COURSE STRUCTURE FOR B.Sc Software Engineering

(For those who join the course from the academic year 2017 – 2018)

Sem	Part I/ II/ III/ IV/V	Sub No	Subject Status	Subject Title	Contact Hrs/ week	L Hrs/ week	T Hrs/ week	P Hrs/ week	C Credits
III	III	15	Core	Java Programming	4	4	0	0	4
	III	16	Core	Software Engineering	5	4	1	0	4
	III	17	Core	Data Structures	4	4	0	0	4
	III	18	Major Practical - III	Java Programming	4	0	0	4	2
	III	19	Allied -III	Web Technology	3	3	0	0	3
	III	20	Allied Practical - III	Web Design using HTML	4	0	0	4	2
	III	21	Skill Based I Core	Programming with PHP & MySQL	4	4	0	0	4
	IV	22	Non-Major Elective	1. Fundamentals of Internet 2. Basic Programming Design	2	2	0	0	2
	IV		Common - Yoga		2	2	0	0	2
				Subtotal (Excluding Yoga)	**30**	**21**	**1**	**8**	**25**
IV	III	23	Core	Visual Basic	4	4	0	0	4
	III	24	Core	Software Testing	4	4	0	0	4
	III	25	Core	Relational Database Management System	5	4	1	0	4
	III	26	Major Practical - IV	Visual Basic	4	0	0	4	2
	III	27	Allied -IV	E-Commerce	3	3	0	0	3
	III	28	Allied Practical - IV	PYTHON	4	0	0	4	2
	III	29	Skill Based II Core	Android Programming	4	4	0	0	4
	IV	30	Non-Major Elective	1. HTML 2. Programming in C	2	2	0	0	2
	IV		Skill Based Common	Computers for Digital Era	2	2	0	*	2
	V		Extension Activity	NCC, NSS, YRC, YWF	0	0	0	0	1
			Subtotal(Excluding Computers for Digital Era)		**30**	**21**	**1**	**8**	**26**
					29				
V	III	31	Core	Software Quality Assurance	4	4	0	0	4
	III	32	Core	Data communication and Computer Network	4	4	0	0	4
	III	33	Core	Dot NET Technologies	4	4	0	0	4
	III	34	Major Practical - V	Dot NET	4	0	0	4	2
	III	35	Major Practical - VI	Data Structures	4	0	0	4	2
			Mini Project		4	0	0	4	3
	III	36	Major Elective - II	1. Mobile Computing 2. Multimedia Applications 3. Cloud Computing	4	4	0		4

Sem		No.	Category	Subject		L	T	P	C
	III		Skill Based Common	Personality Development/Effective Communication/Youth Leadership	2	2	0	*	2
				Subtotal	30	21	0	9	25
	III	37	Core	Operating Systems	5	4	1	0	4
VI	III	38	Core	Computer Graphics and Visualization	4	4	0	0	4
	III	39	Core	Software Project Management	4	4	0	0	4
	III	40	Major Practical - VII	Computer Graphics	4	0	0	4	2
	III	41	Major Practical - VIII	Oracle	4	0	0	4	2
	III	42	Project	Project	4	0	0	4	2
	III	43	Major Elective - III	1. Internet of Things 2. Big Data Analytics 3. Information Security	4	4	0	0	4
				Subtotal	30	20	1	13	22
				Total					140**

- * 10 hours of practical
- **L**-Lecture   **T**-Tutorial   **P**-Practicals

Distribution of marks between External and Internal Assessment is

    For Theory 75 : 25

    For Practical 50 : 50

Internal Marks for Practical shall be allotted in the following manner

Continuous Assessment	**– 25 marks "N" number of practicals be conducted based on the practicals prescribed in the syllabus and the marks should be distributed equally for each practical.**
Test	**- 25 marks Two tests should be conducted and average of tests be taken.**
Calculation of marks	**Sum of marks awarded to number of practicals + the average marks of two tests**
Total	**- 50 marks**

JAVA PROGRAMMING

LTPC
4004

Objective: To understand the basic programming constructs of Java Language and to explore the features of Java by applying to solve problems

UNIT I

Data Types, Variables and Arrays: Primary types – Integers – Floating point types – Characters – Booleans – A Closer Look at Literals – Variables – Type Conversion and Casting – Automatic type Promotion in Expressions - One Dimensional Arrays– Multi Dimensional Arrays. **Introducing Classes:** Class Fundamentals – Declaring objects- Assigning object Reference variables- Introducing Methods- Constructors-Garbage collection – Finalize() Method.   (12L)

UNIT II

A Closer Look at Methods and classes: Overloading Methods-Using objects as parameters-Argument passing –Returning objects- Recursion-Introducing Access control – understanding static –Introducing final – Nested and Inner classes- String class- Using command line arguments. **Inheritance:** Inheritance Basics –Using super- creating Multilevel Hierarchy - Method overriding.   (12L)

UNIT III

Packages and interfaces: Packages –Access Protection – Importing packages-Interfaces. **Exception Handling**: Introduction- Exception Types – Uncaught Exceptions- Using try and catch – Multiple catch clauses –Nested try statements- throw – throws-finally. **Multithreaded programming** : Java Thread Model –Main Thread –Creating a Thread –Creating Multiple Threads   (12L)

UNIT IV

The Applet class: Applet Basics – Applet Architecture –Applet Skeleton- Applet Display method –Requesting Repainting – HTML APPLET tag- Passing Parameters to Applet. **Event Handling**: Event Handling Mechanisms –Delegation Event Model –Event classes(The Action Event ,Item Event , Key Event, Mouse Event) – Sources of Events - Event Listener Interfaces(Action Listener, Item Listener, Key Listener, Mouse Listener).   (12L)

UNIT V

Introducing the AWT: AWT Classes – Window fundamentals – working with Frame Windows –working with Graphics– Working with color – Working with Fonts. **Using AWT Controls**: Controls Fundamentals – Labels – Using Buttons –Applying check Boxes – Check Box group – Choice Controls – Using a Text field – Using a Text Area – Understanding Layout Managers [Flow Layout Only] – Menu Bars and Menus.   (12L)

Text Book:
    Java, The Complete Reference 8/e , Herbert Schildt, TMH

Reference Book:
1. Programming with Java –C.Muthu
2. Java Programming A Practical Approach, C.Xavier, TMH
3. Programming in Java, Sachin Malhotra, Saurabh Choudhary, OXFORD University Press
4. Programming with Java a primer 3/E E.BALAGURUSWAMY
5. Core Java, Mahesh P. Matha, PHI Learning Private Limited

Software Engineering

LTPC
4004

OBJECTIVES:
- To understand the concepts of analysis, design and implementation of a software product.
- To have general understanding about object-oriented software engineering.
- To make students to get experience and be ready for the large scale projects in IT Industry.

Unit I

Introduction:- Evolution – From an Art form on Engineering Discipline: Evolution of an Art into an Engineering Discipline. – Software Development of Projects: Program versus Product – Emergence of Software Engineering: Early Computer Programming – High Level Language Programming – Control Flow-based Design – Data Structure Oriented Design – Object Oriented Design. **Software Life Cycle Models:-** A few Basic Concepts – Waterfall Model and its Extension: Classical Waterfall Model – Iterative Waterfall Model – Prototyping Model – Evolutionary Model. – Rapid Application Development (RAD): Working of RAD. – Spiral Model. (12L)

Unit II

Software Project Management:- Responsibilities of a Software Project Manager – Project Planning- Project Estimation Techniques-Risk Management. (12L)

Unit III

Requirements Analysis and Specification:- Requirements Gathering and Analysis – Software Requirements Specifications (SRS):Users of SRS Document – Characteristics of a Good SRS Document – Important Categories of Customer Requirements – Functional Requirements – How to Identify the Functional Requirements? – Organisation of the SRS Document – Formal System Specification – Axiomatic Specification – Algebraic Specification. (12L)

Unit IV

Software Design:- Overview of the Design Process: Outcome of the Design Process – Classification of Design Activities. – How to Characterize a good Software Design? Cohesion and Coupling – Approaches to Software Design. **Function-Oriented Software Design:-** Overview of SA/SD Methodology – Structured Analysis – Developing the DFD Model of a System: Context Diagram – Structured Design – Detailed Design. (12L)

Unit V

Object Modeling using UML :- Basic Object-Orientation Concepts – Unified Modelling Language – UML Diagrams – Use Case Model – Class Diagrams – Interaction Diagrams – Activity Diagram – State Chart Diagram – Postscript. User Interface Design:- Characteristics of a good User Interface - Basic Concepts – Types of User Interfaces – Fundamentals of Components based GUI Development: Window System. (12L)

Text Book:
Fundamentals of Software Engineering Fourth Edition by Rajib Mall – PHI Learning Private Limited 2015

Reference Books:
1. Software Engineering 2nd Edition by K L James PHI
2. Software Engineering 9th Edition by Ian Sommerville - Pearson Education Asia

DATA STRUCTURES

LTPC
4004

Objective:
- To understand the concepts of basic data structures such as stack, Queues and Linked list.
- To have general understanding of the network structures through trees and graph.
- To make the students to understand the basic algorithms for sorting.

Unit I
    Basic Concepts:- Algorithm specification – Data Abstraction – Performance Analysis. **Arrays and Structures:-** Arrays: Abstract data type – Polynomials – Sparse Matrices – Representation of Multidimensional Arrays. (12L)

Unit II
    Stacks and Queues:- Stacks – Queues – Evaluation of Expressions. **Linked Lists**:- Singly Linked Lists and Chains – Linked Stacks and Queues – Polynomials: Polynomial Representation – Adding Polynomials. Sparse Matrices: Sparse Matrix Representation. – Doubly Linked Lists. (12L)

Unit III
    Trees:- Introduction – Binary Trees – Binary Tree Traversals: Inorder Traversal – Preorder Traversal – Postorder Traversal. Heaps – Binary Search Trees Forests: Transforming a Forest into a Binary Tree. (12L)

Unit IV
    Graphs: - The Graph Abstract Data Type-Elementary Graph Operations – Minimum Cost Spanning Trees: Kruskal"s Algorithm – Prim's Algorithm. – Shortest Paths and Transitive Closure: Single Source/ All Destination: Nonnegative Edge Costs - All Pairs Shortest Paths.
(12L)

Unit V
    Sorting:- Motivation – Insertion Sort – Quick Sort – Merge Sort: Recursive Merge Sort. – Heap Sort – External Sorting: Introduction – k-way Merging..**Hashing**:- Static Hashing: Hash Tables.
(12L)

Text Book:
Fundamentals of Data Structures in C by Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed – Second Edition – Universities Press (India) Private Limited.

Reference Books:
1. Data Structures Using C, Second Edition by Reema Thareja – Oxford University Press
2. Data Structures by Dr N Jeya Prakash – Anuradha Publications

JAVA PRACTICAL LIST

LTPC
0042

Objective: To develop skills in implementing algorithms through the programming Language JAVA and to explore the features of JAVA by applying sample problems.

Each exercise should be completed within two hours.
It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Define a class called Student with the attributes name, reg_number and marks obtained in four subjects(m1,m2,m3,m4).Write a suitable constructor and methods to find the total mark obtained by the student and display the details of the student.
2. Write a Java program to find the area of a square, rectangle and triangle by
   (i) Overloading Constructor
   (ii) Overloading Method.
3. Write a java program to add two complex numbers.
   [Use passing object as argument and return object].
4. Define a class called Student_super with data members name, roll number and age. Write a suitable constructor and a method output () to display the details. Derive another class Student from Student_super with data members height and weight. Write a constructor and a method output () to display the details which overrides the super class method output().[Apply method Overriding concept].
5. Write a java program to create an interface called Demo, which contains a double type constant, and a method called area () with one double type argument. Implement the interface to find the area of a circle.
6. Write a java program to create a thread using Thread class.
7. Write a java program to Design a calculator to perform only addition and division. It must contains three Buttons with labels +, / and =, and a TextField to get input and display the result.
8. Create an applet with four Checkboxes with labels MARUTI-800, ZEN, ALTO and ESTEEM and a Text area object. The program must display the details of the car while clicking a particular Checkbox.
9. Write a Java program, which creates a window with a check box group with boxes for the colors, Violet, Indigo, Yellow, Orange, Red, Blue, and Green. When the button is selected the background color must change accordingly.
10. Write a Java program to throw the following exception,
    1) Negative Array Size
    2) Array Index out of Bounds

Allied
Web Technology

Objective: To impart knowledge about the web technologies and their applications and to understand the basics of web designing.

Unit I

Introduction: Internet Services and Accessibility-Uses of the Internet-Protocols-Web concepts-The client/server model at the web-Retrieving data from the web. **Internet Protocols**: Introduction – Internet protocols-transmission control protocols-User Datagram protocols - Host Names. (9L)

Unit II

HTML: Introduction-SGML-DTD-DTD Elements- attributes-outline of an HTML document-Head section-Body section: Headers – Paragraphs – Text formatting – Linking – Internal linking – Embedding images – Lists – Tables – Frames – Other Special tags - HTML forms. (9L)

Unit III

JavaScript: Introduction- need of a scripting language - language elements : Identifiers – Expressions – JavaScript keywords – Operators – Statements – functions. (9L)

Unit IV

Objects of JavaScript: Window object – Document object – Forms object – Text boxes and text areas – Buttons , Radio buttons and Check boxes – Select object - other objects: Date object – Math Object – String Object – Arrays – worked examples. (9L)

Unit V

Dynamic HTML: Introduction- cascading style sheets: Coding CSS – Properties of tags – Property values – Other style properties – Inline Style Sheets –Embedded Style Sheets – External Style sheets – Grouping – Inheritance – Class as Selector – ID as Selector – Contextual Selectors – Pseudo Classes and Pseudo-elements – Positioning – Backgrounds – Element Dimensions. (9L)

Text Book:

Web Technology A Developer"s Perspective, N.P.Gopalan, J. Akilandeswari ,PHI

Reference Books:

1. Web Technology and Design, C.Xavier, New Age International Publishers
2. Web Technologies TCP/IP Architecture and Java Programming Second Edition, Achyut S. Godbole & Atul Kahate, Tata McGraw Hill
3. Web Technology, S. Padma Priya, SCITECH Publications (India)Pvt. Ltd

Allied
Practical List – Web Design using HTML

LTPC
0042

Objective: To highlight the basic concepts of HTML and help the student to equip with the programming skills in implementing and developing web based applications

Each exercise should be completed within two hours.
It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Create a website using internal links and images.
2. Design a calendar using table tag.
3. Create a HTML document to display a list of five flowers and link each one to another document displaying brief description of the flower, Add pictures wherever possible.
4. Write an HTML code to display a list of 5 cars in a frame, Link each one to a brief description in second frame. The left frame should display the list and the right frame should display the paragraph about the frame.
5. Create a simple HTML Form covering major form elements.
6. Embed Audio and Video in an HTML page.
7. Rotate an element using CSS.
8. Build a simple quiz.

Skill Based 1 Core
Programming with PHP & MySQL

LTPC
4004

OBJECTIVES:
• To understand the concepts of open sources.
 • To learn and use open source database management system MySQL
• To create dynamic web pages and websites.
• To connect webpages with database.

UNIT-I
Introduction: Introduction- Open source PHP – PHP history- features-variables- statements operatorsconditional statements-if-switch-nesting conditions-merging forms with conditional statements-loops-while-do-for – loop iteration with break and continue.   (12L)

UNIT – II
 Arrays and Functions: Arrays: Creating an array- modifying array-processing array-grouping form with arrays- using array functions- creating user defined functions- using files- sessions-cookies- executing external programs- Creating sample applications using PHP.   (12L)

UNIT –III
File Handling Opening files using fopen - looping over a files content with feof- reading text from a file using fgets - closing a file- reading character with fgetc- reading whole file with file_get_contentsreading a fle into into an array with file-checking if a file exists-fscanf-parse_ini_file- Getting file information with stat-fseek- copying files with copy- deleting files-writing to a file-reading and writing binary files –locking files   (12L)

UNIT-IV
 MySQL: Effectiveness of MySQL -MySQL Tools-Prerequisites for MySQL connection-Databases and tables- MySQL data types-Creating and manipulating tables-Insertion-updation and deletion of rows in tables -Retrieving data- Sorting and filtering retrieved data -Advanced data filteringData manipulation functions-Aggregate functions -Grouping data- Sub queries-Joining Tables- Set operators-Full text searching.   (12L)

UNIT-V
PHP with MySQL: Working MySQL with PHP-database connectivity- usage of MYSQLcommands in PHPprocessing result sets of queries- handling errors-debugging and diagnostic functionsvalidating user input through Database layer and Application layer-formatting query output with Character- Numeric- Date and time –sample database applications.
            (12L)

Text Books:
1. VIKRAM VASWANI- "PHP and MySQL"- Tata McGraw-Hill- 2005
2. BEN FORTA - "MySQL Crash course " SAMS- 2006. 3
. Steven Holzner , The Complete reference PHP, Tata McGraw Hill,2008

Books for Reference:
• Tim Converse- Joyce Park and Clark Morgan- "PHP 5 and MySQL" -Wiley India reprint - 2008.
• Robert Sheldon- Geoff Moes- "Beginning MySQL"-Wrox- 2005

Non-Major Elective 1
Fundamentals of Internet

LTPC
20 02

OBJECTIVES:
To: study the basic concepts of Internet and understand the services provided by the Internet.

Unit I

The Internet: Introduction – From Computers to the Internet - Advantages of the Internet – Major Internet Services – Hardware and Software in the Internet Age. **Evolution and Growth of the Internet:** Birth of the Internet – Current Networking Technologies – Next Generation Networking..   (5L)

Unit II

Getting Online: Types of Internet Accounts – Selecting Internet Service Providers – **Electronic Mail:** Advantages of E-mails – E-mail addresses – Mail transfer protocols – Working of E-mail system. **World Wide Web:** Architecture of the World Wide Web – Types of websites – Uniform Resource Locator – Domain Name System – Web Pages and Web Links – Visiting Web Pages – Using Internet Explorer – Searching the Web – Google and Yahoo Search Engines.
    (7L)

Unit III

Hosting and Promoting Websites: Structure of Websites – Web Development tools – Microsoft Front Page –Adobe Dreamweaver – Visual Studio. NET – Hosting Websites – Getting a Domain /name – Visitor Analysis and Statistics – Website Promoting methods.   (6L)

Unit IV

Electronic Commerce: E-Business and E-Commerce – Types of business in the internet – M-Commerce - Marketing Strategies on the Web – Making Payments in Virtual Stores – Shopping in Virtual Stores –Cookies and E-Commerce – Major issues of E-commerce and M-Commerce – Future of E-commerce.   (6L)

Unit V

Blogs and Social Networking: Blogs – Uses of Blogs – Blogs System Components – Steps for Blogging – Building a Blog site – Social Networking – Etiquette in networking sites. **Internet Security:** Importance of Internet Security – Internet Threats – Identity theft and Cybersquatting – Hacking – Spamming and Spoofing – Phishing and Pharming – Denial of Service – spyware – Viruses and worms- Security solutions – Firewalls and Intrusion Prevention Systems –Internet Security Precautions- The Information Technology Act.   (6L)

Text Book:
The Internet A User"s Guide Second Edition by K.L. James – PHI Learning Private Limited

Reference Books:

1. Internet, World Wide Web, How to program, 4th Edition, Paul Deital, Harvey M Deitel, Pearson
2. Learning Internet & Email, 4th Revised Rdition, Ramesh Bangia, Khanna Book Publishing Co Pvt Ltd.
3. Internet & Ecommerce, C. Nellai Kannan, NELS Publications

Non-Major Elective 2
Basic Programming Design

LTPC
20 02

OBJECTIVES:
To: study the basic concepts of Programming and understand the structures of programming constructs.

Unit I

Computer Program: Introduction – Developing a program – Algorithm – Flowchart – Decision Tables. (6L)

Unit II

Program Testing and Debugging – Program Documentation – Program Paradigms: Unstructured programming, Structured programming and Object Oriented Programming – Characteristics of a Good Programming. (6L)

Unit III

Computer Languages: Evolution Programming Languages – Classification of Programming Languages – Generation of Programming Languages – Features of Good Programming language. (6L)

Unit IV

Computer Software: Software Definition – Relationship between Software and Hardware - Software Categories : System Software and Application Software – Terminology Software Firmware, Liveware, Freeware, Public Domain Software, Shareware, Commercial Software and Proprietary Software. (6L)

Unit V

Evolution of Internet - Internet Basics: Basic Internet Terms – Getting connected to Internet - Internet Applications – E-mail – Searching the Web – Internet and Viruses. (6L)

Text Book:

Introduction to Computer Science, ITL Education Solutions Limited, 2/e, Pearson

Reference Books:

1. Fundamentals of Computers, V.Rajaram, 5th Edition, PHI
2. Introduction to Computers, Peter Norton, 7/e, TMH.

VISUAL BASIC

LTPC
4004

Objective: Visual Basic Programming introduces event-driven Windows programming, data types, operators, objects and properties, menus, procedures, control structures, and database file processing

Unit I

Getting started with Visual Basic 6.0: Introduction to Visual Basic - Visual Basic 6.0 Programming Environment – Working with Forms – Developing an Application – Variables, Data types and Modules – Procedures and Control Structures – Arrays in Visual Basic – Additional Examples. **Working with Controls**: Introduction – Creating and using Controls – Working with Control Arrays. (12L)

Unit II

Menus, Mouse Events and Dialog Boxes: Introduction – Mouse Events – Dialog Boxes - additional Examples. **Graphics, MDI, and Flex Grid**: Introduction – Graphics for Applications – Multiple Document Interface(MDI) – Using the Flex Grid Control. (12L)

Unit III

ODBC using Data Access Objects and Remote Data Objects: Open Database Connectivity (ODBC) – Remote Data Objects. (12L)

Unit IV

Object Linking and Embedding: Introduction - OLE Fundamentals – Using OLE Container Controls – Using OLE Automation Objects - OLE Drag and Drop - Additional Examples. **Objects and Classes**: Introduction to Objects – Working with Objects – Classes and Class Modules. (12L)

Unit V

Working with ActiveX Data Objects: An Overview of ADO and OLE DB – ADO Object Model - Additional Examples. **Files and File System Controls**: Introduction – File System Controls – Accessing Files. (12L)

Text Book:
Visual Basic 6.0 Programming – Content Development Group – Tata McGraw-Hill Publishing Company Limited, New Delhi.
Reference Books:
1. VISUAL BASIC 6 in Record Time by Steve Brown, BPB Publications.
2. VISUAL BASIC 6 from the Ground UP – GARY CORNELL – Tata McGraw Hill.

SOFTWARE TESTING

LTPC
4004

Objective:
- Expose the criteria for test cases.
- Learn the design of test cases.
- Be familiar with test management and test automation techniques

Unit I : INTRODUCTION

Testing as an Engineering Activity – Testing as a Process – Testing axioms – Basic definitions – Software Testing Principles – The Tester"s Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support of Developing a Defect Repository – Defect Prevention strategies   (12L)

Unit II : TEST CASE DESIGN

Test case Design Strategies – Using Black Box Approach to Test Case Design – Random Testing – Requirements based testing – Boundary Value Analysis – Equivalence Class Partitioning – Statebased testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Evaluating Test Adequacy Criteria.   (12L)

Unit III: LEVELS OF TESTING

The need for Levers of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing – Compatibility testing – Testing the documentation – Website testing.   (12L)

Unit IV : TEST MANAGEMENT

People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process – Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.   (12L)

Unit V: TEST AUTOMATION

Software test automation – skill needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation – Test metrics and measurements – project, progress and productivity metrics.   (12L)

Text Books:
1. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2006.
2. Ron Patton, "Software Testing", Second Edition, Sams Publishing, Pearson Education, 2007

Reference Books:
1. Ilene Burnstein, "Practical Software Testing", Springer International Edition, 2003.
2. Edward Kit," Software Testing in the Real World – Improving the Process", Pearson Education, 1995.
3. Boris Beizer," Software Testing Techniques" – 2 nd Edition, Van Nostrand Reinhold, New York, 1990.
4. Aditya P. Mathur, "Foundations of Software Testing _ Fundamental Algorithms and Techniques", Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

Relational Database Management System

LTPC
4004

OBJECTIVES:
- To learn the fundamental data models and conceptualize and depict a database system using ER diagram
- To make a study of SQL and relational database design using Oracle

UNIT I
     Introduction: Database - system applications-Purpose of Database Systems - View of Data- Database languages -Relational Databases - Database Design - Data Storage and Querying - Transaction Management - Database Architecture - Data Mining and Information Retrieval- Specialty Databases - Database Users and Administrators.   (12L)

UNIT II
     Introduction to the Relational Model and Introduction to SQL: Structure of Relational Databases -Database Schema-Keys-Schema Diagrams- Relational Query Languages-Relational Operations- Overview of the SQL Query Language -SQL Data Definition-Basic Structure of SQL Queries   (12L)

UNIT III
     SQL operations and Intermediate SQL : Additional Basic Operations-Set Operations-Null values-Aggregate functions- Nested Sub queries- Views - Integrity Constraints - SQL Data Types and Schemas   (12L)

UNIT IV
     Entity-relationship(E-R) Modeling – Enhanced Entity-Relationship(EER) Model   – Data Normalization   (12L)

UNIT V
     Implementation using Oracle: Creating Table-Modifying Table-Creating SEQUENCE-PL/SQL- Stored procedures and Functions   (12L)

Text Book:
1.Database System Concepts – Abraham Silberschatz, Henry F.Horth and S.Sudarashan, McGraw-Hill International Sixth Edition.
2. Essentials of Database Management Systems – Alexis Leon, Mathews
  Leon (Chapter 4,5,8 – IV unit)
3. Oracle8i Jose A.Ramalho BPB Publications

Reference Books:
1. Database Management Systems, R.Panneerselvam, PHI Learning Private Limited
2. Database Management Systems, Ramakrishnan and Gehrke, Mc Graw Hill Publications
3. Relational Database Management Systems,P. Simon Navis, Ave Maria Publications
4. RDBMS Concepts and Database Designing, Dr. R.C. Goyal –Ebook url
   http://www.vssut.ac.in/lecture_notes/lecture1423726199.pdf

5. Fundamentals of Database Systems, Ramez Elmasri, Fourth Edition, Pearson Addison Wesley- EBook URL: http://www.uoitc.edu.iq/images/documents/informatics-institute/Competitive_exam/Database_Systems.pdf
6. An Introduction Relational Database Theory, Hugh Darwen, EBook URL: http://www.zums.ac.ir/files/research/site/ebooks/it-programming/an-introduction-to-relational-database-theory.pdf

VISUAL BASIC Lab

LTPC
0043

Objective: To highlight the basic concepts of HTML and help the student to equip with the programming skills in implementing and developing web based applications

Each exercise should be completed within three hours.
It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Design an Analog Clock.
2. Design a Desktop Calculator.
3. Design Mixing of Colors using basic Colors.
4. Create an application to format the text inside the text box.
5. Create an application using File controls and use two option buttons to show and hide a picture in the Picture box.
6. Create an Editor with File and Edit Menus using Menu Editor Tool.
7. Create a MDI Application with tile and cascade child forms.
8. Create a mailing address database in access `and view the records using Data Control.

Allied
E-Commerce

Objective: To impart knowledge about the web technologies and their applications and to understand the basics of web designing.

Unit I

History of E-Commerce : Electronic Commerce - Emergence of the Internet – Emergence of the World Wide Web –Advantages of E– commerce – Disadvantages of E-Commerce - Qnline Extension of a BAM Model – Transition to E-Commerce in India - The
Internet and India. (8L)

Unit II

Business Models for E-Commerce : Social Networking and Facebook – Business Model – E-business Models Based on the Relationship of Transaction Parties – E-business Models Based on the Relationship of Transaction Types. (9L)

Unit III

e-Marketing - Google – Traditional Marketing – The Browsing Behaviour Model – Online Marketing – E-advertising – Internet Marketing Trends –E-branding – Marketing strategies.
(9L)

Unit IV

e-Security : Information   System Security – Security on the Internet – E-business Risk Management Issues – Information Security Environments in India. (9L)

Unit V

e-Payment Systems : E-banking at ICICI Bank – Main Concerns in Internet Banking - Digital Payment Requirements –Classification of New Payment Systems - Digital Signature – Online Financial Services in India. (10L)

TEXT BOOK:

1. P.T.Joseph , S . J, E-Commerce – An Indian Perspective, PHI Learning Pvt Ltd.,2013

Reference Books:

1   CSV Murthy, E-Commerce – Concepts Models Strategies, Himalaya Publishing House
2. Bharat Bhasker, Electronic Commerce Framework, Technologies and application,
    Tata Mcgraw Hill.

Allied
Practical List – PYTHON

Objective: Learn to program in Python and understand programming paradigms brought in by Python Expressions.

Each exercise should be completed within two hours.
It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
3. WAP to display the first n terms of Fibonacci series.
4. WAP to find factorial of the given number.
5. WAP to find sum of the following series for n terms: $1 - 2/2! + 3/3! - - - - - n/n!$
6. WAP to calculate the sum of two compatible matrices.
7. WAP to calculate the product of two compatible matrices.
8. Explore String functions.
9. Creating a CSV File based on user input.
10. Reading a CSV File already created and display the contents

Reference Books:
1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Python Tutorial/Documentation www.python.or 2010
3. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012
4. http://docs.python.org/3/tutorial/index.html
5. http://interactivepython.org/courselib/static/pythonds
6. http://www.ibiblio.org/g2swap/byteofpython/read/

Skill Based II Core
Android Programming

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OBJECTIVES:
To learn the fundamentals of Android Programming using the Android SDK
UNIT I
      Getting Started with Android Programming: What is Android – Android versions – Features of Android –Android Architecture –Android devices in the market –The Android Market. Obtaining the required tools – Android Studio – Android SDK – Creating Android Virtual Devices – The Android Developer Community – Launching the first Android Application. **Using Android Studio for Android Development** - Exploring the IDE – Using Code completion – Debugging your application – Publishing your application. (12L)
UNIT II
      Activities, Fragments and Intents : Understanding Activities - Applying Styles and Themes to an activity – Hiding the Activity title – Displaying a Dialog Window – Displaying a Progress Dialog. Linking Activities using Intents – Returning results from an intent – Passing data using an Intent Object. Fragments – Adding Fragments dynamically - Life cycle of a fragment – Interactions between fragments – Understanding the Intent object – Using intent filters. Displaying notifications. (12L)
UNIT III
      Getting to know the Android User Interface : Understanding the components of a screen – View and viewgroups – Frame Layout – Linear Layout (Horizontal and Vertical) – Table layout – Relative layout – Frame layout – Scroll view. Adapting to Display Orientation – Anchoring views – Managing changes to screen orientation – Persisting State information during changes in configuration – Detecting orientation changes – Controllong the orientation of the Activity. Utilizing the Action Bar – Adding Action items to the Action Bar – Creating the user interface Programmatically – Listening for user Notifications. (12L)
UNIT IV
      Designing your User Interface with Views: Using Basic views –Textview view – Button, ImageButton, EditText, CheckBox, ToggleButton, RadioButton, and RadioGroup Views –ProgressBar View, AutoCompleteTextView View. Using Picker Views – TimePicker view – DatePicker View. Using List views to display long lists – ListView View – Using the Spinner view. Understanding Specified fragments – Using a list fragment – Using a Dialog fragment – Using a preference fragment. (12L)
UNIT V
      Displaying Pictures and Menus with views: Using ImageViews to Display pictures – ImageView view – ImageSwitcher – GridView. Using Menus with Views – Creating the Helper Methods – Options Menu – Context Menu – Using WebView. **Data Persistence:** Saving and Loading User Preferences – Accessing preferences using an activity – Programmatically Retrieving and Modifying the Preferences Values. Persisting Data to Files – Saving ti Internal Storage – Saving to External Storage – Choosing the best storage option. Creating and using Databases – Creating the DBAdapter Helper Class – Using the database programmatically. (12L)

Text Book:
Beginning Android Programming with Android Studio, J.F. DiMarzio, Wrox Publications

Reference Books:

1. Beginning Android Programming with Android Studio, Roger Deutsch
2. Android Programming: Mastering Course for Beginners - Quick Start to Develop Your Own App (Android studio, Android Development, App Development. Updated to Android 6 Platform, Mitchell Schuler

Non-Major Elective 3
HTML

OBJECTIVES:
- To study the basic concepts of Web design using HTML.
- To learn the various tags used in HTML
- To make use of Dynamic HTML

Unit 1:
Introduction to HTML: Designing a Home page – History of HTML – HTML generations-HTML Documents-Anchor tag –Hyper links –Sample HTML documents.   (6L)

Unit 2:
Head and Body section: Header Section –Title-Prologue-Links-Colorful web page – Comments lines Designing the body: Heading printing –Aligning the headings-Horizontal rule-paragraph-Tab settings-Image and pictures-Embedding PNG format Images   (6L)

Unit 3:
Ordered and unordered lists: List-Unordered lists- headings in a list – ordered lists-Nested lists. Table handling: Tables- table creation in HTML- Width of the Tables and cells-Cells spanning multiple rows/Columns- Coloring cells – Column specification   (6L)

Unit 4:
Frames: Frame set - Definition – Frame definition –Nested Frames Web Page Design Project : Frameset Definition – Animals – Birds – Fish Forms: Action attributes –Method attributes –Enctype attribute – Drop down list- sample forms   (6L)

Unit 5:
DHTML and Style sheets: Defining styles –Elements of styles- Linking a style sheet to an HTML document –Inline styles –Internal & External style sheets –Multiple styles   (6L)

Text Book:
World Wide Web Design with HTML, C. Xavier, TMH, 2001

Reference Book:
1. Internet & World Wide Web, H.M.Deital, P.J.Deital & A.B.Goldberg, Pearson Education
2. Fundamentals of information technology, Mathew,,s lenon and Alxis leon, Vijay Nicole private limited, Chennai.

Non-Major Elective 4
Programming in C

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OBJECTIVES:

To obtain knowledge about the structure of the programming language C and to develop the program writing and logical thinking skill.

Unit I

C Declarations:- Introduction – Character Set – C tokens – Keywords and Identifiers – Identifiers – Constants – Variables – Data types – Declaration of Variables – initializing variables – dynamic initialization – type modifiers – type conversion – constant and volatile variables. **Operators and Expressions:-** Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Operator Precedence. (6L)

Unit II

Input and Output in C: Introduction – Formatted Functions – Flags, widths and Precision with Format String – Unformatted Functions – Commonly used Library functions. **Decision Statements :** Introduction – Simple IF statement – The IF…Else Statement – Nesting of IF…Else Statements – The ELSE IF ladder – The Break Statement – The Continue Statement – The Goto Statement – The Switch Statement. (6L)

Unit III

Loop Control:- Introduction –The WHILE Statement – The DO Statement – The FOR statement – Nested FOR Loops. **Arrays :-** Introduction – One-dimensional arrays – Declaration of One-dimensional arrays – Initialization of One-dimensional arrays – Array terminology -Two-dimensional arrays – Initialization of Two-dimensional arrays. (6L)

Unit IV

Strings and Standard functions:- Introduction – Declaring and Initializing String Variables – Display of strings in different formats – String Standard functions – String Conversion Functions. (6L)

Unit V

Functions:- Introduction – Basics of a function - Function definition – The Return statement Types of functions – Call by Value and Reference – Function as an argument – Function with operators – function and decision statements – function and loop statements – functions with arrays. (6L)

Text Book:

Programming in C – 3th Edition by Ashok Kamthane – Pearson Education

Reference Book:
1. Computer Basics and C Programming by V. Rajaraman – PHI Learning Private Limited
2. Programming with C, Third Edition, Byron S Gottfried, Tata McGraw Hill Education Private Limited.

Software Quality Assurance

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OBJECTIVES:
- Understand the basic tenets of software quality and quality factors.
- Understand of how the SQA components can be integrated into the project life cycle.
- Be familiar with the software quality infrastructure.
- Be exposed to the management components of software quality.

Unit I INTRODUCTION TO SOFTWARE QUALITY & ARCHITECTURE

Need for Software quality – Quality challenges – Software quality assurance (SQA) – Definition and objectives – Software quality factors- McCall?s quality model – SQA system and architecture – Software Project life cycle Components – Pre project quality components – Development and quality plans.   (12L)

Unit II SQA COMPONENTS AND PROJECT LIFE CYCLE

Software Development methodologies – Quality assurance activities in the development process- Verification & Validation – Reviews – Software Testing – Software Testing implementations – Quality of software maintenance – Pre-Maintenance of software quality components – Quality assurance tools – CASE tools for software quality – Software maintenance quality – Project Management.   (12L)

Unit III SOFTWARE QUALITY INFRASTRUCTURE

Procedures and work instructions - Templates - Checklists – 3S developmenting - Staff training and certification Corrective and preventive actions – Configuration management – Software change control – Configuration management audit -Documentation control – Storage and retrieval   (12L)

Unit IV SOFTWARE QUALITY MANAGEMENT & METRICS

Project process control – Computerized tools - Software quality metrics – Objectives of quality measurement – Process metrics – Product metrics – Implementation – Limitations of software metrics– Cost of software quality – Classical quality cost model – Extended model – Application of Cost model.   (12L)

Unit V STANDARDS, CERTIFICATIONS & ASSESSMENTS

Quality manangement standards – ISO 9001 and ISO 9000-3 – capability Maturity Models – CMM and CMMI assessment methodologies - Bootstrap methodology – SPICE Project – SQA project process standards – IEEE st 1012 & 1028 – Organization of Quality Assurance – Department management responsibilities – Project management responsibilities – SQA units and other actors in SQA systems.   (12L)

Text Book

 Daniel Galin, "Software Quality Assurance", Pearson Publication, 2009

References
1. Alan C. Gillies, "Software Quality: Theory and Management", International Thomson ComputerPress, 1997.
2. Mordechai Ben-Menachem "Software Quality: Producing Practical Consistent Software",International Thompson Computer Press, 1997.

Data communication and Computer Network

LTPC
4004

OBJECTIVES:
• To understand the concepts of data communication.
• To get through understanding of different topologies.
• To study the function of different layers.
• To get familiarized with different protocols and network components.

Unit I

   Introduction - Data communication – Networks-the Internet –Protocols and Standards – **Network Models** –Layered tasks –OSI model- layers in OSI model-TCP/IP protocol Suit-Addressing. (12L)

Unit II

   Physical layer – Analog and digital – Transmission Impairment –Data rate limits-Performance- Transmission mode -**BandWidth Utilization**- Multiplexing - **Transmission media** – Guided and Unguided media. (12L)

Unit III

   Switching – Circuit Switched Network-Datagram Network – Virtual Circuit Network. **Using telephone and cable networks –** Telephone Network- Dial-Up Modem–Digital Subscriber lIne – Cable TV Network and Cable TV for Data transfer. (12L)

Unit IV

   Data Link Layer : Error Detection and Correction- Introduction- Checksum. **Data link control**-Framing-Flow and Error Control-Protocols-Noiseless Channels-Noisy Channels. **Wired LANs**-IEEE standards-Standard Ethernet- Changes in the Standard – Fast Ethernet-Gigabit Ethernet. (12L)

Unit V

   Wireless LANs: IEEE 802.11-Blue tooth. **Connecting LANs :** Connecting devices, Backbone networks. **Wireless WANs**: Cellular Telephony, Satellite Networks. **Network Layer**-IPv4 Address-IPv6 Address-Internetworking. **Transport Layer**-Process to Process delivery – UDP-TCP. **Application Layer-** Name space-DNS. (12L)

Text Book
 Data Communication and Networking –"BEHROUZ A FOROUZAN " , The McGraw- Hill- 4 th ed.

References
1.Data Communication and Computer Networks – " Prakash C.Gupta
2.Computer Networks Protocols,Standards and Interfaces- " Uyless Black
3. Data Communications and Computer Networks – Brijendra Singh

Dot NET Technologies

LTPC
4004

OBJECTIVES:
- To highlight the features of ASP.NET and apply it to develop various applications.
- To understand the concepts of .Net framework as a whole and the technologies that constitutes the frame work.
- To make the students to get experience and be ready for the large scale projects in IT industry.

Unit I

The .NET Platform and the Web: The Web Client/Server Model – Components of ASP.NET and the .NET Framework – Overview of Internet Information Server – Overview of ASP.NET – The .NET Common Language Runtime and Class Library – Managed Components in .NET – Web Services – Language Independence in the .NET Framework – COM+ Component Services and .NET – Direction and plans for .NET. **The VB.NET:** What is VB.NET? – First VB application – Variables, Constants and Operators – Modularizing Code – Functions and Subroutines – Controlling Program Flow – Handling Errors and Exceptions – Object Oriented Programming – Multithread Programming. (12L)

Unit II

Working with ASP.NET: The features of ASP.NET – The Anatomy of ASP.NET Pages –Introducing Web Forms – VS.NET Web Applications and other IDE Basics – Separating Content and Code – the Code-Behind Feature – Application Configuration – Using HTML Forms – Using Web Controls – Web Controls for displaying and formatting data –Web Controls for creating buttons – Web control for inputting text – Web controls for selecting choices – Web controls for creating lists – Miscellaneous Basic Controls – Creating a simple ASP.NET Application – ASP.NET Page Directives – ASP.NET Rich Controls – Validation Controls – Data List Controls – User Controls - Saving state with the StateBag Object – ASP.NET Intrinsic Objects. (12L)

Unit III

Using the .NET Framework Class Library: Common Features of the .NET Framework Class Library – Using Data Collections – Handling File Input/output and Directories – Watching the File System for Changes – Using the Windows Event Log – Working with Active Directory Services – Using Message Queues – Communicating with Servers on the Internet – Manipulating XML Data – Sending Internet E-mail. (12L)

Unit IV

Building .NET Managed Components for COM+: The concept of Managed Code Execution – The Common Language Runtime – COM+ Component Services – Using VB.NET to develop Managed Components – Serviced Components – Building VB.NET Serviced Components. **Building Web Services:** The need for Web Services – Overview of Web Services – Web Service Description Language - Web Service Wire Formats – Web Services Discovery – Creating a simple Web Service – Calling Web Services with Proxy Classes – Creating a Client for a Web Service – Managing State in Web Services – Using Transactions in Web Services.

(12L)

Unit V

        Accessing Data with ADO.NET: Overview of Data Access on the Web – ADO.NET: The next generation of Data-Access Technology – ADO.NET Programming Objects and Architecture – Displaying Database Data – Programming with the DataList and DataGrid Controls – Working with the DataSet and DataTable Objects – Maintaining Data Integrity with the DataRelation Class – Using Manual Database Transactions – Working with Typed DataSet Objects. **Securing .NET Applications:** Windows Security – IIS Authentication and Authorization Security – A crash course in Cryptography – Implementing Data Encryption – ASD.NET Authentication Security. (12L)

Text Book

ASP.NET and VB.NET Web Programming –by Matt J. Crouch, Pearson.

Reference Books

1.   Upgrading Microsoft Visual Basic 6.0 to .NET - by d Robinson, Michael Bond, Robert Ian Oliver, WP Publishers

2.   Visual Basic.NET - by Shirish Chavan, Pearson

Dot NET Practical Listing

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Objective: Learn to program in Dot Net and to develop web pages using ASP.NET

Each exercise should be completed within two hours.
It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Build a homepage for XYZ Corporation using Web Controls.
2. Create a login page using user control in a web form.
3. Create a simple multiple choice questionnaire. Submit the answers and display the score.
4. Develop a project to input data through a web form to a database and retrieve the data. Use the calendar control to input date.
5. Develop a project to input data through a web form to a database and validate the data. Use the RequiredFieldValidator andRangeValidator Controls.
6. Check whether a given word or phrase is a palindrome using Web Service.
7. Create an online photo gallery using DataList and DataGrid Controls.
8. Develop code to send email from ASP.NET

DATA STRUCTURE PRACTICAL LIST

LTPC
0042

Objective: To develop skills in implementing data structure algorithms

Each exercise should be completed within two hours.
It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Search an element in a list using Binary Search.

2. Implementation of Stack- Push and Pop.

3. Implementation of Queue – Enqueue and Dequeue

4. Implementation of Binary Tree Traversals using recursion.

      a) Pre-order   b) In-order   c) Post-Order

5. Implementation of Breadth First Search algorithm.

6. Implementation of Depth First Search algorithm.

7. Implementation of Merge Sort

8. Implementation of Quick Sort

Mini Project

Major Elective 1
Mobile Computing

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OBJECTIVES:
- To highlight the features of Mobile Communication.
- To understand the concepts of Mobile Protocols
- To learn about package and deploying Applications.

Unit I

Basics of Communication Technologies: Components of a Wireless Communication System – Architecture of a Mobile Telecommunication System – Wireless Local Area Networks – Bluetooth Technology. **Introduction to Mobile Computing and Wireless Networking:** What is Mobile Computing ? Mobile Computing vs. Wireless Networking – Characteristics of Mobile Computing – Structure of Mobile Computing Application-Cellular Mobile Communication – Global System for Mobile Communications (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunications System (UMTS).   (12L)

Unit II

MAC Protocols: Properties required of MAC Protocols – Wireless MAC Protocols : Some Issues- A taxonomy of MAC Protocols –Fixed Assignment schemes – Random Assignment Schemes –Reservation based Schemes. **Mobile Internet Protocol:** Mobile IP – Packet Delivery – Overview of Mobile IP – Desirable features of Mobile IP- Key mechanism used in Mobile IP – Route Optimization – Dynamic Host Configuration Protocol.   (12L)

Unit III

Mobile Transport Layer: Overview of TCP/IP – Terminologies of TCP/IP – Architecture of TCP/IP – An overview of the operation of TCP – Application Layer Protocols of TCP – TCP in Mobile Networks. **Mobile Databases** : Issues in Transaction Processing – Transaction Processing Environment –Data dissemination – Transaction Processing in Mobile Environment – Data Replication – Mobile Transaction Models – Rollback Process – Two-Phase Commit Protocol – Query Processing – Recovery.   (12L)

Unit IV

Wireless Sensor Networks: WSN vs. MANET – Applications – Architecture of the Sensor Node – Challenges in the design of an effective WSN – Characteristics of Sensor Networks –WSN Routing Protocols –Target Coverage –Clustered Wireless Sensor Networks. **Operating Systems for Mobile Computing:** Special Constraints and requirements of Mobile O/S- A survey of Commercial Mobile Operating Systems – A Comparative study of Mobile OSs.
(12L)

Unit V

Mobile Application Development and Protocols: Mobile Devices as Web Clients – WAP – J2ME – Android Application Development. **Mobile Commerce:** Applications of M-Commerce – Business-to-Business(B2B) Applications –Structure of Mobile Commerce –Pros and Cons of M-Commerce – Mobile Payment Systems.   (12L)

Text Book

Fundamentals of Mobile Computing –by Prasant Kumar Pattnaik, Rajib Mall,, PHI.

Reference Books

1. Wireless and Mobile Communication, T.G. Palanivelu & R. Nakkeeran,PHI Learning Private Limited,2009
2. Wireless and Cellular Telecommunications, Third Edition William C.Y. Lee, McGraw Hill
3. Mobile Computing Technology, Applications and Service Creation, Asoke K. Talukder & Roopa R. Yavagal,TMH Publication
4. Wireless Communications and Networking made simple, Prof. Satish Jain, Vineeta Pillai, BPB Publications

Major Elective 2
Multimedia Applications

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4004

OBJECTIVES:
- To have general understanding about Multimedia.
- To make the students understand the elements of multimedia
- To learn multimedia and internet

Unit I

Introduction: Objectives – History of Multimedia – Its market – Content copyright – Resources for multimedia developers – Types of produces – Evaluation – Hardware Architecture – OS and Software – Multimedia Architecture – Software library – Drivers.   (12L)

Unit II

Text and Graphics : Elements of Text – Text Data files – Using text in Multimedia Application – Hypertext – Elements of Graphics – Images and color – Graphics files and Application formats – Creating images for multimedia use –Using graphics in Application. (12L)

Unit III

Digital Audio and Video : Characteristics of sound and Digital audio – Digital Audio systems – MIDI – Audio file formats – Using Audio in Multimedia Applications – Audio for content – Background as video – Characteristics of digital video – digital video data sizing 0 Video capture and playback systems –computer animation.   (12L)

Unit IV

Product design and Authoring tools: Building blocks – classes of products – Content organizational strategies – story boarding – Multimedia tool selection – Tool feature – categories of Authoring tools – selecting the right authoring paradigm.   (12L)

Unit V

Multimedia and Internet : Internet – HTML and web authoring – Multimedia considerations for Internet – Design considerations for web pages.   (12L)

Text Book :

Multimedia Technology and Applications – David Hillman-Galgotia Publications pvt. Ltd, 1998.

Reference Books :
1. Multimedia making it work by Tay Vaughan TMH, 1997
2. Computer Graphics Multimedia and Animation - Malay K. Pakhira PHI , New Delhi - Second edition
3. Principles of Multimedia - Ranjan Parekh - TMGH, New Delhi - Twelfth Reprint,
4. Computer Graphics and Multimedia - Anirban Mukhapathyay, Aruop Chattopadhyay - Vikas Publishing Ltd - Second Edition

Major Elective 3
Cloud Computing

LTPC
4004

OBJECTIVES:
- Understand core concepts of cloud computing
- Learn the fundamental concepts about data centers to understand the tradeoffs in power, efficiency and cost.
- Understand use of cloud storage in storage systems.

UNIT I:
Introduction Cloud Computing Introduction, From, Collaboration to cloud, Working of Cloud Computing, Pros and Cons, Benefits, Developing Cloud Computing Services, Cloud Service Development, Discovering Cloud Services. (12L)

UNIT II:
Cloud Computing For Everyone Centralizing Email Communications, Cloud Computing for Community, Collaborating on Schedules, Collaborating on Group Projects and Events, Cloud Computing for Corporation, Mapping Schedules Managing Projects, Presenting on Road. (12L)

UNIT III:
Using Cloud Services Collaborating on Calendars, Schedules and Task Management, Exploring on Line Scheduling and Planning, Collaborating on Event Management, Collaborating on Contact Management, Collaborating on Project Management, Collaborating on Word Processing, Spreadsheets, and Databases. (12L)

UNIT IV:
Outside The Cloud Evaluating Web Mail Services, Evaluating Instant Messaging, Evaluating Web Conference Tools, Creating Groups on Social Networks, Evaluating on Line Groupware, Collaborating via Blogs and Wikis. (12L)

UNIT V:
Storing And Sharing Understanding Cloud Storage, Evaluating on Line File Storage, Exploring on Line Book Marking Services, Exploring on Line Photo Editing Applications, Exploring Photo Sharing Communities, Controlling it with Web Based Desktops. (12L)

TEXT BOOK:
Cloud Computing, Michael Miller, Pearson Education, New Delhi, 2009.

REFERENCE BOOK:
1. Cloud Computing, V. K. Pachghare, PHI Learning Pvt Ltd, 2016
2. Cloud Computing, Anthony T.Velte, Toby J.Velte, Pobert Elsenpeter, TMH, 2010
1. Cloud Computing Bible, Barrie Sosinsky, Wiley Publishing, Inc.

Operating Systems

LTPC
4004

OBJECTIVES:
- To acquire the fundamental knowledge of the operating system architecture and components and to know the various operations performed by the operating system.
- Understand the basic working process of an operating system.
- Understand the importance of process and scheduling.
- Understand the issues in synchronization and memory management.

Unit I

Introduction: What Operating system do – Computer System Organization – Computer System Architecture – Operating System Structures- Operating System Operation. **System Structures:** Operating System Services – System Calls – System Programs – Operating System Design and Implementation- Operation System Generation- System Boot.   (12L)

Unit II

Process Concept: Process Concept- Process Scheduling –Operation on Processes- Inter Process Communication- Example of IPC System – Communication in Client – Server system. **Process Scheduling :** Basic concept-Scheduling criteria-Scheduling algorithm-Thread scheduling-Multiple Processor Scheduling-Real Time CPU Scheduling-Operating system example- Algorithm evaluation.   (12L)

Unit III

Synchronization: Background - The Critical section problem-Peterson‟s solution - Semaphores – Classic problems of Synchronization. **DeadLocks:** System models-Deadlock Characterization-Methods for handling deadlock - Deadlock Prevention-Deadlock Avoidance-Deadlock detection - Recovery from deadlock.   (12L)

Unit IV

Memory Management: Background – Swapping - Contiguous Memory allocation – Segmentation – paging. **Virtual Memory Management :** Background - Demand paging - Copy and Write-page replacement-Allocation of Frames - Thrashing.   (12L)

Unit V

File System : File Concept-Access Method-Directory and Structure--File Sharing-Protection**. Implementing File System:** File System Structure - File System implementation-Directory implementation-Allocation Methods - Free Space Management**. Mass Storage Structure:** Overview of Mass Storage Structure-Disk Structure - Disk Scheduling - Disk Management.   (12L)

Text Book:
Operating System Concepts – Abraham Silberscartz, Peter Baer Galvin, and Greg Gange. Addision Wesley Publishing Company – Ninth Edition.

Reference Books:
1. Operating System: Internal and Design Principles – Fifth Edition, William Stalling ,PHI Learning Private Limited.
2. Understanding Operating Systes: Ida M.Flynn ,Ann MclverMcHoes.

Computer Graphics and Visualization

LTPC
4004

OBJECTIVES:

To develop skills and knowledge about computer graphics and Visualization and to understand 2D, 3D transformations.

Unit I

Overview of Graphics System: Video Display Devices – Input Devices - Hard Copy Devices – Graphics Software. **Output Primitives**: Points and Lines –Line drawing algorithms – DDA algorithm- Bresenham‚s line algorithm- Circle drawing algorithms: properties of circles – Midpointcircle algorithm – Filled Area primitives. (12L)

Unit II

Attributes of Output Primitives: Line attributes – Curve attributes – Character attributes. **Two-Dimensional Geometric Transformation**: Basic Transformations – Matrix Representations and homogenous coordinates – Composite and other Transformations. (12L)

Unit III

Two-Dimensional Viewing: The viewing pipeline, Viewing co-ordinate reference frame – Window to view port co-ordinate transformation – Two-dimensional viewing function. **Clipping Operations**: Point clipping – Line clipping (only Cohen-Sutherland line clipping) – Polygon Clipping (only Sutherland-Hodgeman polygon clipping). (12L)

Unit IV

Interactive Input Methods: Input of graphical data – Input functions – Three dimensional display methods. **Three Dimensional Geormetric and Modeling Transformations**: Translation - Rotation - Scaling (12L)

Unit V

Three Dimensional Viewing: Viewing Pipeline, Projections. **Visible-surface deduction methods**: Back-face deduction – Depth buffer method- A-Buffer Method – Scanline Method. (12L)

Text Book:

Computer Graphics C version, Second Edition, Donald Hearn, M.Pauline Baker, Pearson Publications.

Reference Books

1. Express Learning - Computer Graphics and Multimedia-ITL Education Solution Ltd.
2. Computer Graphics-A programming Approach 2/e-Steven Harrington-Mc Graw Hill Education Private Limited.
3. Computer Graphics, Multimedia and Animation - Malay K. Pakhira - PHI

Software Project Management

LTPC
4004

OBJECTIVES:
- To outline the need for Software Project Management
- To highlight different techniques for software cost estimation and activity planning.

Unit I - PROJECT EVALUATION AND PROJECT PLANNING

Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.   (12L)

Unit II - PROJECT LIFE CYCLE AND EFFORT ESTIMATION

Software process and Process Models – Choice of Process models – mental delivery – Rapid Application development – Agile methods – Extreme Programming – SCRUM – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points – COCOMO II A Parametric Productivity Model – Staffing Pattern.   (12L)

Unit III – ACTIVITY PLANNING AND RISK MANAGEMENT

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Monitoring – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical patterns – Cost schedules. (12L)

Unit IV – PROJECT MANAGEMENT AND CONTROL

Framework for Management and control – Collection of data Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis- Project tracking – Change control- Software Configuration Management – Managing contracts – Contract Management.
.   (12L)

Unit V - STAFFING IN SOFTWARE PROJECTS

Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham-Hackman job characteristic model – Ethical and Programmed concerns – Working in teams – Decision making – Team structures – Virtual teams – Communications genres – Communication plans.   (12L)

Text Book:
Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012

Reference Books
- Robert K. Wysocki "Effective Software Project Management" – Wiley Publication,2011.
- Walker Royce: "Software Project Management"- Addison-Wesley, 1998.
- Gopalaswamy Ramesh, "Managing Global Software Projects" – McGraw Hill Education (India), Fourteenth Reprint 2013.

Computer Graphics and Multimedia Lab Listing

LTPC
00 42

Objective:
1. To acquire skills in programming computer graphics
2. To acquire skills in multimedia concepts

Each exercise should be completed within two hours.
It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Write a program to draw a line using DDA algorithm
2. Write a program to draw a circle using Bresenham"s algorithm.
3. Write a program to draw a line using Bresenham"s algorithm.
4. Write a program to scale an image.
5. Write a program to rotate an image.
6. Write a program to translate an image.
7. Write a program for bouncing a ball and moving with sound effect.
8. Write a program to display as many balls in the frame in random position.
9. Write a program to display an image as tiled and cascaded according to the user"s option.
10. Write a program so that it should first display the image as the size of applet then it should be reduced and again it should reduced and so on and finally the image should disappear.

Oracle Lab Listing

LTPC
0042

Objective:
1. To acquire skills in SQL statements with various constructs
2. To acquire skills in PL/SQL Programming

Each exercise should be completed within two hours.
It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Create an employee database with tables department, employee details, address, pay details and project details. Alter the tables and add constraints relevant to the fields in the tables. Insert records into all the tables.
2. Create queries to retrieve relevant information from a table.
3. Create a table from the existing tables.
4. Develop queries to retrieve information from more than one table.
5. Develop summary queries to retrieve relevant information from the tables.
6. Write a PL/SQL program to print multiplication table
7. Write a PL/SQL program to check whether given string is palindrome or not
8. Write a PL/SQL program to find factorial of numbers using function and procedure.

Project

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Students are to take up sample project development activities with the guidelines given below

Preparing a project - brief proposal including

- Problem Identification
- Developing a model for solving the problem
- A statement of system /process specification proposed to be developed (Data Flow Diagram)
- List of possible solution including alternatives and constraints

A presentation including the following

- Implementation phase (Hardware/Software/both)
- Testing & Validation of the developed system
- Learning outcomes from the project

Consolidated report preparation

Major Elective 4
INTERNET OF THINGS

LTPC
4004

OBJECTIVES:
- Learn how the Internet of Things (IOT) has the potential to alleviate some of the world‟s most significant problems
- To learn IOT technology and architecture.

UNIT I

M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics. (12L)

UNIT II

M2M to IoT – A Market Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. **M2M to IoT-An Architectural Overview**– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. (12L)

UNIT III

M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management (12L)

UNIT IV

IoT Architecture-State of the Art – Introduction, State of the art, **Architecture Reference Model-** Introduction, Reference Model and architecture, IoT reference Model (12L)

UNIT V

IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. **Real-World Design Constraints-** Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control. (12L)

TEXT BOOK

Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, **"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",** 1st Edition, Academic Press, 2014.

REFERENCE BOOKS

1. Vijay Madisetti and Arshdeep Bahga, **"Internet of Things (A Hands-on-Approach)",** 1stEdition, VPT, 2014.
2. Francis daCosta, **"Rethinking the Internet of Things: A Scalable Approach to Connecting Everything",** 1st Edition, Apress Publications, 2013

Major Elective 5
BIG DATA ANALYTICS

LTPC
4004

OBJECTIVES:
- Learn about Big Data.
- To explore novel statistical, algorithmic, and implementation challenges that emerge in processing, storing, and extracting knowledge from Big Data.

UNIT I

What Is Big Data and Why Is It Important? - A Flood of Mythic "Start-Up" Proportions - Big Data Is More Than Merely Big - Why Now? - A Convergence of Key Trends - Relatively Speaking - A Wider Variety of Data - The Expanding Universe of Unstructured Data.

Industry Examples of Big Data: Digital Marketing and the Non-line World - Don"t Abdicate Relationships - Is IT Losing Control of Web Analytics? - Database Marketers, Pioneers of Big Data - Big Data and the New School of Marketing - Consumers Have Changed. So Must Marketers. - The Right Approach: Cross-Channel Lifecycle Marketing - Social and Affiliate Marketing - Empowering Marketing with Social Intelligence   (12L)

UNIT II

Fraud and Big Data - Risk and Big Data - Credit Risk Management - Big Data and Algorithmic Trading - Crunching Through Complex Interrelated Data - Intraday Risk Analytics, a Constant Flow of Big Data - Calculating Risk in Marketing - Other Industries Benefit from Financial Services" Risk Experience - Big Data and Advances in Health Care - "Disruptive Analytics" - A Holistic Value Proposition - BI Is Not Data Science - Pioneering New Frontiers in Medicine - Advertising and Big Data: From Papyrus to Seeing Somebody - Big Data Feeds the Modern-Day Donald Draper - Reach, Resonance, and Reaction - The Need to Act Quickly (Real-Time When Possible) -Measurement Can Be Tricky - Content Delivery Matters Too - Optimization and Marketing Mixed Modeling – Beard's Take on the Three Big Data Vs in Advertising - Using Consumer Products as a Doorway.   (12L)

UNIT III

Big Data Technology : The Elephant in the Room: Hadoop"s Parallel World - Old vs. New Approaches - Data Discovery: Work the Way People's Minds Work - Open-Source Technology for Big Data Analytics - The Cloud and Big Data - Predictive Analytics Moves into the Limelight - Software as a Service BI - Mobile Business Intelligence is Going Mainstream - Ease of Mobile Application Deployment - Crowdsourcing Analytics - Inter- and Trans-Firewall Analytics - R&D Approach Helps Adopt New Technology - Adding Big Data Technology into the Mix - Big Data Technology Terms - Data Size 101.   (12L)

UNIT IV

Information Management : The Big Data Foundation - Big Data Computing Platforms (or Computing Platforms That Handle the Big Data Analytics Tsunami) - Big Data Computation - More on Big Data Storage - Big Data Computational Limitations - Big Data Emerging Technologies.

Business Analytics : The Last Mile in Data Analysis - Geospatial Intelligence Will Make Your Life Better - Listening: Is It Signal or Noise? - Consumption of Analytics - From Creation to Consumption - Visualizing: How to Make It Consumable? - Organizations Are Using Data Visualization as a Way to Take Immediate Action - Moving from Sampling to Using All the

Data - Thinking Outside the Box - 360° Modeling - Need for Speed - Let‟s Get Scrappy - What Technology Is Available? - Moving from Beyond the Tools to Analytic Applications.   (12L)

UNIT V

The People Part of the Equation : Rise of the Data Scientist - Learning over Knowing - Agility - Scale and Convergence - Multidisciplinary Talent - Innovation - Cost Effectiveness - Using Deep Math, Science, and Computer Science - The 90/10 Rule and Critical Thinking - Analytic Talent and Executive Buy-in - Developing Decision Sciences Talent - Holistic View of Analytics - Creating Talent for Decision Sciences - Creating a Culture That Nurtures Decision Sciences Talent - Setting Up the Right Organizational Structure for Institutionalizing Analytics.

Data Privacy and Ethics : The Privacy Landscape -The Great Data Grab Isn‟t New - Preferences, Personalization, and Relationships - Rights and Responsibility - Playing in a Global Sandbox - Conscientious and Conscious Responsibility - Privacy May Be the Wrong Focus - Can Data Be Anonymized? - Balancing for Counterintelligence – Now What?   (12L)

TEXT BOOK

Michael Minelli, Michele Chamboss, Ambiga Dhiraj , "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for today‟s businesses" John Wiley , 2014

REFERENCE BOOKS

1. Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, EMC Education Services
2. Bill Franks, Taming The Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, Wiley, 2012
3. Arvind Sathi, Big Data Analytics: Disruptive Technologies for Changing the Game, MC Press, 2012

Major Elective 6
INFORMATION SECURITY

LTPC
4004

Objective: Information security focuses on the overview of information security, the tools and techniques used to secure information and the procedures and practices that must be followed by organizations ti ensure information security.

Unit I

Basics of information security: Introduction – Information – Need for information security – What is an information security breach – What needs to be secured?- Who needs to be concerned on information security. Aspects of information security – Goals of information security – Establishing a Security Equation.

Information Security Threats: Introduction – What is a threat – Threats and Vulnerabilities – Threats, vulnerabilities and counter measures.- Types of threats   (12L)

Unit II

Viruses: Introduction – Who creates a virus and why?- How does a virus spread. Types of viruses – Boot sector virus – file virus. Prevention from virus attacks – Impact of a virus attack – Security measures to prevent virus attacks. Antivirus Software – Types of Antivirus software – Deploying Antivirus software. Virus detection and recovery – Virus detection – Recovery from virus attack.

Backups: Introduction – Need for making backups – Types of backups – Backup media – Qualities of a good backup. Backup Strategy – What should be backed up – How frequently and what types of backups should be made – which backup medium should be used – For how long should backups be maintained – who is responsible for making a backup. Backup solutions - Backup solutions used in Linux - Backup solutions used in Windows 2000.   (12L)

Unit III

Countermeasures for Information Security Breach: Cryptography – What is cryptography – Need for cryptography – Types of cryptography – Algorithms used in Cryptography – Authentication models used in cryptography – Implementation of cryptography.   Biometrics – Biometrics Authentication process – Biometrics Authentication methods – Areas where Biometrics is used.

Risk Management: Introduction –What is Risk management – Need for risk management - Benefits of risk management – Important roles in risk management – The risk management process. Risk Assessment –Identifying the assets at risk – Assessing the value of assets – identifying the threats to the assets – identifying the vulnerabilities in an organization. Risk Analysis – Analyze the probability of threat occurrence – Analyze the impact of threat occurrence – Determine the levels of risk of each asset – Prepare for a Risk analysis report. Risk Mitigation – Devise an implementation plan and prioritize Assets – Identify security controls – Conduct cost benefit analysis – challenges in Risk management.   (12L)

Unit IV

Security Policies: Introduction – What is security policy – need for security policy – people who are affected by security policies – Role of management in implementing security Policies- Components of a security policy – security policies and Trust. Security Policy Life Cycle – Prerequisites for creating a Security policy – Design and Creation – Implementation – Compliance – Monitor and Review. Key Security Policies- Acceptable use policy –P:assword policy – Remote Access policy – Virus prevention and Protection policy.

Intrusion Detection: Introduction – What is intrusion – How intrusion happens – who can intrude –types of intrusions. Intrusion Detection Systems – Models on which IDS are based – types of IDS. Honeypots – types of honeypots – uses of honey pots. Firewalls-types of firewalls.

(12L)

Unit V

Security Audit: Introduction – Objectives of security audit – when is a security audit required. Auditor – Qualification of an auditor – role of an auditor – responsibilities of an auditor. Conducting Security Audits – Auditing strategies – Phases of a security audit – types of security audits. **Sample Security Policy**: Introduction – Security policy – Roles and responsibilities – policy documentation – security policy compliance – Standards and guidelines for the use of Company Resources and Network facilities V 1.0 - Standards and guidelines for email usage V 1.0 - Standards and guidelines for internet usage V 1.0. Sample Risk Analysis (12L)

Text Book:
Information security, An overview. PHI, 2004

Reference Books:
1. Information Security: Principles and Practice 2nd Edition, Mark Stamp , Wiley Publications
.
2. Information Security: The Complete Reference 2nd Edition, Mark Rhodes & Ousley, Mcgraw Hill.