DAYANANDA SAGAR UNIVERSITY

SCHOOL OF ENGINEERING

DEPARTMENT OF COMPUTER APPLICATIONS

SCHEME OF TEACHING AND EXAMINATION 2016 – 2017

SEMESTER IV **BRANCH: BCA**

Sl. No.	Course Code	Course	CR/ AU	No. of hours of Teaching				Scheme of Evaluation	
								Continuous	Examination
				Lecture	Tutorial	Lab/ Practice	No. of Credits		
1	16CA207	Object Oriented Analysis and Design Using UML	CR	03	--	02	04	40	60
2	16CA208	Advanced Web Programming	CR	04	--	--	04	40	60
3	16CA209	Database Systems	CR	03	02	--	04	40	60
4	16CA210	Software Testing	CR	03	--	02	04	40	60
5	16CA2XX	Elective – I	CR	02	02	02	04	40	60
6	16CA273	Advanced Web Programming Lab	CR	-	-	04	02	40	60
7	16CA274	Database Systems Lab	CR	-	-	04	02	40	60
8	16CA281	Seminar	CR	-	-	02	01	20	30
GRAND Total: 750				**15**	**04**	**14**	**25**	**300**	**450**

Continuous evaluation: 2 IA Tests : 20 Marks, Self-study presentation / survey reports / quiz / assignments: 10 Marks , programming exercises/presentation in seminar and workshops:10 Marks.

Syllabus 4th Semester Courses

Course Code: **16CA207**	**OBJECT ORIENTED ANALYSIS AND DESIGN USING UML**	L	T	P	C
		03	--	02	04
Course Objectives	• To understand the fundamentals of objects and their modeling • To differentiate unified process from other approaches • To emphasize on modeling based software design • To familiarize with the modeling languages • To reinforce software design with design patterns				
Course outcomes	At the end of the course student will be able • To express software design with UML diagrams • To analyze the communication of software modules using interaction diagrams • To identify and map basic software requirements in UML modeling • To be capable of transforming UML based software design into pattern based design framework using design patterns • To explain the purpose of applying particular design pattern to a specific module • To outline and analyze the areas of design pattern correspondence with code				

Module 1	**INTRODUCTION:** Complexity- Structure of complex of systems, Inherent complexity of software, attributes of a complex system, Evolution of object models – Foundations of Object model, Elements of Object model – Major elements: Abstraction, Encapsulation, Modularity and Hierarchy- Minor elements Typing, Concurrency, Persistence.	09 hrs
Module 2	**CLASSES AND OBJECTS** – Nature of an object- Relationships among objects – Nature of class – Relationship among classes – Interplay of Classes and objects- on building quality classes and objects Classification: Importance of Proper Classification- Identifying classes and objects –Key Abstractions and Mechanisms.	09 hrs
Module 3	**METHODOLOGY AND MODELING:** Object Oriented methodologies - Introduction, Survey of some Object oriented methodologies – Rumbaugh, Booch, Jacobson ,Patterns, Frameworks, Unified approach.	09 hrs
Module 4	**UNIFIED MODELING LANGUAGE:** **CLASS DIAGRAM:** Notation- Object diagram, Class interface notation. UML Interaction DIAGRAMS: Sequence Diagrams, Collaboration Diagrams- UML State chart diagram, UML Activity diagram, Implementation diagrams: Component diagram, Deployment diagram	09 hrs
Module 5	**CASE STUDIES:** Object Oriented Analysis process, Object oriented Design process **-** Automatic Teller Machine	09 hrs
Text Books	1. Grady Booch, Robert A.Maksimchuk, Michael. W. Engle, Bobbi J. Young, JIM Conallen, Kelli A. Houston "Object Oriented Analysis and Design with Applications", Pearson Education Inc., USA, 2010 2. Ali Bahrami, "Object Oriented System Development", McGraw Hill International Edition, Singapore, 2008.	

Reference Books	1. Rumbaugh J, Blaha M, Premerlani W, Eddy F and Lorensen W, "Object Oriented Modeling and Design", Prentice Hall of India/ Pearson Education, New Delhi, 2004. 2. Kendall Scott, martin Fowler, "UML Distiled : A brief guide to the standard Object modeling Language ", Addison Wesley, USA, 2009 3. Atul Kahate, " Objetct Oriented Analysis and Design ", Tata McGraw-Hill , New Delhi 2007. 4. Sudha Sadasivam G., " Object-Oriented Analysis and Design", Macmillian India, New Delhi, 2009.

Course code: **16CA208**	**ADVANCED WEB PROGRAMMING**	L	T	P	C
		04	--	--	04

Course Objectives	This course aims to • Describe several tools and/or techniques involved in developing professional level Web sites. • Compare and contrast those tools and/or techniques while analyzing their appropriateness for solving specific problems.
Course outcomes	At the end of the course student will be able • Demonstrate an understanding of the basic principles of the programming process. • Demonstrate an understanding of the web and related delivery systems.

Module 1	**Internet Security & HTML:** Overview of internet security, access security, transaction security, security zones, digital IDS, sending / receiving signed & encrypted emails. Introduction to firewalls.	09 hrs
Module 2	**ADVANCE HTML:** Working with images, links and lists, creating tables. working with frames, creating horizontal, vertical frames, named frames, opening new browser window, creating html forms, Adding controls on forms, submitting data from forms, working with multimedia, multimedia sound, video, 3D,Using multimedia files, inline sound and videos. Style sheets: types, creating and, using style sheets.	09 hrs
Module 3	**CSS & Java script & XML:** introduction to client and server side scripting, introduction to Cascading Style sheet, selectors and there properties, where to include CSS in HTML. Introduction to Java script, data types, operators, conditional statement, loops in Java script, functions, arrays, objects and elements in Java script, form validation using Java script.	09 hrs
Module 4	**XML:** Introduction to XML, Creating XML documents, specifying attributes in DTDs, accessing XML data with XML Data Island, documents. Handling events while loading XML documents.	09 hrs
Module 5	**E-Commerce:** Introduction to E-Business, Electronic Fund Transfer (EFT), Value chain, internet Business strategy, Functional Architecture, implementation Strategies; Building Blocks of E-commerce, System design, creating and managing content etc.; Payment systems; Auxiliary system; transaction Processing; Building e-commerce system, system architecture, secure links etc.; Present and future Trend; Impact of ecommerce; A case	09 hrs

	Study on development of e-commerce system.	
Text Books	1. Bayross, Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Pen CGI, BPB Publications, 2000 2. J. Jaworski, Mastering Javascript, BPB Publications, 1999	
Reference Books	1. T. A. Powell, Complete Reference HTML (Third Edition), TMH, 2002 2. G.Buczek, ASP.NET Developers Guide, TMH, 2002	

Course Code: **16CA209**	**DATABASE SYSTEMS**	**L**	**T**	**P**	**C**
		03	02	--	04
Course objectives	To learn the fundamentals and issues in database systems • To appreciate the design of databases using relational models • To learn data definition and query languages • To understand the importance of transaction management in databases • To emphasize the need for sorting and indexing in databases • To learn advanced representations of databases suited for real-time applications				
Course outcomes	To classify modern and futuristic database applications based on size and complexity • To design a database from understanding an Universe of Discourse, using ER diagrams • To be able to map ER model with Relational model • To write queries using normalization criteria • To create a physical database from a design using DDL • To compare and contrast various indexing strategies in different database systems • To critique how advanced databases differ from traditional databases.				

Module 1	**Introduction:** Data, Database, Database management system, Characteristics of the database approach, Role of Database administrators, Role of Database Designers, End Users, Advantages of Using a DBMS and When not to use a DBMS.	09 Hrs
Module 2	**DBMS Architecture:** Data Models – Categories of data models, Schemas, Instances, and Database state. DBMS Architecture and Data Independence – The Three schema architecture, Data independence. DBMS Languages and Interfaces. Classifications of Database Management Systems.	09 Hrs
Module 3	**Data Modelling Using Entity -** Relationship Model: Using High Level Conceptual Data Models for Database Design, Example Database applications. Entity types, Entity Sets, Attributes and Keys. Relationships, Relationship types, Roles and Structural constraints. Weak Entity Types and Drawing E- R Diagrams.	09 Hrs

Module 4	**Index Structures for Files:** Single Level Ordered Indexes – Primary indexes, clustering indexes and Secondary indexes. Multi-level indexes, Dynamic Multilevel indexes using B-trees (Introductory concepts). Hashing concepts.	09 Hrs
Module 5	**Relational Data Model**: Relation, Integrity constraints - domain, entity and Referential integrity constraints, Basic Relational Algebra operations, select, project and join operations. Functional dependencies and Normalization for Relational Databases, Normalization concepts, first, second, third normal forms, Boyce-Codd normal form. **SQL:** Queries, sub queries, correlated sub query, views, updation of a database through views, Update, Delete.	09 Hr
Text Books	1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Sixth Edition, Tata McGraw Hill, 2010 2. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems",Sixth Edition, Pearson / Addision wesley, 2010.	
Reference Books	1. O`neil Patric & O`neil Elizabeth, Database Principles, Programming and Performance, 2nd Edition, Margon Kaufmann Publishers Inc. 2. Bipin Desai, "An Introduction to database systems", Galgotia Publications, 1991.	

Course code: **16CA210**	**SOFTWARE TESTING**	L	T	P	C
		03	--	02	04
Course Objectives	The objective of the course is to make students aware of the importance of the software testing during software development. • Understand the theoretical aspects of software testing • To study traditional static and dynamic analyses, such as data-flow, slicing, and profiling, along with promising techniques such as model checking and abstract interpretation				
Course outcomes	• Develop the test plan and execute that plan to detect the defects in the software. • Apply the testing metrics to evaluate the test results. • Implement many real time applications with various software testing tools.				

Module 1	**Introduction to Software Quality Engineering** Software Quality -Software Quality Assurance -Reviews, Inspections and Walkthroughs.	09 hrs
Module 2	**Introduction to Testing** Guiding Principles of testing – Composition of a testing team – Essential Skills of a tester – Types of Testing – Evaluating the quality of test cases – Techniques for reducing number of test cases-Requirements for effective testing – Test Oracle – Economics of testing – Handling Defects.	09 hrs
Module 3	**White Box (Structural) Testing:**	09 hrs

	Introduction to control paths – Control flow Testing – Basis Path testing – Linear Code Sequence and Jump Coverage – Looping testing – Data Flow Testing – Slice-based Testing – Pitfalls of White box testing – Tools for White box testing.	
Module 4	**Integration Testing :** Types of integration testing – Functional Testing – Non- Functional Testing – Acceptance Testing- Regression Testing.	09 hrs
Module 5	**TEST Management:** Activities in test management – Evaluation of test Effectiveness – Release management – Tools in test management. Cloud Testing – Test Automation.	09 hrs
Text Books	1. Anirban Basu , "Software Quality Assurance, Testing and Metrics ", PHI.	

Course code: **16CA221**	**SYSTEM ADMINISTRATION**	L	T	P	C
		02	02	02	04
Course Objectives	• This course focuses on administration of operating systems in a client-server technology. • Installation and maintenance. It prepares students to installation of Windows Server; NTFS file system and folder permissions, Domain Name System, Active Directory, local and domain Group Policy, Windows Terminal Services. • Internet Security and Acceleration Server, Internet Information Services, communications and networking.				
Course outcomes	By the end of the course students will have a basic knowledge about the installation and configuration of the server operating systems.				

Module 1	**INTRODUCTION TO SYSTEM ADMINISTRATION** Why System Administration is required in our system? Role and responsibilities of System Administrator. Basics and background of Windows and Unix/Linux OS. Basic Info and Account Management. File and directory layout. File Systems (NTFS, FAT, UFS). File permissions. ACL.	09 hrs
Module 2	**INSTALLATION AND WORKING OF THE OPERATING SYSTEM**: Basic DOS/Windows/Unix commands and tools. Command Line vs. GUI. Start up (booting) and Shutdown. Task Manager. More Account Management. System Processes. Scheduling jobs (scheduler/cron), job monitoring. (event viewer/ps), start and stop jobs. At command vs. Scheduled Tasks GUI tool.	09 hrs
Module 3	**DISK ADMINISTRATION** Disk administration - File systems/partitions. Disk Defragmentation. RAID. Basic client/server file sharing. Files, Directories and Memory Management. Permissions.	09 hrs

Module 4	**NETWORKING** TCP/IP, DNS, DHCP, Domains/NIS. File Sharing. Client/Server. NFS. NetBeui. PDC/BDC. Active Directory. Setting up a file server (and client/server network).Ethernet Addresses, Hostnames. Automating System Admin Tasks. Scripts. Regedit.(shell, perl and C) Performance Monitoring and Optimization.	09 hrs
Module 5	**SECURITY AND BACKUPS** Patches, passwords, kerberos, enigma... Tools (tcpwrappers and others). Backup methods. Other Advanced Topics (depending upon time), printing, Installing / upgrading hardware/software/O.S. email server, web server, dns/dhcp server, telnet/ftp/ssh , unix-windows interoperability (samba), user communications and documentation problems resolution and solutions, raid, san, nas	09 hrs
Text Books	1. Hassell J., Learning Windows Server 2003, O'Reilly Media, 2004. 2. Hassell J., Windows Server 2008: the definitive guide, O'Reilly Media, 2008.	
Reference Books	1. von Hagen W., Ubuntu Linux Bible: Featuring Ubuntu 10.04 LTS, John Wiley & Sons, 2010.	

Course code: **16CA222**	**USER INTERFACE DESIGN**	L	T	P	C
		02	02	02	04
Course Objectives	The objective of the course is to make students aware of the importance of the user interface design				
Course outcomes	Successful completion of this course prepares students to • Identify and define key terms related to user interfaces and user interface design and implementation • Identify and describe various types of computer users and computer use contexts • Identify and describe various types of user interfaces • Describe and explain the user interface design process				

Module 1	**INTRODUCTION** Human–Computer Interface – Characteristics Of Graphics Interface –Direct Manipulation-Graphical System – Web User Interface –Popularity –Characteristic & Principles.	09 hrs
Module 2	**HUMAN COMPUTER INTERACTION** User Interface Design Process – Obstacles –Usability –Human Characteristics In Design – Human Interaction Speed –Business Functions –Requirement Analysis – Direct –Indirect Methods – Basic Business Functions – Design Standards – System Timings –Human Consideration In Screen Design – Structures Of Menus – Functions Of Menus–Contents Of Menu– Formatting – Phrasing The Menu – Selecting Menu Choice–Navigating Menus–	09 hrs

	Graphical Menus.	
Module 3	**WINDOWS** Characteristics– Components– Presentation Styles– Types– Managements–Organizations– Operations– Web Systems– Device– Based Controls Characteristics–Screen – Based Controls – Operate Control – Text Boxes– Selection Control–Combination Control– Custom Control– Presentation Control.	09 hrs
Module 4	**MULTIMEDIA** Text For Web Pages – Effective Feedback– Guidance & Assistance–Internationalization– Accesssibility– Icons– Image– Multimedia – Coloring.	09 hrs
Module 5	**WINDOWS LAYOUT– TEST** Prototypes – Kinds Of Tests – Retest – Information Search – Visualization –Hypermedia – WWW– Software Tools.	09 hrs
Text Books	1. Wilbent. O. Galitz ,"The Essential Guide To User Interface Design", John Wiley&Sons, 2001. 2. Ben Sheiderman, "Design The User Interface", Pearson Education, 1998.	
Reference Books	1. Alan Cooper, "The Essential Of User Interface Design", Wiley – Dream Tech Ltd., 2002.	

Course code: **16CA223**	**ADVANCE OS**	L	T	P	C
		02	02	02	04
Course Objectives	To learn the fundamentals of Operating Systems • To gain knowledge on Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols • To gain insight on to the distributed resource management components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols • To know the components and management aspects of Real time, Mobile operating systems				
Course outcomes	Upon Completion of the course, the students should be able to: • Discuss the various synchronization, scheduling and memory management issues • Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system • Discuss the various resource management techniques for distributed systems • Identify the different features of real time and mobile operating systems • Install and use available open source kernel • Modify existing open source kernels in terms of functionality or features used				

Module 1	**FUNDAMENTALS OF OPERATING SYSTEMS 9** Overview – Synchronization Mechanisms – Processes and Threads - Process Scheduling – Deadlocks: Detection, Prevention and Recovery – Models of Resources – Memory Management Techniques.	09 hrs
Module 2	**DISTRIBUTED OPERATING SYSTEMS 9** Issues in Distributed Operating System – Architecture – Communication Primitives – Lamport's Logical clocks – Causal Ordering of Messages – Distributed Mutual Exclusion Algorithms – Centralized and Distributed Deadlock Detection Algorithms – Agreement Protocols.	09 hrs
Module 3	**DISTRIBUTED RESOURCE MANAGEMENT 9** Distributed File Systems – Design Issues - Distributed Shared Memory – Algorithms for Implementing Distributed Shared memory–Issues in Load Distributing – Scheduling Algorithms – Synchronous and Asynchronous Check Pointing and Recovery – Fault Tolerance – Two-Phase Commit Protocol – Non-blocking Commit Protocol – Security and Protection.	09 hrs
Module 4	**REAL TIME AND MOBILE OPERATING SYSTEMS 9** Basic Model of Real Time Systems - Characteristics- Applications of Real Time Systems – Real Time Task Scheduling - Handling Resource Sharing - Mobile Operating Systems –Micro Kernel Design - Client Server Resource Access – Processes and Threads - Memory Management - File System.	09 hrs
Module 5	**CASE STUDIES 9** Linux System: Design Principles - Kernel Modules - Process Management Scheduling – Memory Management - Input-Output Management - File System - Interprocess Communication. iOS and Android: Architecture and SDK Framework - Media Layer - Services Layer - Core OS Layer – File System.	09 hrs
Text Books	1. Mukesh Singhal and Niranjan G. Shivaratri, "Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems", Tata McGraw-Hill, 2001.	

	2. Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, "Operating System Concepts", Seventh Edition, John Wiley & Sons, 2004. 3. Daniel P Bovet and Marco Cesati, "Understanding the Linux kernel", 3rd edition, O'Reilly, 2005.
Reference Books	1. Rajib Mall, "Real-Time Systems: Theory and Practice", Pearson Education India, 2006. 2. Neil Smyth, "iPhone iOS 4 Development Essentials – Xcode", Fourth Edition, Payload media, 2011.

Course code: **16CA224**	**INTERNET & WEB ARCHITECTURE**	L	T	P	C
		02	02	02	04
Course Objectives	• To understand the client / server programming • To learn CSS to implement a variety of presentation effects using HTML and XML documents • To know the unique features of scripting languages				
Course outcomes	• Upon Completion of the course, the students should be able to: • Create web pages using HTML, JavaScript and CSS • Understand the key technologies of Internet • Distinguish the concepts of Java script and Java servlet • Understand the web service technologies				

Module 1	**Web Essentials** Internet – Web clients – Web servers – Markup languages – XHTML 1.0 – Cascading Style Sheets (CSS): Features- Style rule cascading and inheritance - Text properties –CSS box model.	09 hrs
Module 2	**Client Side Programming** Java script operators - Java script objects – Arrays – Build-in objects - DOM: History and levels- Document tree- DOM event handling- Non compliant browsers.	09 hrs
Module 3	**Server Side Programming** Java servlet: Architecture – Servlet life cycle – Parameter data – Sessions – Cookies – Other servlet capabilities – Data storage –Servlet and concurrency.	09 hrs
Module 4	**JSP Programming** Introduction to Java Server Pages – JSP and servlets – Running JSP applications - Basic JSP – Java beans classes and JSP - Tag libraries and files.	09 hrs
Module 5	**Web Services**	09 hrs

	Web services concepts - Writing java web services – Web services for clients – WSDL – Representing data types:XML schema – Communicating object data: SOAP – SOAP encoding of struct data.	
Text Books	1. Jeffrey C Jackson, Web Technology – A computer Science perspective, Person Education, 2009. 2. Chris Bates, Web Programming – Building Internet Applications, Wiley India, 2006. 3. Gopalan. N.P, Web Technology A Developer Perspectives, PHI, 2010.	
Reference Books	1. Deitel, Deitel and Neito, INTERNET and WORLD WIDE WEB – How to program, Pearson education, 2011.	

Course code: 16CA225	**COMPUTER GRAPHICS AND MULTIMEDIA**	L	T	P	C
		02	02	02	04
Course Objectives	Gain knowledge about graphics hardware devices and software used. • Understand the two dimensional graphics and their transformations. • Understand the three dimensional graphics and their transformations. • Appreciate illumination and color models. • Be familiar with understand clipping techniques.				
Course outcomes	At the end of the course, the student should be able to: • Design and Apply of two dimensional transformations. • Design and Apply of three dimensional transformations. • Apply clipping techniques to graphics. • Design animation sequences.				

Module 1	**OUTPUT PRIMITIVES:** Introduction – Points and Lines – DDA Algorithm – Circle-Generating Algorithms – Ellipse-Generating Algorithms – Parallel Curve Algorithms – Curve Functions – Attributes.	09 hrs
Module 2	**TWO-DIMENSIONAL GEOMETRIC TRANSFORMATIONS & VIEWING:** Basic Transformation – Matrix Representations – Composite Transformation – Other Transformations – Affine Transformation – The viewing Pipeline – Clipping Operation – Point Clipping – Line Clipping – Polygon Clipping – Curve Clipping – Text Clipping – Exterior Clipping	09 hrs
Module 3	**INTRODUCTION:** Introduction – Multimedia applications – Multimedia System Architecture – Evolving technologies for Multimedia – Defining objects for Multimedia systems **–** Multimedia Data interface standards – Multimedia Databases.	09 hrs

	MULTIMEDIA COMPRESSION : Types of Compression – Binary Image Compression Schemes – Color, Gray Scale, And Still-video Image compression – Video Image Compression – Audio Compression .	
Module 4	**MULTIMEDIA DATA & FILE FORMAT STANDARDS:** Rich-Text Format – TIFF - RIFF – MIDI – JPEG – AVI – MPEG- TWAIN- Multimedia I/O technologies - Digital voice and audio – Video image and animation – Full motion video – Storage and retrieval Technologies. **MULTIMEDIA AUTHORING, USER INTERFACE & HYPERMEDIA:** Multimedia Authoring Systems – Hypermedia Application Design Consideration – User Interface Design - Hypermedia messaging - Mobile Messaging – Hypermedia message component – Creating Hypermedia message – Integrated multimedia message standards – Integrated Document management	09 hrs
Module 5	**COLOR MODELS & COMPUTER ANIMATION:** Properties of Light – Standard Primaries – Intuitive Color Concepts – Color models – Color Selection and Application – Computer Animation: Design of Animation Sequences – Raster Animation – Key-Frame Systems Morphing – Motion Specifications – Virtual Reality case study.	09 hrs
Text Books	1. Donald Hearn and Pauline Baker M, “Computer Graphics C Version”, Pearson Education, New Delhi, 2003. 2. Foley, Vandam, Feiner and Huges, “Computer Graphics: Principles & Practice”, Pearson Education, Asia, 2003.	
Reference Books	1. Prabat K Andleigh and Kiran Thakrar, “Multimedia Systems Design”, Prentice Hall of India, New Delhi 2003. 2. Judith Jeffcoate, “Multimedia in practice technology and Applications”, Prentice Hall of India, New Delhi, 2009.	