working with Strings in Ruby-Storing Data in variables-creating constants-Interpolating variables in double quoted strings – reading text on the command line-creating symbols in ruby – working with operators – handling operators precedence.

Unit II Control Structures

Conditionals, Loops, Methods and blocks: Its all about making choices: the if Statement – Using the case statement-using loops-creating and calling a method.

Unit III Classes and Objects

Classes and Objects: all about Encapsulation-creating a class-creating an object-basing one class on another-understanding Ruby's object access – overriding methods- creating Class variables - creating class methods.

Unit IV Rails

Welcome to Rails: Putting Ruby on Rails- Introducing Model View Controller Architecture – giving the view something to do –mixing Ruby code and HTML inside the view – Passing Data from an Action to a View- Escaping sensitive Text – Adding a Second Action.

Unit V Database connection

Connecting to Databases: Creating a Data – Aware Rails Application – Creating a Database-Running the store Application – adding another Record – Beautifying a display – Working with Databases: Displaying items to the customer – Creating a shopping Cart.

Text Book:

1. Beginning Ruby on Rails by Stephen Holzner, Wiley India Publications, 2007.

Reference Book:

1. Ruby on Rails: Up and Running by Bruce A. Tate, Curt Hibbs, O'Reilly Media Publications,2006.

Frank. P. Coyle, XML,Web Services and The Data Revolution, Pearson Education, 2002.

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Skill Based Elective – III

J2EE

Objectives

- **To learn the evolution of the J2EE architecture from two – tier to multi tier.**
- **To explore J2EE standard common services.**
- **To understand J2EE design patterns and best practices.**

Unit- I The Java 2 Platform Enterprise Edition

An introduction to J2EE : J2EE Architecture - J2EE applications - J2EE technologies - J2EE SDK Tools - J2EE security

Unit II Creating and Deploying an Enterprise Bean

An introduction to enterprise beans: the advantages of EJB – the architecture of EJB – creating an EJB – deploying an EJB – coding the client – executing the client .

Unit- III XML

An introduction to XML: the advantages of XML – creating an XML document – document type definition – XML name spaces – XML schemas.

Unit- IV Types of Enterprise Beans

Enterprise Beans - the life cycle of a session bean – the modes of managing the states of session beans – comparing two stateful beans – coding the home interface – coding the remote interface – coding the helper classes – entity beans – the transaction.

Unit –V An introduction to the Bluetooth technology

An Introduction to Bluetooth – the Bluetooth SIG – the Bluetooth architecture – the L2CAP – the RFCOMM protocol - the SDP – security in Bluetooth – establishing a connection – Bluetooth and other technologies.

Text Book:

1. Pallavi Jain and Shadab Siddiqui with NIIT "J2EE Professional projects"
   [Unit-1 (Chapters – 7); Unit-2 (Chapters – 8); Unit-3 (Chapters – 9); Unit-4 (Chapters – 10); Unit-5 (Chapters – 35)]

References

1. Michael C.Daconta, Kevin T.Smith, Donald Avondolio, W.Clay Richardson,"More Java / J2EE Pitfalls ", Wiley dreamlech India Pvt.Ltd.

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Skill Based Elective – IV

Hardware Troubleshooting

Objectives:

- To describe the fundamentals of computer system.
- To acquire knowledge about the peripherals and storage devices of a computer.
- To provide an understanding of the networking concepts.

Unit I

Fundamentals of PC technology: Fundamental Building Blocks of the PC-Principles of CPU operations-CPU family and operations.

Unit II

Mother boards: Motherboard controllers and System Resources-The I/O system Bus- Onboard I/O devices Power Supply, cooling, and Protection: The Power Supply-Ventilation and Cooling Protection – Power production and Back up.

Unit III

Magnetic Storage – Hard Disk Drives – optical storage Devices: Optical storage media-CD-ROM Devices – DVD – ROM drives – I/O Ports and Devices: Serial ports- Parallel Ports- Universal Serial Bus.

Unit IV

Keyboards and Pointing Devices: Keyboards – Pointing Devices Modems and Communications: Modems – ISDN, CATV network Modems - DSL Networking: Networking Fundamentals- Network Hardware – Network Protocols.

Unit V

Printers: Types – Printer Attributes – Printer Maintenance – Troubleshooting Tools and Techniques: Tools of the Trade – Basic PC Handling Techniques

Text Book:

PC Hardware: The Complete reference 23rd march 200 by Craig Zacker and John Rourke.

Reference Books:

1. Govindarajulu. B, IBM PC and clones: Hardware, Trouble shooting and Maintenance. Second edition, Tata – McGraw Hill,(ISBN 0-07-048286-1).
2. Rosch. Winn L.,Hardware bible, Sixth edition , Que/Techmedia publishers, 2003 (ISBN 81-7635-696-4)

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