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Program:	B. Tech. (Information Technology)				Semester :	VIII
Course :	System Administration				Code : BTIT08001	
Teaching Scheme					**Evaluation Scheme**	
Lecture Hours per week	**Practical Hours per week**	**Tutorial Hours per week**	**Credit**	**Theory**	**Internal Continuous Assessment (ICA) As per Institute Norms (50 Marks)**	
1	2	0	2	-	Scaled to 50 marks	

Pre-requisite: Operating Systems (BTIT04004), Computer Networks(BTIT05005)

Objectives: Objective of this course is to provide the knowledge and hands-on skills necessary for system administration. Students will understand basic principles of System administration.

Outcomes:

- Demonstrate various System admin tasks.
- Configure various application servers.
- Secure Linux system.

Detailed Syllabus:

Unit	Description	Duration
1.	**Introduction to System Administration:** Thinking About System Administration, Becoming super user, Communicating with users, principles of system administration	1
2.	**Process Management:** Understanding processes, process priorities, background jobs	1
3.	**Disk Management:** Understanding disk devices, disk partitioning, file systems, mounting, troubleshooting tools, uuid's and logical volume management.	1
4.	**System Management: B**ooting process, boot loaders, init and runlevels, job scheduling, logging, memory management, resource monitoring, package management.	3
5.	**User Management:** becoming super user, creation of user and group, deletion of user and group , user password management, user profiles	2
6.	**Network management:** configuring network interface, network sniffing, troubleshooting network problems, ssh client and server configuration**,** ConfiguringDNS, DHCP, apache web server and squid	4
7.	**Security:** Standard file permissions, SUID, SGID, Sticky bit, ACL, file links, iptables	2

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8.	**Backup and Restore:** Planning for Disasters and Everyday needs, Backing Up Files and FileSystems, Restoring Files from Backups, Making Table of Contents Files	1
	Total	**15**

Text Book:
1. Evi Nemeth, et. al "UNIX and Linux System Administration Handbook", 4/e, Pearson Education, 2011

Reference Books:
1. Thomas A. Limoncelli, "The Practice of System and Network Administration", 2nd Ed. Pearson Education, 2007
2. Ellen Frisch, "Essential System Administration: Tools and Techniques for Linux and Unix Administration", O'Reilly Media, 3rd Edition, 2002
3. Mark Burgess," Principles of Network and System Administration", 2nd Ed. Wiley India, 2013

Term Work:
As per Department and Institute ICA Norms.

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Program:	B. Tech. (Information Technology)				**Semester :** VIII	
Course :	Service Oriented Architecture				**Code :** BTIT08011	
Teaching Scheme					**Evaluation Scheme**	
Lecture Hours per week	**Practical Hours per week**	**Tutorial Hours per week**	**Credit**		**Theory (3 Hrs, 70 Marks)**	**Internal Continuous Assessment (ICA) As per Institute Norms (50 Marks)**
3	2	0	4		Scaled to 70 marks	Scaled to30 marks

Pre-requisite: Computer Programming-II (BTAB02006), Programming Workshop (BTIT03006), Web Programming (BTIT04005).

Objectives:
- To provide a thorough introduction to "Service Oriented Architecture" (SOA), which refers to a design pattern made up of components and interconnections that stress interoperability and location transparency.
- It covers both the design of SOA systems as well as practical hands-on programming of a distributed Web Service based system and how it is succeeding, traditional distributed architecture on a global scale.
- Making students understand as to why SOA is the next phase in the evolution of business automation and how past technical disparities of client-server environment, distributed solutions are blanketed by layers of abstraction of global accepted standard for representing logic and information.
- Service-orientation establishes a universal model in which automation logic and business logic conform, the model equally to a task, a solution, an enterprise, a community and resources are cleanly partitioned and consistently represented.

Outcomes: Students would be able to :
1. Apply knowledge of Client-Server and distributed architectures, RPC Protocol.
2. Design and conduct experiments on Web Services by embedding distributed components, using Java API's & REST technology.
3. Understand all elements of SOA infrastructure and Web Services.
4. Implement the techniques, skills, through modern engineering tools like Java Platform/ Dot Net/ Apache Axis necessary for developing effective Web Service solutions.

Detailed Syllabus:

Unit	Description	Duration
1	**SOA Fundamentals :** Defining SOA, Business Value of SOA, Evolution of SOA, SOA characteristics, concept of a service in SOA, misperceptions about SOA, Basic SOA architecture, infrastructure services, Enterprise Service Bus (ESB), SOA Enterprise Software models. Web Services and Primitive SOA, SOA Platforms.	5
2	**SOA and WS:** WS framework, Services, Descriptions, Messaging, Coordination,	5

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	Orchestration, and Choreography, Advanced Messaging, Metadata, and Security.	
3	**SOA and Service Orientation:** Principles of Service Orientation, Service Layer.	5
4	**SOA Planning and Analysis:** SOA delivery lifecycle phases, SOA Delivery Strategies, service-oriented analysis, Determining non-functional requirements (e.g., technical constraints, business constraints, runtime qualities, and non-runtime qualities), benefits of business-centric SOA, Service modelling, basicmodelling blocks.	10
5	**SOA Design and Implementation:** Introduction, XML schema, WSDL language basic, SOAP language basic, Steps to composing SOA, UDDI, WS-Policy, WS-Addressing, WS-BPEL language basic, Design overview, process description, application service design, service design guidelines, WS-Security.	10
6	**Managing SOA Environment:** Distributing service management and monitoring concepts, operational management challenges, Service-level agreement considerations, SOA governance.	5
7	**Contemporary Issues related to SOA**	5
	Total	45

Text Books:
1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2007.
2. Norbert Bieberstein, Sanjay Bose, Marc Fiammante, Keith Jones, Rawn Shah, "Service-Oriented Architecture Compass: Business Value, Planning, and Enterprise Roadmap", IBM Press Publication, 2005.

Reference Books:
1. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
2. B.M. Harwani, "Practical Web Services for Beginners", Shroff Publications, 2009.
3. SanjivaWeerawarana, Francisco Curbera, Frank Leymann, Donald F.Ferguson, "Web Services Platform Architecture", Prentice Hall Publication, 2005.
4. Thomas Erl, "SOA Principles of Service Design", 1/e, Pearson Education, 2008.
5. Matjaz B. Juric, Benny Mathew, Poornachandra G. Sarang,"Business Process Execution Language for Web Services", Packt Publishing Ltd., 2006.

Term Work: As per Department and Institute norms for termwork.

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Program:	B. Tech. (Information Technology)				Semester : VIII	
Course :	Electronic Commerce				Code : BTIT08003	
Teaching Scheme					**Evaluation Scheme**	
Lecture Hours per week	Practical Hours per week	Tutorial Hours per week	Credit	Theory (3 Hrs, 70 Marks)	Internal Continuous Assessment (ICA) As per Institute Norms (50 Marks)	
2	2	0	3	Scaled to 70 marks	Scaled to30 marks	

Pre-requisite: Computer Networks (BTIT05005), Information Security (BTIT07003), Web Programming (BTIT04005).

Objectives:

• The objectives of the course are to introduce the critical concepts of electronic commerce from both managerial and technological perspectives. It is expected that this course provide you understanding of how electronic commerce is affecting business enterprises, governments, consumers and people in general and help you build up your knowledge and skills on leading an organization to the road to success in the digital future.

• The students will learn the difference between various ecommerce classifications like C2C, B2B, B2C, E-business vs E-commerce, value chains of various businesses, trade cycles, SWOT analysis. They would know the legal issues & security issues with respect to online business.

• Understanding of separation of businesses with respect to various ecommerce types like Electronic market, internet commerce & EDI.

• They would practically understand the working of catalog, payment, security aspects of online ecommerce sites.

Outcomes :

1. Analyze and interpret data of various scenarios based on understanding of ecommerce concepts.
2. Understand selling and marketing strategies involved in e-commerce and to create an effective business presence on the web.
3. Understand the need to engage in continuing professional development by extending the knowledge of various components (legal & ethical issues, payment, security) & types of e-commerce to applying it on new trends like Social networking and online business activities, M-Commerce, L-Commerce etc.
4. Use modern engineering tools for incorporating catalog management, payment & security module necessary for developing effective web applications and knowledge of client-side & server-side technology to build e-commerce sites.
5. Function effectively on teams to create an online project on any one type of e-business.

Detailed Syllabus:

	Description	Duration

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1	**Introduction & Concepts:** Evolution of E-Commerce, Business models, Revenue models and Business processes; Electronic markets, EDI; Porter's value chain model, Industry value chain; SWOT analysis; Advantage and Disadvantage of E-commerce; Economic forces; Identifying E-Commerce opportunities; International nature of E-Commerce;	6
2	**Social Network, M-Commerce and L-Commerce:** Social networking and online business activities; M-Commerce – Growth, overview; Benefits and Drivers; Applications; Mobile computing infrastructure; Inhibiters and barriers of M-Commerce; L-Commerce – Overview, Technology; Issues and challenges involved in L-Commerce	5
3	**Legal & Ethical Issues:** Legal issues, Borders &Jurisdction; Protection of Intellectual Property in online business; Taxation; Online crimes, terrorism and warfare; Ethical issues Introduction to IT laws specific to E-commerce and M-commerce across the globe.	3
4	**Selling and Marketing on the Web:** Understanding how to create an effective Web presence, Website usability for E-Commerce sites, Connecting with customers; Personalisation aspects for customers; Web marketing and advertising strategies for E-commerce sites, Introduction to Creating and maintaining brands on the web, Introduction to Search engine positioning and domain names.	5
5	**E-Commerce Software:** Basic functions; catalog display; shopping cart; Advanced functions; Software for small, mid-size & Large businesses.	3
6	**E-Commerce Security:** online security issues, security for client, communication channel and server computers; Organizations that promote computer security.	3
7	**E-Commerce Payment System:** Online payment basics; payment cards, electronic cash, electronic wallets, stored-value cards; Internet technology and banking industry.	3
8	**Planning E-Commerce:** Identifying benefits and estimating costs of e-commerce initiatives; Strategies for developing e-commerce websites; Managing e-commerce implementations	2
	Total	30

Text Books:
1. Gary P. Schneider, "Electronic Commerce", 9th Edition, Cengage Learning,

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2010.
2. Gary P. Schneider, "E-Commerce : Strategy, Technology and Implementation", 1st Edition, Cengage Learning, 2007.
Reference Books:
1. Dave Chaffey, "E-Business and E-Commerce Management", Pearson, Third Edition, 2009.
2. E. Turban, Dave King, Jay Kyu Lee, Dennis Viehland."Electronic Commerce, A Managerial Perspective 2006", 6th Edition, Prentice Hall, 2006.
3. BrahmCanzer, "e-Business Theory and Practice", 1st Edition, Cengage Learning, 2011.
Term Work:
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Program: B. Tech. (Information Technology)				Semester: VIII	
Course : Business Visualization				Code: BTIT08012	
Teaching Scheme				Evaluation Scheme	
Lecture Hours per week	Practical Hours per week	Tutorial Hours per week	Credits	Theory	Internal Continuous Assessment (ICA) As per Institute Norms(50 Marks)
2	-	-	2	-	Scaled to 50 marks
Prerequisite: Basic Computer Knowledge					
Objectives: To explore data and build reports using Visual Analytics					
Course Outcomes: After successful completion of this course students will be able to, 1. Understand the various visualizations available to represent data 2. Analyze data and create effective visualizations from data given 3. Create concise and presentable reports from available data					
Detailed Syllabus					

Unit	Topics	Duration(Hr)
1.	**Getting Started with Visual Analytics :** exploring Visual Analytics concepts, using the Visual Analytics ,discussing the course environment and scenario	02
2.	**Administering the Environment and Managing Data :** Data building and exploration, Data Administration	06
3.	**Using the Visual Analytics Explorer :** examining the Visual Analytics Explorations, selecting data and defining data item properties, creating visualizations, enhancing visualizations with advanced analytics	08
4.	**Designing Reports with Visual Analytics :** examining the Visual Analytics Designer , creating a simple report, working with graphs, working with filters and report sections, establishing interactions, working with gauges, working with tables, working with other objects	08
5.	**Viewing Visual Analytics Reports :** viewing reports on the Web, viewing reports on a mobile device	02
6.	**Case Study: Creating Analyses and Reports with Visual Analytics**	04
	Total	30

Text Books:
1. The research and development agenda for visual analytics by James J. Thomas, Kristen A. Cook -2013

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Reference Books: *Visual Analytics : User Guide*
Term work: Case Studies / Assignments / Class Test/Presentation/Project

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Program:	B. Tech. (Information Technology)		Semester :	VIII
Course :	Project - II		Code :	BTIT08004
Teaching Scheme			**Evaluation Scheme**	
Lecture Hours per week	**Practical Hours per week**	**Tutorial Hours per week**	**Credit**	**Theory**	**Internal Continuous Assessment (ICA) As per Institute Norms (200 Marks)**
-	12	-	6	-	Scaled to 200 marks

Pre-requisite: Project -I (BTIT07004)

Objectives:

- The Objective of the Project is to make the student understand the entire software project lifecycle of literature survey, feasibility study, design, analysis, coding, testing and deployment.
- To provide students with the opportunity to synthesize the knowledge and skills acquired from their courses.
- To encourage a multidisciplinary approach through the integration of material learned in a number of courses.
- To allow students to develop problem solving, analysis, synthesis, evaluation and design skills.
- To encourage teamwork.
- To improve student's communication skills.

Outcomes :

Students will be able to :

- Work effectively in a team.
- Understand Problem Definition, Scope and evaluate Feasibility.
- Apply the Design Principles to architect a solution for the problem identified.
- Analyze different solutions and select optimum solution.
- Select the appropriate technology for implementation.
- Perform independent learning of new technologies and concepts in order to complete the project.
- Address a contemporary issue that is either centrally related to computing or represents an innovative application of computing.
- Develop their oral & written communication skills by way of providing presentations and report throughout the course.
- Research, select, and learn the necessary tools and techniques that are needed to complete the project.

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Contents :

Project - Phase2 Activities to be done:

1. The second phase of the project will involve design, analysis, coding, implementation, testing and deployment of the System.

2. Student is required to submit a 1-page weekly report on the work done to the mentor. There would continuous evaluation based on the weekly report submitted.

3. Report primarily containing the entire Project Life Cycle beginning from Literature Survey, Feasibility Study, Design, Analysis, Coding, Testing, and Deployment is to be submitted at the end of the Semester. (Hard Bound Report (Golden Embossing))

Term Work:

As per Department and Institute norms for termwork.

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**SVKM's NarseeMonjee Institute of Management Studies
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Program:	B. Tech. (Information Technology)		Semester :	VIII
Course :	Robotics (Elective – II)		Code :	BTIT08005
Teaching Scheme			**Evaluation Scheme**	
Lecture Hours per week	Practical Hours per week	Tutorial Hours per week	Credit	Theory (3 Hrs, 70 Marks)	Internal Continuous Assessment (ICA) As per Institute Norms (50 Marks)
3	2	1	4.5	Scaled to 70 marks	Scaled to 30 marks

Pre-requisite: Image Processing (**Error! Reference source not found.**)

Objectives:
- To provide knowledge to students with the concepts and techniques in robotics.
- To expose students to evaluate, choose and incorporate robots in engineering systems and programming of robots.
- To understand and analyse the various applications of robots.

Outcomes:
1. Understanding the basics of Robotics.
2. Apply the knowledge of vector mathematics and geometry for kinematics (Direct and Inverse) motion.
3. Perform Trajectory planning and workspace Analysis for robots.
4. Use Image representation for robotic environment.
5. Robot Control Problem formulation due to moment of Inertia.

Detailed Syllabus:

Unit	Description	Duration
1.	**Robotic Manipulation & Introduction to Robots:** Introduction, types of automation, automation and robots, history of robotics, definition of robotics, AI & Robotics, definition of robot, robot manipulators / Arms, robot motion, representation of robot, robot anatomy, robot programming, classification of robots: Based on drive technology, based on work space envelope, based on motion control, specification, Application, advantages, disadvantages of robots.	4
2.	**Direct Kinematics:** Introduction to Kinematics, Types of kinematics, Coordinate frame, Rotations, Homogeneous Coordinates: HCTM, Inverse HCTM , composite HCTM, Screw transformations, kinematics parameters, Tool / Hand Coordinate frame, Denavit-Hartenberg Representation, Arm matrix, Direct kinematics analysis of 2 axis, 3 axis, 4 axis, 5 axis, 6 axis robots.	6

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3.	**Inverse Arm Kinematics:** Introduction, Inverse kinematics problem, Solutions to inverse Kinematics problems, relation between direct and inverse kinematics, Tool configuration vector [TCV] of 5 axis articulated Robot, TCV of 4 axis SCARA Robot. Inverse kinematics analysis of 2,3,4,5,6 axis Robots	**5**
4.	**Work Space analysis of Robots:** Introduction to work space analysis, Robot work space envelopes, work space analysis of 5 axis Robot and 4 axis Robot, Work space fixtures : Part feeders, conveyors and Carousels, Fixed tools	**5**
5.	**Trajectory planning of Robots :**Introduction, path & trajectory, Types of Robot motions: Pick & place motion, Continuous path motion, Continuous path control of 5 axis & 4 axis Robot, Interpolated Motions, Straight line motions : cubical polynomial, linear interpolation, Knot point deviation, straight line motion, Bounded deviation Algorithm.	**5**
6.	**Differential Motion &Statics :** Introduction: Tool configuration matrix, Manipulator Jacobian Matrix, Tool configuration Jacobian Matrix of 5 axis, 4 axis, 3 axis Robots. Joint space singularities, Generalized inverse, Pseudo Inverses : Resolved Motion rate control using Pseudo Inverses abd Resolved Motion rate control of a SCARA Robot. Manipulator Jacobian Matrix, Induced Joint Torques and forces.	**6**
7.	**Robot Vision :**Introduction, Image representation and analysis, Template matching, Polyhedral Objects: Edge detection, Corner point detection, Run length encoding, Shape Analysis : Line descriptors, Area Descriptors, Segmentation : Thresholding, Region labeling ,Iterative processing: Shrink operator, swell operators, Euler number, Perspective transformation, camera calibration, Structured illumination.	**5**
8.	**Robot Task Planning :**Introduction, task planners, Task level programming, Uncertainty, Configuration space: translations. Rotations, Cross motion planning Generalized Voronoi Diagram [GVD],Complex GVD, Grasp planning, Fine motion planning ,simulation of planner motion, polygon penetration. A task planning simulation problem.	**5**
9.	**Moments of Inertia & Introduction to NC & CNC Machines :** Introduction to moments of inertia, Its types, Moments of inertia	**4**

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	of Area and Mass, Robot control problem due to Moments of Inertia , Numerically controlled machines : Definition, Constructional features, Types of NC machines, Applications / Advantages, Computer numerically controlled machines : Definition, Types, Applications, Advantages	
	Total	**45**

Text Books:

1. Groover M P , "Industrial Robotics", Pearson Education, 2008
2. Fu K S, "Robotics", Mc-Graw Hill, 2008

Reference Books:

1. CSP Rao and V.V. Reddy, "Robotics", Pearson Publications, 2008
2. Mittal R K &Nagrath I J, "Robotics and Control", TMH, 2007
3. P. Coiffet and M. Chaironze , "An Introduction to Robot Technology", Kogam Page Ltd. 1983 London.
4. Richard D. Klafter, "Robotic Engineering", Prentice Hall, 1989
5. Asada and Slow time, "Robot Analysis and Intelligence", Wiley Inter-Science, 2000
6. John J Craig, "Introduction to Robotics", Pearson Education, 2004
7. Mark W. Spong and M. Vidyasagar, "Robot Dynamics and Control", John Wiley & Sons, 1989

Term Work:

As per Department and Institute norms for termwork.

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Program:	B. Tech. (Information Technology)			Semester : VIII	
Course :	High Speed Networking Architecture and Protocols (Elective – II)			Code : BTIT08006	
Teaching Scheme				**Evaluation Scheme**	
Lecture Hours per week	**Practical Hours per week**	**Tutorial Hours per week**	**Credit**	**Theory (3 Hrs, 70 Marks)**	**Internal Continuous Assessment (ICA) As per Institute Norms (50 Marks)**
3	2	1	4.5	Scaled to 70 marks	Scaled to 30 marks

Pre-requisite: Computer Networks (BTIT05005), Advance Computer Networks (BTIT06004)

Objectives:
- To enable the students to understand the need to carry large volumes of traffic with different QoS requirements over networks operating at very high data rates
- To provides a comprehensive, integrated and up-to-date survey of the key issues of high speed TCP/IP networks
- To understand and analyze the design issues for high-speed networks like ATM, Frame Relay, High Speed LAN's

Outcomes: Students will be able to :
- Identify the network issues for High speed networks and analyze them.
- Understand the architecture and working of Frame relay, ATM, MPLS and optical networks.
- Describe QoS architectures for Internet
- Explain congestion control, traffic control and QoS objectives and apply them to real life problems
- Describe various switch designs

Detailed Syllabus:

Unit	Description	Duration
1.	**Network services and layered architectures:** Application, Traffic characterization and QoS, Network Services, High performance network, layered architecture, Network architectures , Network bottleneck	**2**
2.	**Frame Relay** architecture and layers, extended address, FRADs, VOFR, LMI	**3**
3.	**Asynchronous transfer mode** - ATM Protocol Architecture, ATM logical Connection, ATM Cell - ATM Service Categories - AAL.	**4**
4.	**High Speed LANs:** Fast Ethernet, Gigabit Ethernet,	**4**

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	FiberChannel, Wireless LANs: applications, requirements - Architecture of 802.11, FDDI, DQDB	
5.	**CONGESTION AND TRAFFIC MANAGEMENT:** Queuing Analysis- Queuing Models - Single Server Queues - Effects of Congestion - Congestion Control - Traffic Management - Congestion Control in Packet Switching Networks - Frame Relay Congestion Control.	4
6.	**TCP AND ATM CONGESTION CONTROL:** TCP Flow control - TCP Congestion Control - Retransmission - Timer Management - Exponential RTO backoff - KARN's Algorithm - Window management - Performance of TCP over ATM. Traffic and Congestion control in ATM - Requirements - Attributes - Traffic Management Frame work, Traffic Control - ABR traffic Management - ABR rate control, RM cell formats, ABR Capacity allocations - GFR traffic management.	5
7.	**INTEGRATED AND DIFFERENTIATED SERVICES:** Integrated Services Architecture - Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ - Random Early Detection, Differentiated Services	5
8.	**PROTOCOLS FOR QoS SUPPORT:** RSVP - Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms - Multiprotocol Label Switching - Operations, Label Stacking, Protocol details - RTP - Protocol Architecture, Data Transfer Protocol, RTCP.	5
9.	**Optical network:** optical links, WDM systems, optical cross connect, optical LAN's , Optical paths and networks	4
10.	**Switching:** Switch Performance measures, time and space division switching, modular switch design, Distributed buffer, shared buffer, input buffer, output buffer.	5
11.	**MPLS and VPN:** MPLS architecture, modes of operation, MPLS based VPN architecture and operations	4
	Total	45

Text Books:

1. William Stallings, "High-Speed networks and Internets Performance and Quality of Service", 2nd Edition, Pearson Education, 2002
2. Warland& Pravin Varaiya, "High Performance Communication

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Networks", 2ⁿᵈ Ed., Morgan Kaufmann Publishers,2009
Reference Books: 1. Mahbub Hassan and Raj Jain, "High Performance TCP/IP Networking", 1ˢᵗ Ed., PHI, 2009 2. SumitKasera, "ATM Networks : Concepts and Protocols", 2/e. Tata McGraw-Hill,2005 3. Behrouz Forouzan, "Data Communication and Networking", 4/e, Tata McGraw-Hill,2006. 4. Ivan Pepelnjak, Jim Guichard, "MPLS and VPN architectures", Cisco Press, 2012 5. Ivan Pepelnjak, "MPLS and VPN architectures", Volume II, Pearson Education, 2007
Term Work: As per Department and Institute norms for termwork.

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Program:	B. Tech. (Information Technology)			Semester :VIII	
Course :	Information Security Assurance and Forensics (Elective-II)			Code :BTIT08007	
Teaching Scheme				**Evaluation Scheme**	
Lecture Hours per week	**Practical Hours per week**	**Tutorial Hours per week**	**Credit**	**Theory (3 Hrs, 70 Marks)**	**Internal Continuous Assessment (ICA) As per Institute Norms (50 Marks)**
3	2	1	4.5	Scaled to 70 marks	Scaled to30 marks
Pre-requisite: Advance Computer Networks (BTIT06004), Web Programming (BTIT04005), Information Security (BTIT07003)					
Objectives: The main objective of this course to understand various hacker's techniques and tools used for penetration testing. Other objective is to learn to respond to incident and understand cyber forensics.					
Outcomes: After successfully completion of this course, students should be able to - Recognize ethical, legal and professional issues related to Hacking - Demonstrate hacking in lab environment - Perform forensic operations on a given media - Analyse Window registry email header and internet activity. - Understand incident response					

Detailed Syllabus:

Unit	Description	Duration
1.	Introduction, Ethics of hacking, hacking process, types of hackers, types of pen testing, pen testing process	02
2.	Foot printing, Scanning and Enumeration, Sniffers, Encryption and password cracking, Spoofing, Session Hijacking, DoS, Buffer Overflows, Malware	10
3.	Mail Vulnerabilities, Web Application Vulnerabilities, Windows and Linux Vulnerabilities	08
4.	Overview of computer forensics, types of cybercrime. The forensics process, disk imaging, forensics tools, Hardware and OS fundamentals, Disk geometry, partitions, Windows and Linux file systems	06
5.	Formal Forensic Approaches: DoD Forensic standard, DFRWS framework, An event based digital forensics investigation framework	02
6.	**Data hiding techniques**: Deleted file recovery, recycle bin, alternate data streams, cryptography, steganography, anti-	04

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	forensics tools	
7.	**Investigative Techniques**: Windows registry files, Email analysis, Internet activity analysis, Live system forensics, Static and dynamic analysis of executable file, mobile forensics, Documentation and reports	06
8.	**Legal Issues**: The justice system, Indian IT act and case studies	02
9.	**Incident response:** Incident response plan, Incident response phases, preserving evidence, integrating forensics and incident response.	02
10.	Contemporary issues related to cyber forensics and hacking.	03
	Total	**45**

Text Books:

1. B. Nelson, A. Phillips and C. Steuart, Guide to Computer Forensics and Investigations, 4th Ed., Cengage Learning, 2013.

Reference Books:

1. S.-P. Oriyano, Hacker Techniques, Tools, and Incident Handling, 2nd Ed, Jones and Bartlett Learning, 2014.

2. C. Easttom, System Forensics, Investigation, and Response, 2nd Ed. , Jones and Bartlett Learning, 2014.

3. J. Luttgens, M. Pepe and K. Mandia, Incident Response & Computer Forensics, 3rd Ed. McGraw Hill, 2014.

4. C. Eoghan, Digital Evidence and Computer Crime, 3rd Ed, Academic Press, 2011

Term Work:

As per Department and Institute norms for termwork.

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Program:	B. Tech. (Information Technology)				Semester :	VIII
Course :	Advanced Database Management System (Elective – II)				Code :	BTIT08008
Teaching Scheme					Evaluation Scheme	
Lecture Hours per week	Practical Hours per week	Tutorial Hours per week	Credit	Theory (3 Hrs, 70 Marks)	Internal Continuous Assessment (ICA) As per Institute Norms (50Marks)	
3	2	1	4.5	Scaled to 70 marks	Scaled to30 marks	

Pre-requisite: Error! Reference source not found.(BTIT03005)

Objectives:

- Enhance on the knowledge gained in Database Management systems in several directions like Non-relational data models, deductive (intelligent) databases systems, distributed systems, web base systems and object oriented systems etc.
- Designing and implementing database systems based on the client-server architecture and distributed data base systems.

Outcomes:

After successfully completion of this course, students should be able to

- Analyze the different database management systems.
- Learn query processing and optimization of query.
- Learn to write programs in PL/SQL language.
- Design database system based on client server architecture.

Detailed Syllabus:

Unit	Description	Duration
1.	**The Extended Entity Relationship Model and Object Model:** The ER model revisited, Motivation for complex data types, User defined abstract data types and structured types, subclasses, super classes, Inheritance, Specialization and Generalization, Constraints and characteristics of specialization and Generalization, Relationship types of degree higher than two.	6
2.	**Query Processing and Optimization:** Overview, Measures of Query cost, Selection operation, Sorting, Join operation, other operations, Evaluation of Expressions, Transformation of relational expressions, Estimating Statistics of Expression Results, Choice of Evaluation Plans, Materialized Views.	6
3.	**Object Based Databases:** Overview of Object-Oriented concepts, object identity, object structure and type constructions,	10

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	Encapsulation of operations, Methods and Persistence, Type hierarchies and Inheritance, Type extents and queries, Complex objects; Overview of the object model of ODMG, OQL and ODL languages, queries for OQL, Mapping an EER schema to ODB schema, Structured types and inheritance in SQL, Type inheritance, Table inheritance, Array and Multiset types in SQL, Creating and accessing collection values, querying collection valued attributes, Nesting and Unnesting, Object identity and reference types in SQL, Persistent Programming language, Persistence of objects, object identity and pointers, Storage and access of persistent objects, RDBMS versus object oriented versus object relational systems.	
4.	**Parallel and Distributed Databases and Client-Server Architecture:** Architectures for parallel database, Parallel query evaluation; Parallelizing individual operations, Sorting, Joins; Distributed database concepts, Data fragmentation, Replication, and allocation techniques for distributed database design; Query processing in distributed databases; concurrency control and Recovery in distributed databases. An overview of Client-Server architecture.	5
5.	**XML and Internet Databases:** Structured, Semi structured, and Unstructured data, XML Hierarchical (Tree) Data Model, XML Documents, DTD and XML Schema, XML Documents and Databases, XML Querying.	5
6.	**Overview of Enhanced Data Models for Advanced Applications:** Active database concepts, Temporal database concepts; Spatial databases, concepts and architecture, Deductive databases and Query processing; Mobile databases, Geographic information systems.	5
7.	**Overview of Database Administration:** Managing a Database Instance, Maintaining Online Redo Log files, Managing tablespaces and Data files, managing undo data, Managing users and privileges, managing roles and auditing.	4
8.	**Case Study:** Conceptualization and object oriented database design for Railway Reservation System, Banking System etc.	4
	Total	45

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Text Books:
1. Elmarsi, Navathe, "Fundamentals of Database Systems", 6th Edition, Addision Wesley, 2010
2. HennryKorth, Abraham Silberschatz, "Database System Concepts", 6th Edition, Mc-Graw Hill, 2010.
Reference Books:
1. Stefano Ceri and Giuseppe Pelagatti, "Distributed Databases Principles and Systems", Tata McGraw-Hill, 2008
2. R. Ramakrishnan, "Database Management Systems", 3rd Edition, Tata McGraw Hill, 2009
3. C.J. Date, et. al, "An Introduction to Database System", 8th Edition, Pearson Education, 2006
4. George Koch, "Oracle9i – The Complete Reference", 1st Edition, Tata Mc-Graw Hill, 2002
5. Ivan Bayross, "Commercial Applications Development Using Oracle Developer 2000—forms 6i 2008 Edition", BPB, 2009.
Term Work:
As per Department and Institute norms for termwork.

Signature
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Program:	B. Tech. (Information Technology)				Semester :	VIII
Course :	Cloud Computing (Elective – II)				Code : BTIT08009	
Teaching Scheme				**Evaluation Scheme**		
Lecture Hours per week	Practical Hours per week	Tutorial Hours per week	Credit	Theory (3 Hrs, 70 Marks)	Internal Continuous Assessment (ICA) As per Institute Norms (50 Marks)	
3	2	1	4.5	Scaled to 70 marks	Scaled to 30 marks	

Pre-requisite: Advance Computer Networks (BTIT06004), Web programming (BTIT04005), Information Security (BTIT07003), Distributed Computing (BTIT05006)

Objectives:

The primary purpose of this course is to capture the state-of-the-art in Cloud Computing technologies and applications. This course covers a series of current cloud computing technologies, including technologies for Virtualization, Infrastructure as a Service, Platform as a Service and Software as a Service.

Outcomes:

After successfully completion of this course, students should be able to
- Understand the fundamental concepts of cloud computing
- Explore the virtualization at various layers of cloud infrastructure.
- Analyse various cloud security concerns and mechanisms
- Assess the need and then migrate to cloud
- Explain Hadoop File System and role of HDFS in cloud

Detailed Syllabus:

Unit	Description	Duration
1.	Introduction to Cloud Computing : What's cloud computing?, Properties & Characteristics, Service models, Deployment models	04
2.	Infrastructure as a Service (IaaS): Introduction to IaaS, Resource Virtualization (Server, Storage, Network)	08
3.	Platform as a Service (PaaS): Introduction to PaaS, Cloud platforms & Management (Computation and Storage), Case studies	06
4.	Software as a Service (SaaS) : Introduction to SaaS, Web services, Web 2.0, Web OS	10
5.	Hadoop: Hadoop distributed file system, distributed computations with MapReduce, Hadoop's data and I/O building blocks. Hadoop in the cloud.	10
6.	**Cloud security:** cloud Security reference model, governance and enterprise risk management, compliance and audit management,	05

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	information management and data security.	
7.	**Migration to cloud:** Cloud models suitable for different categories of users, Considerations for choosing applications suitable for cloud, Different phases to adopt the cloud	02
	Total	**45**

Text Books:

1. Raj Buyya, Christian Vecchiola, S. Selvi, "Mastering Cloud Computing", TMH, 2013
2. RajkimarBuyya, James Broberg, Andrzej Goscinski, "Cloud Computing: Principles and Paradigms", Wiley India, 2013

Reference Books:

1. Tom white, "Hadoop: The Definitive Guide", 3rd Ed. O'Reilly, 2012
2. Chuck Lam, "Hadoop in action", Dreamtech Press, 2011
3. Dr. Kumar Saurabh, "Cloud Computing: Insights into New-Era Infrastructure", Wiley India, First Edition, 2011
4. Anthony T.Velte, "Cloud Computing: A Practical approach", TMH, 2009
5. Halper Fern, Kaufman Marcia, Bloor Robin, Hurwit Judith, "Cloud Computing For Dummies", Wiley India, 2009

Term Work:

As per Department and Institute's ICA norms.

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Program:	B. Tech (Information Technology)			Semester : VIII	
Course :	Human Computer Interaction (Elective II)			Code: BTIT08010 (Revised A.Y. 2016-17)	
Teaching Scheme				**Evaluation Scheme**	
Lecture Hours per week	Practical Hours per week	Tutorial Hours per week	Credit	Theory (3 Hrs, 70 Marks)	Internal Continuous Assessment (ICA) As per Institute Norms (50 Marks)
3	2	1	4.5	Scaled to 70 marks	Scaled to 30 marks

Pre-requisite: Software Engineering (BTIT05002), Web Programming (BTIT04005)

Objectives:
Basic objectives of the course is to understand:
- User interface design and development.
- Phenomena and theories of HCI.
- Human aspects of HCI design.
- Application domain of HCI.

Course Outcomes:
After successfully completion of this course, students should be able:

1. To understand users, their interaction with systems and the importance of good interface design
2. To design, implement and evaluate interactive applications using design principles and evaluation techniques
3. To apply various models for designing interactive applications
4. To understand benefits of HCI in business and next generation HCI

Detailed Syllabus:

Unit	Description	Duration
1.	**Foundations:** Introduction to HCI, Importance of good interface design Multi-disciplinary design perspectives in HCI	2
2.	**Foundations:** Understanding users – Types of users and personas, Input-Output channels, Cognitive psychology – Visual perception, Memory, Thinking, Emotions, Mental model and User model, Individual differences, Psychology and the design of interactive system Understanding computers – Various elements of computers which affect its users	6

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	Understanding interaction - What is interaction? Models of interaction, Ergonomics, Interaction styles, Multi-modal interaction	
3.	**Design Process: Interaction Design Basics:** What is design? User-centered design, Participatory design, Scenario based design, Navigation design, Screen design and Layout, Iteration & Prototyping Service design, Designing mobile interfaces Designing for diversity	6
4.	**Design Process: Design Rules** Principles to support usability, Standards, Guidelines, Golden rules and Heuristics, HCI Patterns	6
5.	**Implementation: HCI in the software process:** The software life cycle, Usability engineering, Iterative design and prototyping	4
6.	**Evaluation** Overview of Evaluation methods Evaluation through expert analysis – Cognitive walkthrough, Heuristic evaluation Evaluation through user participation – Experiments, Surveys, Observation, Interviews, Focus groups, Monitoring physiological responses Choosing an evaluation method	8
7.	**Models and Theories:** Importance of models and theories in HCI Models - Cognitive models: GOMS and Keystroke Level Model, Task Analysis: Hierarchical Task Analysis	6
8.	**HCI in Business and Next Generation HCI:** HCI in Business – Introduction, How HCI can benefit business Next Generation HCI: - Introduction to Emergent paradigms: Groupware systems, Ubiquitous computing, Virtual & Augmented Reality, Affective computing, Context aware interfaces - Introduction to incorporating Design Thinking in HCI	7

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	design practices - Introduction to HCI design for Development (HCI4D)	
	Total	**45**

Text Books:
1.   Alan Dix, Janet Finlay, Gregory Abowd, Russel Beale, "Human–Computer Interaction", Pearson, 2009
2.   Preece, J., Rogers, Y. and Sharp, H. (2002). Interaction Design, John Wiley and Sons, ISBN: 0471492787.

Reference Books:
1.   John M Carroll, "Human Computer Interaction in the New Millennium", Pearson Education, 2001
2.   Ben Shneiderman, "Designing the User Interface: Strategies for Effective Human-Computer Interaction", 5th Edition, Pearson Education, 2009

Term Work: As per Department and Institute norms for Term-work

Signature
(Prepared by Concerned Faculty/HOD)