

NORTH MAHARASHTRA UNIVERSITY, JALGAON – 425 001

School of Computer Sciences

COURSE STRUCTURE WITH CREDIT

M.Sc. (Information Technology)

	Course	Marks	Hour/week	Credit	Total
Semester-I	IT-101	100	04	04	24
	IT-102	100	04	04	
	IT-103	100	04	04	
	IT-104	100	04	04	
	IT LAB-I	100	06	04	
	IT LAB-II	100	06	04	
Semester-II	IT-201	100	04	04	27
	IT-202	100	04	04	
	IT-203	100	04	04	
	IT-204	100	04	04	
	IT LAB-III	100	06	04	
	IT LAB-IV	100	06	04	
	IT-205	25	02	03	
	(Softskill Development Course)				
Semester-III	IT-301	100	04	04	25
	IT-302	100	04	04	
	IT-303	100	04	04	
	IT-304	100	04	04	
	IT LAB-V	100	06	04	
	IT LAB-VI	100	06	04	
	IT-305	75	01	01	
(Seminar)					
Semester-IV	IT-401	100	04	04	24
	IT-402	100	04	04	
	IT-403	100	04	04	
	IT-404	200	12	08	
	(Project)				
	IT LAB-VII	100	06	04	

NORTH MAHARASHTRA UNIVERSITY, JALGAON
School of Computer Sciences

Proposed SYLLABUS for M. Sc. (Information Technology)
(With effect from June-2013)

Semester-I

IT-101 Theoretical Computer Science
IT-102 Digital Image Processing
IT-103 Modern Concepts in C++ Programming
IT-104 Web Designing and Navigation
IT-Lab-I Lab on DIP& C++
IT-Lab-II Lab on Web Designing and Navigation

Semester-II

IT-201 Web Publishing & Data Storage Technologies
IT-202 Advance Java
IT-203 C# using .NET Framework
IT-204 Internet Programming
IT-205 Soft Skills Development
IT-Lab-III Lab on C# and .NET & PHP
IT-Lab-IV Lab on Java Programming

Semester-III

IT-301 Object Oriented Analysis & Design
IT-302 Current Computing Trends-I
IT-303 Windows Programming
IT-304 Advance Operating Systems
IT-305 Seminar
IT-Lab-V Lab on Current Computing Trends I & Windows Programming
IT-Lab-VI Lab on OS Administration

Semester- IV

IT-401 Software Engineering
IT-402 Current Computing Trends-II
IT-403 Cloud Computing
IT-404 Project
IT-Lab-VII Lab on Current Computing Trends-II

Semester- I

IT-101 Theoretical Computer Science

1. Finite Automata:

[12]

Sets, relations, functions, graphs, trees, mathematical induction, Finite Automata(FA), definition, description, transition systems, acceptability of a string, NFA, DFA, equivalence of DFA and NFA, Melay Moore model, minimization of automaton, Applications.

2. Formal Languages:

[04]

Formal languages, Chomsky classification of languages, languages, their relation and automaton.

3. Regular Expressions:

[14]

Regular expressions, FA and regular expressions, pumping lemma for regular sets, applications of pumping lemma, closure properties of regular sets, regular sets and regular grammars.

4. Context Free Languages:

[10]

CFLs and derivation trees, ambiguity in Context-Free Grammars (CFGs), simplification of CFGs, Normal Forms for CFGs(CNF and GNF), pumping lemma for CFLs, decision algorithms for CFLs.

5. Push Down Automata:

[6]

Pushdown Automaton (PDA), informal description, basic definitions, acceptance by a PDA, PDA and CFLs.

6. Turing Machine:

[6]

Turing Machine, Model, computable languages and function, representation of TMs, Language Acceptability by TMs, Design of TM, Halting Problem of TMs.

BOOKS:

1. Theory of Automata and Formal Languages, Smita Rajpal, GALGOTIA Publications.
2. J.E.Hopcraft, R. Motwani and J.D.Ullman, Introduction to Automata Theory languages & Computation, Pearson Education Asia.
3. K.L.P.Mishra, N. Chandrashekhara, Theory of Computer Science, PHI.
4. Martin John C., Introduction to Language & Theory of computation(TMh).

IT-102 Digital Image Processing

Unit 1. Introduction to Digital Image Processing & Applications

[2]

Digital Image Processing.Examples of Use of Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System.

Unit 2. Basic Relationship Between Pixels & Sampling and Quantization

[4]

Elements of Visual Perception.Image Sensing and Acquisition.Image Sampling and Quantization. Some Basic Relationships Between Pixels. Linear and Nonlinear Operations.

Unit 3. Image Enhancement

[8]

Background. Some Basic Gray Level Transformations. Histogram Processing. Enhancement Using Arithmetic/Logic Operations.Basics of Spatial Filtering.Smoothing Spatial Filters.Sharpening Spatial Filters.Combining Spatial Enhancement Methods. Introduction to the Fourier Transform and the Frequency Domain. Smoothing Frequency-Domain Filters. Sharpening Frequency Domain Filters. Homomorphic Filtering. Implementation.

Unit 4. Image Restoration and Transforms

[8]

A Model of the Image Degradation/Restoration Process.Noise Models.Restoration in the Presence of Noise Only-Spatial Filtering.Periodic Noise Reduction by Frequency Domain Filtering.Linear, Position-Invariant Degradations.Estimating the Degradation Function.Inverse Filtering.Minimum Mean Square Error (Wiener) Filtering.Constrained Least Squares Filtering.Geometric Mean Filter.Geometric Transformations. Discrete Fourier transform, Walsh transform(WT), Hadamard transform, Cosine transform, Haar transform, Wavelet transform.

Unit 5. Color Image Processing.

[8]

Color Fundamentals. Color Models. Pseudocolor Image Processing. Basics of Full-Color Image Processing.Color Transformations. Smoothing and Sharpening.

Unit 6. Morphological Image Processing & Segmentation

[10]

Detection of Discontinuities, Edge linking & Boundary Detection, Thresholding, Region based segmentation Laplacian of Gaussian, Derivative of Gaussian, Canny Edge Detection, Morphological operation : Dilation erosion, Opening & Closing, Basic Morphological Algorithm, Image representation schemes.

Unit 7. MATLAB Image processing toolbox

[02]

Introduction to MATLAB, matrix operations, introduction to image processing tool box

Unit 8. Programming MATLAB

[08]

Image read & write, filters (spatial, frequency domain), Image Restoration and Reconstruction, morphological operations, edge detection and linking, segmentation.

Books:

1. Gonzalez & Woods, Digital Image Processing, Pearson Education, Second edition.
2. S.Jayaraman Digital Image Processing TMH (McGraw Hill) publication
3. A.K. Jain, Fundamentals of Image processing, Prentice Hall of India Publication, 1995
4. Gonzalez, Woods & Steven, Digital Image Processing using MATLAB, Pearson Education

IT-103 : Modern Concepts in C++ Programming

Unit I: [10]

Review of basic C++ concepts like data type, control structures, Functions, Passing Variables, Pass By Value, Function Types, Inline Functions, Default Arguments, Function Overloading, Recursion, Structures, Accessing Structure Members, Initializing Structure Members, Array of Structures, Array in structure, Structure in structure, Passing structure to function, Structure returned by function, Union

Unit II: [10]

Constants, References, Pointers, Pointer arithmetic, String literals, Pointers in to arrays, void Pointer, Array of Pointers to Objects, Inheritance, Pointer to base class object, Pointers to Derived Class object, Typecasting, Virtual Functions, Pure Virtual Functions, Abstract Classes, Polymorphism, Compile time polymorphism, Run time polymorphism, Array of pointer to the derived class, Virtual Destructor, Reference Variables, Using reference variables in passing arguments, Returning by Reference, const references

Unit III: [10]

Exception handling, Uncaught exceptions, Standard exceptions. Namespaces, using namespaces, avoiding name clashes, name lookups, namespace composition, namespaces aliases, Namespace and 'C' code.

Unit IV: [5]

Classes For File Stream Operations, Opening and Closing a File, Opening Files Using Constructor, Opening Files by using open() function, File mode Parameters, File Pointers, Sequential File, Detecting End-of-File, Functions for Manipulation of File Pointers, Specifying the Offset, Binary File, Reading and Writing a Class Object, Updating a File, Command-Line Arguments, this Pointer

Unit V [5]

Templates, Template functions, specializing a template function, Disambiguation under specialization, Template classes, Instantiating a template class object, Rules for templates

Unit VI: [10]

Standard Ternplate Library (STL), STL generic Programming, organization of STL, header filers, containers, container types, Sequence containers, sorted associated containers: Iterators, Iterator types, Generic STL algorithms, Adaptors: Container adaptors, Iterator adapter, Function adaptors, Function object

Books:

1. B. M. Harwani, "C++ for Beginners", Shroff publishers and Distributors Pvt. Ltd., ISBN: 9788184046564
2. Bjarne Stroustrup, "The C++ Programming language", 3rd Edition, Person Education Asia, 2000, ISBN 81-7808-126-1.
3. Danny Kaleve, "The ANSI/ISO C++ Professional programmer's Handbook" Printice hall India .Indian Reprint, 1999, ISBN 81-203-1630-4.
4. David R. Musser, Atul Saini, "STL Tutorial & Reference guide", Person Education Asia, Second Indian Reprint 2000, ISBN-81-7808-132-6.

IT 104 : Web Designing & Navigation

Pre-requisite: Basic knowledge of HTML, Preliminary information about websites and internet surfing

Unit I : Internet Basics

[04]

History & structure of the Internet, Internet connection types & devices, Internet browsers & client side technologies, web sites: classification, structure, anatomy of urls & domain specifiers, web page basics: elements, structure, browser window size, monitor resolution

Unit II : Advance HTML & CSS

[08]

Linking with anchor tag including internal links, absolute & relative referencing of web resources, borders & margins, imagery, unicode fonts, div & span tags, HTML table tags, html form tags, positioning & floating, introduction to css: typography, consistency, types of styles, specifying class within html document

Unit III : Web Site Design process

[08]

Design goals: site purpose, look and Feel, usability & accessibility, web content: Conceptualization & research, content organization, planning 'look & feel', interaction, aesthetics: page templates & layouts, artistic layer, color schemes

Unit IV : Web Navigation Foundation

[15]

Need for navigation, web navigation design, understanding navigation, information seeking, seeking information online, web browsing behavior, information shape, experiencing information, navigation mechanism: step navigation, paging navigation, breadcrumb trail, tree navigation, site maps, directories, tag clouds, A-Z Indexes, navigation bars and tabs, vertical menu, dynamic menus, drop-down menus, visualizing navigation, browser mechanisms, types of navigation, categories of navigation, page types, labeling navigation, vocabulary problem, aspects of good labels, labeling systems, persuasive labels, sources of labels

Unit V : Web Navigation Design Framework

[15]

Qualities of successful navigation, evaluation methods, Persuasive architecture, creating a navigation concept and concept diagrams, Information structures: Linear structures, webs,

hierarchies, facets, emergent structures, Organizational schemes and categories, creating site maps and detailed site plans, Layouts: determining navigation paths, visual logic, page template, wireframes, navigation in the context of search, faceted browse, navigating, rich web applications, browser controls, the back button, and pop-up windows, types of interaction, capturing and refinding information, designing web applications for interaction, inductive user interfaces

Reference Books :

- 1) Learning Web Design, Jennifer Niederst Robbins, 2007, 3rd Edition, O'Reilly, ISBN-10: 0-596-52752-7
ISBN-13: 978-0-596-52752-5[C]
- 2) Web designing in Nut Shell (Desktop Quick Reference), Jennifer Niederst Robbins, O'Reilly
ISBN: 1-56592-515-7 [M]
- 3) Designing web navigation, James Kalbach, 2007, O'Reilly publication, IS BN-10: 0-596-52810-8
IS BN-13: 978-0-596-52810-2[L]

IT-Lab-I Lab on DIP& C++

DIP:

1. Display of Grayscale Images, Color images.
2. Conversion between color spaces.
3. Histogram Equalization.
4. Non-linear Filtering.
5. 2-D DFT and DCT.
6. Filtering in frequency domain.
7. DWT of images.
8. Morphological operation
9. Edge detection using Operators and edge linking
10. Segmentation using thresholding, region based, watershed .

C++ Lab:

1. Design a C++ program that demonstrates language basics such as data types, controls structures, functions, structures, passing structure to function, Structure returned by function, Union etc.
2. Demonstrate following
 - a. Pointer arithmetic
 - b. Pointers in to arrays and Array of Pointers to Objects
 - c. Pointer to base and Derived Class object
3. Demonstrate compile time and run time polymorphism in C++.
4. Demonstrate exception handling in C++.

5. Demonstrate file handling in C++.
6. Demonstrate function templates, class templates and specialization in C++.
7. Implement a C++ program that demonstrates sequence containers of STL.
8. Implement a C++ program that demonstrates associative containers of STL.
9. Write a program to demonstrate generic algorithm for sorting, search, conditional search, fill, generate, replace, reverse, rotate, swap, heap operation merge.
10. Implement a C++ program that demonstrates adaptors of STL.
11. Implement a C++ program that demonstrates function objects.

IT-Lab-II Lab on Web Designing and Navigation

Web Designing and Navigation

The Instructor / Committee will prepare list of assignment to be completed before the beginning of the semester.

Semester- II

IT-201 Web Publishing & Data Storage Technologies

Unit - I

Overview of web client/server architectures, HTML and CSS & JavaScript, Building dynamic web pages using server-side includes and environment variables. **[04]**

Introduction to XML, XML advantages, XML Implementations, XML approach to web designing, logical and physical structure of XML documents Writing well-formed and valid XML documents based on W3C specifications, Creating valid XML documents using document type definitions (DTDs), elements, attributes, entities, Working with XML schemas, Formatting XML using cascading stylesheets, Introduction to powerful Extensible Stylesheet Language Transformations (XSLT), XML Parses, Displaying XML using Internet Explorer and MSXML, Using data binding and XML Document Object Model (XML DOM) scripts to display XML in HTML Web pages. **[20]**

Unit - II

Introduction to PHP, PHP Installation & Configuration, PHP syntax, PHP variables and constants, Control structures, Data structures, Functions, Object Oriented Programming with PHP. **[08]**

Processing HTML forms and dynamically generating HTML documents, PHP function Extensions, File processing with PHP, Building applications with cookies and session objects, Sending emails with PHP. **[08]**

Unit- III

Introduction to MySQL database management and SQL Language, How to develop PHP/MySQL applications. **[10]**

Introduction to PHP programming with XML. **[02]**

Books:

1. Beginning PHP5 Publisher: Wrox Press Inc; ISBN: 0-7645-5783-1
2. XML Step by Step, 2nd Ed. Publisher.- Microsoft Press Inc; ISBN: 0-7356-1465-2
3. Mastering JavaScript, Publisher: Sybex, Author: James Jaworski; ISBN: 0-7821-21:19-X'

Web References :

<http://www.php.net>

<http://www.w3c.org>

IT-202 Advance Java Programming

1. Java Basics Review:

[10]

Java streams- Text input and output, Reading and writing Binary data, Object serialization; Networking- Socket Programming; Exception Handling, Multithreading; Collection Classes- HashSet , LinkedHashSet ,Stack, LinkedList , ArrayList , Vector ,HashMap, Hashtable, Arrays.

2. Distributed Computing:

[08]

Remote Method Invocation- Introduction, Architecture, RMI Object services, stub and Skeleton, Steps of developing an RMI system; Overview- IIOP, Interface definition language , CORBA , JINI, JNI.

3. Java Beans and EJB:

[12]

Java Bean- Concepts, Writing process, Applications, Properties and Events, Property Editors, Customizer , Persistence; Enterprise JavaBeans- Introduction, Specification, Architecture, Container, Types, Life cycle, Applications.

4. Servlets and Java Server Pages:

[12]

Servlets – Concepts, Architecture, Servlet Container Writing Process, API, Life Cycle, Hierarchy, ServletConfig, ServletContext, Programming and deployment, Servlet and HTML Form, Session Management, JDBC ;

Java Server Pages – Introduction, JSP Tags (Scripting Elements), JSP Containers, Architecture, API, JSP Objects, JSP and JavaBeans, JSP and Servlets.

5. Struts:

[10]

Introduction, Understanding Scopes, Custom Tags, The MVC Design Pattern, Simple Validation, Processing Business Logic, Basic Struts Tags, Configuring Struts; Introduction- Spring , Hibernate.

Books:

1. Beginning Apache Struts From Novice to Professional, by Arnold Doray by Apress ISBN: 978-1-59059-604-3
2. Professional Hibernate, by Eric Pugh, Joseph D. Gradecki by Wiley Publishing, Inc., ISBN: 0-7645-7677-1
3. Spring In Action, Craig Walls, Ryan Breidenbach, Manning Publishing Co., ISBN: 1-932394-35-4
4. Gary Cornell and Cay S. Horstmann, "Core Java Vol 1 and Vol 2", Sun Microsystems Press, Eight Edition.
5. SoumadipGhosh, "Web Technology with Advanced Java", University Science Press, ISBN:978-93-80856-78-0.

IT-203 :C# using .NET Framework

Unit 1: C# and the .NET Framework

[5]

Before .NET, Enter Microsoft .NET, Compiling to the Common Intermediate Language , Compiling to Native Code and Execution , The Common Language Runtime, The Common Language Infrastructure, The Evolution of C#

Unit 2: Overview of C# Programming

[5]

Identifiers, Keywords, Main, Types, Storage, and Variables, Value Types and Reference Types, Storing Members of a Reference Type Object, Categorizing the C# Types variables, statements, Arrays, Enumerations, struts

Unit 3: Classes: The Basics

[6]

Overview of Classes, Programs and Classes: A Quick Example, Declaring a Class , Class Members, Fields, Methods, Creating Variables and Instances of a Class, Allocating Memory for the Data, Instance Members, Access Modifiers Private and Public Access . Accessing Members from Inside the Class, Accessing Members from Outside the Class Static Fields, Static Function Members, Other Static Class Member Types, Member Constants, Properties, Constructors, Destructors, The read only Modifier, The this Keyword, Indexers

Unit 4: Classes and Inheritance

[6]

Class Inheritance, Accessing the Inherited Members, All Classes Are Derived from Class object, Masking Members of a Base Class, Base Access, Using References to a Base Class, Constructor Execution, Inheritance Between Assemblies, Member Access Modifiers, Abstract Members, Abstract Classes, Sealed Classes, Static Classes, Extension Methods, Interfaces

Unit 5: Operators and Conversions

[6]

Operators, Operator overloading, What Are Conversions, Implicit Conversions, Explicit Conversions and Casting, Types of Conversions, Numeric Conversions, Reference Conversions, Boxing Conversions, Unboxing Conversions, User-Defined Conversions, The is Operator, The as Operator

Unit 6: Delegates and Events

[6]

An Overview of Delegates, Declaring the Delegate Type, Creating the Delegate Object, Assigning Delegates, Combining Delegates, Adding Methods to Delegates, Removing Methods from a Delegate, Invoking a Delegate, Invoking Delegates with Return Values, Invoking Delegates with Reference Parameters, Anonymous Methods. Lambda Expressions, Publishers and Subscribers, Overview of Source Code , Components, Declaring an Event, Subscribing to an Event, Raising an Event, Standard Event Usage, Event Accessors

Unit 7: Generics

[5]

What Are Generics? Generics in C#, Generic Classes, Declaring a Generic Class, Creating a Constructed Type, Creating Variables and Instances, Constraints on Type Parameters, Generic

Methods, Extension Methods with Generic Classes, Generic Struts, Generic Delegates, Generic Interfaces, Covariance, Contra variance

Unit 8: Introduction to LINQ [5]

What Is LINQ? LINQ Providers, Method Syntax and Query Syntax, Query Variables, The Structure of Query Expressions, The Standard Query Operators, LINQ to XML

Unit 9: Windows forms [6]

Overview, The Form class, The class hierarchy of Windows Forms, The controls and components that are part of the System, Windows. Forms namespace, Menus and toolbars, Creating controls, Creating user controls

Books:

1. Daniel Solis, Illustrated C# 2012, 2nd edition, Publisher: Apress 2012, ISBN: 1430242795, 9781430242796
2. Professional C# 2005 by Christian Nagel, Bill Evjen, Jay Glynn, Morgan Skinner, Karli Watson by Wiley Publishing Inc. ISBN: 978-0-470-19137-8

IT-204 Internet Programming

Unit I

Application and Page Frameworks , Asp .Net Server Controls and Client Side Scripts, Asp .Net Web Server Controls., Validation Server Control, Working with Master Pages, Themes and Skins [12]

Unit II

Data Binding in Asp .Net 3.5, Data Management with ADO .Net, Querying with LINQ, Site Navigation, Personalisation, Membership and Role Management, Portal Framework with Web Parts [24]

Unit III

Asp .Net Ajax, Security, State Management, Caching, User and Server Controls, File I/O and Streams, Building and Consuming Services, Packing and Deploying Asp .Net Application[14]

Books:

1. Professional Asp .Net 3.5 in C# and VB by Bill Evjen, Scott Hanselman, Devin Rader, by Wiley Publishing Inc. ISBN:978-0-470-18757-9.
2. Programming Microsoft ASP.NET 3.5, Dino Esposito, Microsoft Press, 2008.

IT-205 : Soft Skills Development

- | | |
|---|-----|
| 1. Communicative English | [4] |
| 2. Group Discussions | [4] |
| 3. How to prepare a good Resume? | [3] |
| 4. Analytical/Logical Skill Development | [8] |
| 5. Interview Techniques | [6] |

(If the Resource Person is from the industry then he/she may decide the course content as the requirement).

No grade will be given for the Soft Skills Development course. However, the completion of the credit for the IT-306 course shall be compulsory.

BOOKS:

1. Cornerstone Developing Soft Skills, Fourth Ed., R. Sherfield, R. Montgomery, P. Moody, Pearson Education, 2010.

IT-Lab-III Lab on C# and .NET & PHP

C#:

1. Implement a C# program that demonstrates fundamental concepts such as data types, arrays, enumerations, structures etc.
2. Design a class having various members such as readonly fields, static and instance methods, properties, constructors etc.
3. Demonstrate the concept of Implementation and Interface Inheritance in C#.
4. Demonstrate inheritance between assemblies.
5. Demonstrate built in and user defined type conversions in C#.
6. Demonstrate unary and binary operator overloading in C#.
7. Demonstrate generics used in C# programs.
8. Demonstrate use of LINQ in C#
9. Create a C# application that demonstrates windows forms.
10. Demonstrate creating user controls with help of windows forms.

PHP:

1. Implement a XML based application demonstrate validation using DTDs.
2. Implement a XML based application to demonstrate validation using XML Schema.
3. Implement a XML based application to transform XML w.th XSLT.
4. Implement a XML based application to access XML data using DOM (Document Object Model).
5. Implement a PHP program to display a Well-Come page based on client browser.
6. Implement a PHP program to process HTML forms.
7. Implement a PHP program to demonstrate Object Oriented Programming in PHP
8. Implement a PHP program to demonstrate use of Cookies & Session objects.
9. Implement a PHP program to demonstrate database handing.
10. Implement a PHP program to access XML data.

IT-Lab-IV Lab on JAVA Programming

1. Write java program(s) that demonstrates Java streams.
2. Implement the Java program(s) for server and client to demonstrate networking in Java using Sockets. (Single server and single client, Single server and multiple clients).
3. Write java program(s) that demonstrates concept of Exceptions.
4. Write java program(s) that demonstrates concept of Multithreading.
5. Write a Java program(s) that demonstrates the use of Collection Classes.
6. Write a Java program(s) that demonstrates the use of RMI technology.
8. Write a Java program(s) that demonstrates Java Bean.
9. Write a Java program(s) that demonstrates EJB.
10. Write a Java program(s) that demonstrates use of Servlets.
11. Write a Java program(s) that demonstrates JSP.
12. Write a Java program(s) that demonstrates the use of struts.
13. Write a window program to Move a ball horizontally inside the client area using timer. At each time lapse the ball should move left of the window and when it touches the left boundary of the window it should go to, the right of the window. and so on .
14. Write a window program to display the characters entered by user from the keyboard.
[Consider only alphabets and numbers only.]

Semester- III

IT-301 :Object Oriented Analysis and Design

Unit 1. Introduction: [8]

An overview – Object basics – Object state and properties – Behavior – Methods – Messages – Information hiding – Class hierarchy – Relationships – Associations – Aggregations- Identity – Dynamic binding – Persistence – Metaclasses – Object oriented system development life cycle.

Unit 2. Methodology and UML: [10]

Introduction – Survey – Rumbugh, Booch, Jacobson methods – Patterns – Frameworks – Unified approach – Unified modeling language – Static and Dynamic models – UML diagrams – Class diagram – Usecase diagrams – Dynamic modeling – Model organization – Extensibility.

Unit 3. Object Oriented Analysis: [12]

Identifying Usecase – Business object analysis – Usecase driven object oriented analysis – Usecase model – Documentation – Classification – Identifying object, relationships, attributes, methods – Super-sub class – A part of relationships Identifying attributes and methods – Object responsibility

Unit 4. Object Oriented Design: [12]

Design process – Axions – Colollaries – Designing classes – Class visibility – Refining attributes – Methods and protocols – Object storage and object interoperability – Databases – Object relational systems – Designing interface objects – Macro and Micro level processes – The purpose of a view layer interface

Unit 5. Software Quality: [8]

Quality assurance – Testing strategies – Object orientation testing – Test cases – Test Plan – Debugging principles – Usability – Satisfaction – Usability testing – Satisfaction testing.

BOOKS:

1. Ali Bahrami, "Object Oriented System Development", McGraw Hill International Edition, 1999.
2. Booch, Jacobson, Rumbaugh, Object Oriented Analysis and Design with Applications, Third Ed., Pearson Education, 2010.

IT-302 Current Computing Trends-I

The syllabus of this course (IT-302: Current Computing Trends-I) will be prepared before the beginning of the Third Semester by the committee by considering the market requirement, student's feedback and latest technological trends.

IT-303 Windows Programming

- UNIT I Introduction to Windows Programming and Unicode** [08]
Windows environment, programming options, first program, character sets, wide characters (C and Windows).
- UNIT II Windows, Messages and Textout** [08]
window architecture, creating, displaying, WM_PAINT, WM_DISTROY, Painting and Repainting, GDI, Scroll bars.
- UNIT III Basic Drawing** [10]
Structure of GDI, Device Context, Dots , Lines, Filled areas, Rectangles, Regions and Clipping, Mapping mode.
- UNIT IV Keyboard and Mouse** [08]
Keyboard: Keystorke, character, keyboard messages, Character sets
Mouse: mouse messages, capturing.
- UNIT V Child Window Controls, Menus , Dialogs** [10]
Child Window Controls: Button, static, scroll bar, edit, list box classes, controls and colors.
Menus: Creating menus, accelerators
Dialogs: modal, modeless, common dialogs
- Unit VI Multiple Document Interface and DLLS** [06]
Multiple Document Interface: Concepts, implementation
DLLS: basics, linking without library.

BOOKS

1. Charles Petzold, “Windows Programming”, Microsoft Press, 2007

IT-304 Advance Operating Systems

- 1.Overview:** [6]
General Overview of the System : History – System structure – User perspective – Operating system services – Assumptions about hardware. Introduction to the Kernel : Architecture of the UNIX operating system – Introduction to system concepts.
- 2. The Buffer Cache** [6]
Buffer headers – Structure of the buffer pool – Scenarios for retrieval of a buffer (algorithm: getblk) – Reading and writing disk blocks (algorithm: breada, bwrite)– Advantages and disadvantages of the buffer cache.
- 3.File Subsystem:** [10]
Internal representation of files: Inodes – Structure of a regular file (algorithm: bmap)– Directories – Conversion of a path name to an Inode (algorithm: namei) – Super block – Inode assignment to a new file (algorithm: ialloc) – Allocation of disk blocks.
- 4. System Calls for the File System:** [10]
Open – Read – Write – File and record locking – Adjusting the position of file I/O – Lseek –

Close – File creation – Creation of special files – Changing directory, root, owner, mode – stat and fstat – Pipes – Dup – Mounting and unmounting file systems (algorithm: mount, umount) – link – unlink.

5.Processes:

[10]

Process states and transitions – Layout of system memory – The context of a process – Saving the context of a process – Manipulation of the process address space – Sleep (algorithm: sleep). Process Control : Process creation – Signals – Process termination – Awaiting process termination – Invoking other programs – user id of a process – Changing the size of a process - Shell – System boot and the INIT process– Process Scheduling-algorithm, scheduling parameters, examples of process scheduling, controlling process priorities, fair scheduler.

6. Memory Management and Inter process Communication:

[8]

Memory Management Policies: Swapping – Demand paging. Inter process communication, System V IPC (Messages, Shared Memory, Semaphores), Network Communications, Sockets.

BOOKS:

1. Maurice J. Bach, “The Design of the Unix Operating System”, Pearson Education.
2. B. Goodheart, J. Cox, “The Magic Garden Explained”, Prentice Hall of India.
3. S. J. Leffler, M. K. Mckusick, M. J. Karels and J. S. Quarterman., “The Design and Implementation of the 4.3 BSD Unix Operating System”, Addison Wesley.
4. J. Hart, Windows System Programming, Pearson Education, 2008.
5. A. Robbins, Linux Programming by Example: The Fundamentals, Pearson Education, 2008.

IT-305 : Seminar

1. The seminar shall be conducted as per the following depending on the applicability of the subject - Every week there shall be a period for seminar wherein the students have to select the topic, carry out literature survey and prepare seminar report.
2. No grade will be given for the seminar. However, the completion of the credit for the seminar shall be compulsory.

IT-Lab-V Lab on Current Computing Trends I & Windows Programming

Current Computing Trends- I

The syllabus of this Lab Course (Current Computing Trends-I) will be prepared before the beginning of the Third Semester by the committee/instructor by considering the market requirement, student’s feedback and latest technological trends.

Windows Programming:

1. Write a window program to demonstrate line drawing with left mouse button. The color & width of the line should change with every new line
2. Write a Window Program that displays a small rectangle with every left mouse button. Double Clicking on existing rectangle should erase the rectangle.
3. Write a Window Program to display size of window and no. of left clicks; no. of right clicks and no. of double clicks. The data should be display at the center of the window. Size should be updated when user resizes the window object.
4. Write a Window Program to create filled rectangle and circle. on alternate left click. New figure should not erase the previous one. If user clicks inside any figure a mistake box is display.
5. Write a Window Program to create various brushes and change the background color to brushes on left mouse click.
6. Write a Window program to create a window object. Drag the left mouse buttons & display rectangle for which dragged line is a diagonal. Also demonstrate mouse capturing.
7. Write a window program to Move a ball horizontally inside the client area using timer. At each time lapse the ball should move left of the window and when it touches the left boundary of the window it should go to, the right of the window. and so on .
8. Write a window program to display the characters entered by user from the keyboard. [Consider only alphabets and numbers only.

IT-Lab-VI Lab on OS Administration

1. Use of Unix/Linux – User Commands – Editors - Shell programming
2. C/C++ programming on Unix/Linux – use of make, version control
3. Use of system calls – files – processes – I/O – IPC
4. Experiments using C of mini unix systems (such as Minix) – File system – Processes – Memory Management – Drivers
5. Unix / Linux sources – build, run kernel – small modifications

Semester- IV

IT-401 : Software Engineering

- Unit 1. Introduction:** [2]
What is Software Engineering.
- Unit 2. Software Development Life-cycle:** [6]
Requirements analysis, software design, coding, testing, maintenance, etc.
- Unit 3. Software Requirements Specification:** [6]
Waterfall model, prototyping, interactive enhancement, spiral model. Role of Management in software development. Role of metrics and measurement.
- Unit 4. Software Requirement Specification:** [6]
Problem analysis, requirement specification, validation, metrics, monitoring and control.
- Unit 5. System Design:** [6]
Problem partitioning, abstraction, top-down and bottom-up design, Structured approach. Functional versus object-oriented approach, design specification and verification metrics, monitoring and control.
- Unit 6. Coding:** [6]
Top-down and bottom-up, structured programming, information hiding, programming style, and internal documentation. Verification, Metrics, monitoring and control.
- Unit 7. Testing:** [6]
Levels of testing functional testing, structural testing, test plane, test cases specification, reliability assessment.
- Unit 8. Software Project Management:** [6]
Cost estimation, Project scheduling, Staffing, Software configuration management, Quality assurance, Project Monitoring, Risk management, etc.
- Unit 9. Web Engineering:** [6]
The attribute of Web based application, The WebE Process, Framework for WebE Design and Testing for Web based application.

BOOKS:

1. Software Engineering : A Practitioner's Approach, Roger S Pressman 7th Edition McGraw Hill International Publication.
2. The Complete Reference : Web Design, Thomas A Powell. McGraw Hill International Publication.

IT-402 Current Computing Trends-II

Unit I

Windows Communication Foundation Overview, Windows Communication Foundation Concepts, Understanding Windows Communication Foundation, Addresses, Understanding and Programming WCF Binding, Understanding and Programming WCF Contracts, Clients, Services, Security [19]

Unit II

Introduction to Workflow and Windows Workflow Foundation, Workflow Overview, Conditional Activities, Flow Activities, Rule Based Workflow, Workflow and web services, Interacting with Work Flow, Deploying Workflow Applications. [16]

Unit III

Overview of Windows Presentation Foundation, WPF and .Net Programming, Anatomy of EPF-Enabled Application, Building a Rich UI with Microsoft Expression Blend, Custom Controls, Security. [15]

Books:

1. Professional WCF Programming .Net Development with Windows Communication Foundation by Scott Klein, by Wiley Publishing Inc. ISBN:978-0-470-08984-2.
2. Foundations of WF, An Introduction to Windows Workflow Foundation by Brian R. Myers., by Apress publication, ISBN:978-1-59059-718-7
3. Professional WPF Programming .Net Development with Windows Presentation Foundation, by Chris Andrade, Shawn Livermore, Mike Meyers, Scott Van Vilet, By Wiley Publishing Inc. ISBN:978-0-470-04180-2

IT-403 Cloud Computing

Unit 1: Introduction to Cloud Computing [8]

Roots of Cloud Computing, Layers and Types of Clouds, Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, and Challenges and Opportunities.

Unit 2: Virtualization and Resource Provisioning in Clouds [8]

Introduction and Inspiration, Virtual Machines (VM), VM Provisioning and Manageability, VM Migration Services, VM Provisioning in the Cloud Context, and Future Research Directions.

Unit 3: Cloud Computing Architecture [10]

Cloud Benefits and Challenges, Market-Oriented Cloud Architecture, SLA-oriented Resource Allocation, Global Cloud Exchange; Emerging Cloud Platforms, Federation of Clouds

Unit 4: Programming Enterprise Clouds using Aneka [12]
Introduction, Aneka Architecture, Aneka Deployment, Parallel Programming Models, Thread Programming using Aneka, Task Programming using Aneka, and MapReduce Programming using Aneka, Parallel Algorithms, Parallel Data mining, Parallel Mandelbrot, and Image Processing.

Unit 5: Advanced Topics and Cloud Applications [12]
Integration of Private and Public Clouds, Cloud Best Practices, GrepTheWeb on Amazon Cloud, ECG Data Analysis on Cloud using Aneka, Hosting Massively Multiplayer Games on Cloud, and Content Delivery Networks Using Clouds, and Hosting Twitter and Facebook on Cloud.

Books:

1. RajkumarBuyya, Christian Vecchiola, and ThamaraiSelvi, Mastering Cloud Computing, Tata McGraw Hill, New Delhi, India, 2013.
2. Cloud Computing: Principles and Paradigms RajkumarBuyya, James Broberg , Andrzej M. Goscinski, ISBN: 978-0-470-88799-8, Wiley India Publication.
3. Cloud Computing, A Practical Approach Toby Velte, Anthony Velte, Robert Elsenpeter ISBN0071626948 / 9780071626941 Tata McGraw Hill Publication.
4. Cloud Computing bible, Barrie Sosinsky, Wiley India Pvt Ltd (2011)

IT-404 Project

Project course will commence at the beginning of fourth semester at the school of Computer Sciences and the final work along with report will be submitted to the school at the end of fourth semester. Project viva will be conducted for final evaluation.

IT-Lab-VII Lab on Current Computing Trends- II

1. Create and ASP .NET application using Web server controls apply appropriate validation to it.
2. Create an ASP .NET application using Master Pages and Themes and Skins
3. Create an ASP .NET application to demonstrate binding of GridView, DataList, Repeater, DropDownList, RadioButtonList, CheckBoxList Control using ADO .NET
4. Create an ASP .NET application to demonstrate LINQ to XML, LINQ to Objects, LINQ to SQL
5. Create an ASP .NET application to demonstrate Navigation controls
6. Create an ASP .NET application to demonstrate User and Role management.
7. Create an ASP .NET application to demonstrate User controls
8. Create an ASP .NET application to demonstrate Web parts
9. Create an ASP .NET application to demonstrate various type of Caching (Data Caching, Output Caching, and SQL Server Cache Dependency).
10. Create an ASP .NET application using Ajax
11. Create an ASP .NET application using Web Service.

12. Create a simple WCF application with appropriate client and host it in various environments IIS, Windows Service, Windows Application.
13. Create a Sequential Workflow.
14. Create a Conditional Workflow.
15. Create a State Machine Workflow.
16. Create an application using Windows Presentation Foundation.