JAI HIND COLLEGE
BASANTSING INSTITUTE OF SCIENCE
&
J.T.LALVANI COLLEGE OF COMMERCE
(AUTONOMOUS)
"A" Road, Churchgate, Mumbai - 400 020, India.

Affiliated to
University of Mumbai

Program : BSc IT

Proposed Course : T.Y.BSc. IT

Credit Based Semester and Grading System (CBCS) with effect from the academic year 2018-19

List of Courses

Course:InformationCourse   **Semester:VI**

SR. NO.	COURSE CODE	COURSE TITLE	NO. OF LECTURES / WEEK	NO. OF CREDITS
TYBSC				
1	SBIT601	Software Quality Assurance	5	2
2	SBIT602	Security in Computing	5	2
3	SBIT603	Business Intelligence	5	2
4	SBIT604	Enterprise Networking	5	2
5	SBIT605	Cyber Law	5	2
6	SBIT601 PR	Project Implementation	3	2
7	SBIT602 PR	Security in Computing Practical	3	2
8	SBIT603 PR	Business Intelligence Practical	3	2
9	SBIT604 PR	Enterprise Networking Practical	3	2
10	SBIT605 PR	Advanced Mobile Programming Practical	3	2

Course: SBIT601	**Software Quality Assurance (Credits : 02 Lectures/Week:05)**	
	Objectives: ➢ To preventdefects. ➢ To find defects which may get created by the programmerwhile softwaredevelopment. ➢ To gain confidence in and giving information about the qualitylevel. ➢ Ensuring that the end result meets the user and business requirements. ➢ To ensure that it meets the SRS that is System Requirement Specifications and BRS that is Business RequirementSpecification and ➢ To gain the customers' confidence by offering them a quality product. **Outcomes:** ➢ Attributes and assessment of quality, reliability and security ofsoftware. ➢ Principles of software developmentprocess. ➢ Process selection regarding softwaredevelopment. ➢ Understanding and implementation of a software development process and domainanalysis. ➢ 5. be familiar with the difficulties of working in teams and use of strategies to overcome thosedifficulties.	
Unit I	**Introduction to Quality:** Historical Perspective of Quality, What is Quality? (Is it a fact or perception?), Definitions of Quality, Core Components of Quality, Quality View, Financial Aspect of Quality, Customers, Suppliers and Processes, Total Quality Management (TQM), Quality Principles of Total Quality Management, Quality Management Through Statistical Process Control, Quality Management Through Cultural Changes, Continual (Continuous) Improvement Cycle, Quality in Different Areas, Benchmarking and Metrics, Problem Solving Techniques, Problem Solving Software Tools. **Software Quality:** Introduction, Constraints of Software Product Quality Assessment, Customer is a King, Quality and Productivity Relationship, Requirements of a Product, Organisation Culture, Characteristics of Software, Software Development Process, Types of Products, Schemes of Criticality Definitions, Problematic Areas of Software Development Life Cycle, Software Quality Management, Why Software Has Defects?Processes Related to Software Quality, Quality Management System Structure, Pillars of Quality Management System, Important Aspects of Quality Management.	**12 L**
Unit II	**Fundamentals of testing:** Introduction, Necessity of testing, What is testing? Fundamental test process, The psychology of testing, Historical Perspective of Testing, Definitions of Testing, Approaches to Testing, Testing During Development Life Cycle, Requirement Traceability Matrix, Essentials of Software Testing, Workbench, Important Features of Testing Process, Misconceptions About Testing, Principles of Software Testing, Salient Features of Good Testing, Test	**12 L**

	Policy, Test Strategy or Test Approach, Test Planning, Testing Process and Number of Defects Found in Testing, Test Team Efficiency, Mutation Testing, Challenges in Testing, Test Team Approach, Process Problems Faced by Testing, Cost Aspect of Testing, Establishing Testing Policy, Methods, Structured Approach to Testing, Categories of Defect, Defect, Error, or Mistake in Software, Developing Test Strategy, Developing Testing Methodologies (Test Plan), Testing Process, Attitude Towards Testing (Common People Issues), Test Methodologies/Approaches, People Challenges in Software Testing, Raising Management Awareness for Testing, Skills Required byTester, Testing throughout the software life cycle, Software development models, Test levels, Test types, the targets of testing, Maintenance testing	
Unit III	**Unit Testing: Boundary Value Testing:** Normal Boundary Value Testing, Robust Boundary Value Testing, Worst-Case Boundary ValueTesting, Special Value Testing, Examples, Random Testing, Guidelines for Boundary Value Testing, **Equivalence Class Testing:** Equivalence Classes, Traditional Equivalence Class Testing, Improved Equivalence Class Testing, Edge Testing, Guidelines and Observations. **Decision Table–Based Testing:** Decision Tables, Decision Table Techniques, Cause-and-Effect Graphing, Guidelines and Observations, **Path Testing:** Program Graphs, DD-Paths, Test Coverage Metrics, Basis Path Testing, Guidelines and Observations, **Data Flow Testing:** Define/Use Testing, Slice-Based Testing, Program Slicing Tools.	12 L
Unit IV	**Software Verification and Validation:**Introduction, Verification, Verification Workbench, Methods of Verification, Types of reviews on the basis od Stage Phase, Entities involved in verification, Reviews in testing lifecycle, Coverage in Verification, Concerns of Verification, Validation, Validation Workbench, Levels of Validation, Coverage in Validation, Acceptance Testing, Management of Verification and Validation, Software development verification and validation activities. **V-test Model:**Introduction, V-model for software, Testing during Proposal stage, Testing during requirement stage, Testing during test planning phase, Testing during design phase, Testing during coding, VV Model, Critical Roles and Responsibilities.	12 L
Unit V	**Levels of Testing:** Introduction, Proposal Testing, Requirement Testing, Design Testing, Code Review, Unit Testing, Module Testing, Integration Testing, Big-Bang Testing, Sandwich Testing, Critical Path First, Sub System Testing, System Testing, Testing Stages. **Special Tests:**Introduction, GUI testing, Compatibility Testing, Security Testing, Performance Testing, Volume Testing, Stress Testing, Recovery Testing, Installation Testing, Requirement Testing, Regression Testing, Error Handling Testing, Manual Support Testing, Intersystem Testing, Control Testing, Smoke Testing, Adhoc Testing, Parallel Testing, Execution Testing, Operations Testing, Compliance Testing, Usability Testing, Decision Table Testing, Documentation Testing, Training testing, Rapid Testing, Control flow graph, Generating tests on the basis of Combinatorial Designs, State Graph,	12 L

| | Risk Associated with New Technologies, Process maturity level of Technology, Testing Adequacy of Control in New technology usage, Object Oriented Application Testing, Testing of Internal Controls, COTS Testing, Client Server Testing, Web Application Testing, Mobile Application Testing, eBusiness eCommerce Testing, Agile Development Testing, Data Warehousing Testing. | |

Textbook:
1. Software Testing and Continuous Quality Improvement William E. Lewis CRC Press Third2016.
2. Software Testing: Principles, Techniques and Tools M. G. Limaye TMH2017
3. Foundations of Software Testing Dorothy Graham, Erik van Veenendaal,Isabel Evans, Rex Black Cengage Learning3rd
4. Software Testing: A Craftsman"s Approach Paul C. Jorgenson CRC Press 4th2017

Course: SBIT602	Security in Computing (Credits : 02 Lectures/Week:05)	
	Objectives: Students will learn the basic concepts in computer security including software vulnerability analysis and defense, networking and wireless security, applied cryptography, as well as ethical, legal, social and economic facets of security. Students will also learn the fundamental methodology for how to design and analyze security critical systems. **Outcomes:** ➥ Identify some of the factors driving the need for Computersecurity ➥ Identify physical points of vulnerability in simplenetworks ➥ Design and implement appropriate security technologies and policies to protect computers and digitalinformation	
Unit I	**Information Security Overview** : The Importance of Information Protection, The Evolution of Information Security, Justifying Security Investment, Security Methodology, How to Build a Security Program, The Impossible Job, The Weakest Link, Strategy and Tactics, Business Processes vs. TechnicalControls. **Risk Analysis**: Threat Definition, Types of Attacks, Risk Analysis. **Secure Design Principles**: The CIA Triad and Other Models, Defense Models, Zones of Trust, Best Practices for Network Defense.	12 L
Unit II	**Authentication and Authorization**: Authentication, Authorization **Encryption**: A Brief History of Encryption, Symmetric-Key Cryptography, Public Key Cryptography, Public KeyInfrastructure. **Storage Security**: Storage Security Evolution, Modern Storage Security, Risk Remediation, Best Practices. **Database Security**: General Database Security Concepts, Understanding Database Security Layers, Understanding Database-Level Security, Using Application Security, Database Backup and Recovery, Keeping Your Servers Up to Date, Database Auditing and Monitoring.	12 L
Unit III	**Secure Network Design**: Introduction to Secure Network Design, Performance, Availability, Security. **Network Device Security**: Switch and Router Basics, Network Hardening. **Firewalls**: Overview, The Evolution of Firewalls, Core Firewall Functions, Additional Firewall Capabilities, Firewall Design. **Wireless Network Security**: Radio Frequency Security Basics, Data-Link Layer Wireless Security Features, Flaws, and Threats, Wireless Vulnerabilities and Mitigations, Wireless Network Hardening Practices and Recommendations, Wireless Intrusion Detection and Prevention, Wireless Network Positioning and SecureGateways.	12 L
Unit IV	**Intrusion Detection and Prevention Systems**: IDS Concepts, IDS Types and Detection Models, IDS Features, IDS Deployment Considerations, Security Information and Event Management (SIEM). **Voice over IP (VoIP) and PBX Security**: Background, VoIP Components, VoIP Vulnerabilities and Countermeasures, PBX, TEM: Telecom Expense Management. **Operating System Security Models**: Operating System Models, Classic Security Models, Reference Monitor, Trustworthy Computing, International Standards for Operating System Security.	12 L
	Virtual Machines and Cloud Computing: Virtual Machines, Cloud	12 L

	Computing.
Unit V	**Secure Application Design**: Secure Development Lifecycle, Application Security Practices, Web Application Security, Client Application Security, Remote AdministrationSecurity. **Physical Security**: Classification of Assets, Physical Vulnerability Assessment, Choosing Site Location for Security, Securing Assets: Locks and Entry Controls, Physical Intrusion Detection.

Textbook:

1. The Complete Reference: Information Security ,Mark Rhodes-Ousley,McGraw-Hill 2nd Edition,2013
2. Essential Cybersecurity Science ,Josiah Dykstra,O'Reilly ,Fifth Edition2017
3. Principles of Computer Security: CompTIA Security+ and Beyond, Wm.Arthur Conklin, Greg White ,McGraw Hill ,Second Edition,2010

Course: SBIT603	Business Intelligence(Credits : 02 Lectures/Week:05)	
	Objectives: The main purpose of Business Intelligence in a business is to help corporate executives, business managers and other operational workers make better and more informed business decisions. Companies also use BI to cut costs, identify new business opportunities, and spot inefficient business processes ripe for re-engineering. **Outcomes:** ➥ Apply principles and skills of economics, marketing, and decision making to contexts and environments in datascience. ➥ Build and enhance business intelligence capabilities by adaptingthe appropriate technology and softwaresolutions. ➥ Design tested and effective advanced analytics models and simulations for decisionmaking	
Unit I	**Business intelligence:** Effective and timely decisions, Data, information and knowledge, The role of mathematical models, Business intelligence architectures, Ethics and business intelligence **Decision support systems:** Definition of system, Representation of the decision-making process, Evolution of information systems, Definition of decision support system, Development of a decision support system	12 L
Unit II	**Mathematical models for decision making:** Structure of mathematical models, Development of a model, Classes of models **Data mining:** Definition of data mining, Representation of input data , Data mining process, Analysis methodologies **Data preparation**: Data validation, Data transformation, Data reduction	12 L
Unit III	**Classification**: Classification problems, Evaluation of classification models, Bayesian methods, Logistic regression, Neural networks, Support vector machines **Clustering:** Clustering methods, Partition methods, Hierarchical methods, Evaluation of clusteringmodels	12 L
Unit IV	**Business intelligence applications:** **Marketing models**: Relational marketing, Sales force management, **Logistic and production models**: Supply chain optimization, Optimization models for logistics planning, Revenue management systems. **Data envelopment analysis**: Efficiency measures, Efficient frontier, The CCR model, Identification of good operating practices	12 L
Unit V	**Knowledge Management:** Introduction to Knowledge Management, Organizational Learning and Transformation, Knowledge Management Activities, Approaches to Knowledge Management, Information Technology (IT) In Knowledge Management, Knowledge Management Systems Implementation, Roles of People in Knowledge Management **Artificial Intelligence and ExpertSystems:** Concepts and Definitions of Artificial Intelligence, Artificial Intelligence Versus Natural Intelligence, Basic Concepts of Expert Systems, Applications of Expert Systems, Structure of Expert Systems, Knowledge Engineering, Development of Expert Systems	12 L
Textbook: 1) Business Intelligence: Data Mining and Optimization for Decision Making CarloVercellis Wiley First 2009		

2) Decision support and Business Intelligence Systems Efraim Turban, RameshSharda, Dursun Delen Pearson Ninth 2011
3) Fundamental of Business IntelligenceGrossmann W, Rinderle-MaSpringerFirst 2015

Course: SBIT604	Enterprise Networking (Credits : 02 Lectures/Week: 05)	
	Objectives: This course is designed to: Provide an in-depth view of the advanced technologies used in enterprise-wide computer networks. Provide the theoretical foundation and practical skills of advanced computer networks. Understanding IPv4 and IPv6 addressing in detail. Understanding Wireless LAN Design, WAN Technologies and the Enterprise Edge. Understanding WAN Design Managing network security. **Outcomes:** ➢ Upon completion of the course, students will be ableto: ➢ Analyze state-of-the-art real-world enterprise-widenetworks. ➢ Design and build advanced enterprise-wide computernetworks. ➢ Analyze Enterprise LAN, Wireless LAN, WAN technologiesdesign. ➢ Understand IPv4 and IPv6 addressing indepth.	
Unit I	**General Network Design:** Network Design Methodology, Architectures for the Enterprise, Borderless Networks Architecture, Collaboration and Video Architecture, Data Center and Virtualization Architecture, Design Lifecycle: Plan, Build, Manage Plan Phase Build Phase Manage Phase Prepare, Plan, Design, Implement, Operate, and Optimize Phases Prepare Phase Plan Phase Design Phase Implement Phase Operate Phase Optimize Phase Summary of PPDIOO Phases Project Deliverables Design Methodology Identifying Customer Design Requirements Characterizing the Existing Network Steps in Gathering Information Network Audit Tools Network Checklist Designing the Network Topology and Solutions Top-Down Approach Pilot and Prototype Tests Design Document. **Network Design Models:** Hierarchical Network Models Benefits of the Hierarchical Model, Hierarchical Network Design, Core Layer, Distribution Layer, Access Layer, Hierarchical Model Examples, Hub-and-Spoke, Design Collapsed Core, Design Enterprise Architecture Model, Enterprise Campus Module, Enterprise Edge Area, E-Commerce Module, Internet Connectivity Module, VPN/Remote Access, Enterprise WAN, Service Provider Edge Module, Remote Modules, Enterprise Branch Module, Enterprise Data Center Module, Enterprise Teleworker Module, High Availability Network Services, Workstation-to-Router Redundancy and LAN, High Availability Protocols, ARP Explicit Configuration, RDP, RIP, HSRP, VRRP, GLBP, Server Redundancy, Route Redundancy, Load Balancing, Increasing Availability, Link Media Redundancy.	**12 L**
Unit II	**Enterprise LAN Design:** LAN Media, Ethernet Design Rules, 100Mbps Fast Ethernet Design Rules, Gigabit Ethernet Design Rules, 1000BASE-LX Long-Wavelength Gigabit Ethernet, 1000BASE-SX Short-Wavelength Gigabit Ethernet, 1000BASE-CX Gigabit Ethernet over Coaxial Cable, 1000BASE-T Gigabit Ethernet over UTP 86, 10 Gigabit Ethernet Design Rules, 10GE Media Types, EtherChannel, Comparison of Campus Media LAN Hardware, Repeaters, Hubs, Bridges, Switches, Routers, Layer 3 Switches, Campus LAN Design and Best PracticesBest Practices for Hierarchical Layers, Access Layer Best Practices,	**12 L**

	Distribution Layer Best Practices, Core Layer Best Practices, STP Design Considerations, STP Toolkit, PortFast, UplinkFast, BackboneFast, Loop Guard, Root Guard, BPDU Guard, BPDU Filter, VLAN and Trunk Considerations, Unidirectional Link Detection (UDLD) Protocol, Large-Building LANs, Enterprise Campus LANs, Edge Distribution, Medium-Size LANs, Small and Remote Site LANs, Server Farm Module, Server Connectivity Options, Enterprise Data Center Infrastructure, Campus LAN QoS Considerations, Multicast Traffic Considerations, CGMP, IGMP Snooping. **Data Center Design:** Enterprise DC Architecture, Data Center Foundation Components, Data Center Topology Components, Data Center Network Programmability, SDN, Controllers, APIs, ACI, Challenges in the DC, Data Center Facility Aspects, Data Center Space, Data Center Power, Data Center Cooling, Data Center Heat, Data Center Cabling, Enterprise DC Infrastructure, Data Center Storage, Data Center Reference Architecture, Defining the DC Access Layer, Defining the DC Aggregation Layer, Defining the DC Core Layer, Security in the DC, Fabric Extenders, Virtualization Overview, Challenges, Defining Virtualization and Benefits, Virtualization Risks, Types of Virtualization, Virtualization Technologies, VSS, VRF, vPC, Device Contexts, Server Virtualization, Server Scaling, Virtual Switching, Network Virtualization Design Considerations, Access Control, Path Isolation, Services Edge, Data Center Interconnect, DCI Use Cases, DCI Transport Options, DCI L2 Considerations, Load Balancing in the DC, Application Load Balancing, Network LoadBalancing.	
Unit III	**Wireless LAN Design:** Wireless LAN Technologies, WLAN Standards, ISM and UNII Frequencies, Summary of WLAN Standards, Service Set Identifier, WLAN Layer 2 Access Method, WLAN Security, Unauthorized Access, WLAN Security Design Approach, IEEE 802.1X-2001 Port-Based Authentication, Dynamic WEP Keys and LEAP, Controlling WLAN Access to Servers, WLAN Authentication, Authentication Options, WLAN Controller Components, WLC Interface Types, AP Controller Equipment Scaling, Roaming and Mobility Groups, Intracontroller Roaming, Layer 2 Intercontroller Roaming, Layer 3 Intercontroller Roaming, Mobility Groups, WLAN Design, Controller Redundancy Design: Deterministic vs. Dynamic, N+1 WLC Redundancy, N+N WLC Redundancy, N+N+1 WLC Redundancy, Radio Management and Radio Groups, RF Groups, RF Site Survey, Using EoIP Tunnels for Guest Services, Wireless Mesh for Outdoor Wireless, Mesh Design Recommendations, Campus Design Considerations, Power over Ethernet (PoE), Wireless and Quality of Service (QoS), Branch Design Considerations, Local MAC, REAP, Hybrid REAP, Branch Office ControllerOptions.	12 L

	WAN Technologies and the Enterprise Edge: WAN and Enterprise Edge Overview, Definition of WAN, WAN Edge Module, Enterprise Edge Modules, WAN Transport Technologies, ISDN, ISDN BRI Service, ISDN PRI Service, Digital Subscriber Line, Cable, Wireless, Frame Relay, Time-Division Multiplexing, Metro Ethernet, SONET/SDH, Multiprotocol Label Switching (MPLS), Dark Fiber, Dense Wavelength-Division Multiplexing, Ordering WAN Technology and Contracts, WAN and Edge Design Methodologies, Response Time, Throughput, Reliability, Bandwidth Considerations, WAN Link Categories, Optimizing Bandwidth Using QoS, Queuing, Traffic Shaping and Policing, Classification, Congestion Management, Priority Queuing, Custom Queuing, Weighted Fair Queuing, Class-Based Weighted Fair Queuing, Low-Latency Queuing, Traffic Shaping and Policing, Link Efficiency, Window Size, DMZ Connectivity, Segmenting DMZs, DMZ Services, Internet Connectivity, Centralized Internet (Branch) vs. Direct Internet (Branch), High Availability for the Internet Edge, VPN Network Design. **WAN Design** Traditional WAN Technologies Hub-and-Spoke Topology Full-Mesh Topology Partial-Mesh Topology Point-to-Point Topology Remote Site Connectivity Enterprise VPN vs. Service Provider VPN Enterprise Managed VPN: IPsec IPsec Direct Encapsulation Generic Routing Encapsulation IPsec DMVPN IPsec Virtual Tunnel Interface Design GETVPN Service Provider–Managed Offerings ,Metro Ethernet Service Provider VPNs: L2 vs. L3 ,Virtual Private Wire Services VPWS L2 VPN Considerations ,Virtual Private LAN Services VPLS L2 VPN Considerations ,MPLS, MPLS Layer 3 Design Overview MPLS L3 VPN Considerations ,VPN Benefits WAN Backup Design WAN Backup over the Internet Enterprise WAN Architecture Cisco Enterprise MAN/WAN Enterprise WAN/MAN Architecture Comparison ,Enterprise WAN Components Comparing Hardware and Software Enterprise Branch Architecture Branch Design Branch Connectivity Redundancy for Branches Single WAN Carrier vs.Dual WAN Carriers Single MPLS Carrier Site ,Dual MPLS Carriers Hybrid WAN: L3 VPN with IPsec VPN ,Internet for Branches Flat Layer 2 vs. Collapsed Core ,Enterprise Branch Profiles Small Branch Design Medium Branch Design Large Branch DesignEnterprise Teleworker Design ,ISRs for Teleworkers.	
Unit IV	Internet Protocol Version 4 Design,IPv4 Header ToS IPv4 Fragmentation IPv4 Addressing ,IPv4 Address Classes Class A Addresses Class B Addresses ,Class C Addresses Class D Addresses Class E Addresses ,IPv4 Address Types IPv4 Private Addresses NAT ,IPv4 Address Subnets Mask Nomenclature IP Address Subnet Design Example Determining the Network Portion of an IP Address Variable-Length Subnet Masks, Loopback Addresses IP Telephony Networks ,IPv4 Addressing Design Goal of IPv4 Address Design , Plan for Future Use of IPv4 Addresses , Performing Route Summarization , Plan for a Hierarchical IP Address Network , Private and Public IP Address and NAT Guidelines , Steps for Creating an IPv4 AddressPlan	**12 L**

	Case Study: IP Address Subnet Allocation , Address Assignment and Name Resolution , Recommended Practices of IP Address Assignment , BOOTP DHCP DNS , Internet Protocol Version 6 Design, IPv6 Header IPv6 Address Representation IPv4-Compatible IPv6 Addresses IPv6 Prefix Representation IPv6 Address Scope Types and Address Allocations IPv6 Address Allocations IPv6 Unicast Address Global Unicast Addresses Link-Local Addresses , Unique Local IPv6 Address Global Aggregatable IPv6 Address , IPv4-Compatible IPv6 Address IPv6 Anycast Addresses , IPv6 Multicast Addresses IPv6 Mechanisms ICMPv6 , IPv6 Neighbor Discovery Protocol IPv6 Name Resolution , Path MTU Discovery IPv6 Address-Assignment Strategies , Manual Configuration SLAAC of Link-Local Address , SLAAC of Globally Unique IPv6 Address DHCPv6 , DHCPv6 Lite IPv6 Security IPv6 RoutingProtocols	
	RIPng OSPFv3 , BGP4 Multiprotocol Extensions (MP-BGP) for IPv6 , IPv6 Addressing Design , Planning for Addressing with IPv6 , Route Summarization with IPv6 IPv6 Private Addressing	
	IPv6 for the Enterprise IPv6 Address Allocation , Partly Linked IPv4 Address into IPv6, Whole IPv4 Address Linked into IPv6	
	IPv6 Addresses Allocated Per Location and/or Type , IPv4-to-IPv6 Transition Mechanisms and Deployment Models , Dual-Stack Mechanism IPv6 over IPv4 Tunnels , Protocol Translation Mechanisms IPv6Deployment Models , Dual-Stack Model Hybrid Model Service Block Model ,IPv6 Deployment Model Comparison IPv6 Comparison with IPv4	
	,OSPF, BGP, Route Manipulation, and IP Multicast,OSPFv2 OSPFv2 Metric OSPFv2 Adjacencies and Hello Timers , OSPFv2 Areas OSPF Area Design Considerations OSPF Router Types OSPF DRs LSA Types Autonomous System External Path Types OSPF Stub Area Types Stub Areas Totally Stubby Areas , NSSAs Virtual Links OSPFv2 Router Authentication , OSPFv2 Summary OSPFv3 OSPFv3 Changes from OSPFv2, OSPFv3 Areas and Router Types OSPFv3 LSAs OSPFv3 Summary	
	BGP BGP Neighbors eBGP iBGP Route Reflectors Confederations BGP Administrative Distance , BGP Attributes, Weight, and the BGP Decision Process	
	BGP Path Attributes Next-Hop Attribute Local Preference Attribute Origin Attribute Autonomous System Path Attribute	
	MED Attribute Community Attribute Atomic Aggregate and Aggregator Attributes Weight BGP Decision Process , BGP Summary , Route Manipulation PBR Route Summarization	
	Route Redistribution Default Metric OSPF Redistribution Route Filtering Transit Traffic Routing Protocols on the Hierarchical Network Infrastructure IP Multicast Review , Multicast Addresses Layer 3 to Layer 2 Mapping IGMP , IGMPv1 IGMPv2 IGMPv3 CGMP IGMP Snooping , Sparse Versus Dense Multicast Multicast Source and Shared	
	Trees PIM PIM-SM PIM DR Auto-RP PIMv2 Bootstrap Router , DVMRP IPv6 MulticastAddresses	
	Managing Security Network Security Overview Security Legislation Security Threats	**12 L**

Unit V	Reconnaissance and Port Scanning Vulnerability Scanners Unauthorized Access Security Risks Targets Loss of Availability Integrity Violations and Confidentiality Breaches , Security Policy and Process Security Policy Defined , Basic Approach of a Security Policy Purpose of Security Policies, Security Policy Components Risk Assessment , Risk Index Continuous Security Integrating Security Mechanisms into Network Design Trust and Identity Management , Trust Domains of Trust Identity Passwords Tokens Certificates , Network Access Control Secure Services Encryption Fundamentals Encryption Keys VPN Protocols , Transmission Confidentiality Data Integrity Threat Defense , Physical Security Infrastructure Protection Security Management Solutions Security Solution Network Security Platforms , Trust and Identity Technologies Firewall Fundamentals , Types of Firewalls Next-Gen Firewalls NAT Placement , Firewall Guidelines Firewall ACLs , Identity and Access Control Deployments Detecting and Mitigating Threats IPS/IDS Fundamentals IPS/IDS Guidelines , Threat Detection and Mitigation Technologies ,Threat- Detection and Threat-Mitigation Solutions , FirePOWER IPS Security Management Applications , Security Platform Solutions Security Management Network Integrating Security into Network Devices IOS Security , ISR G2 Security Hardware Options Securing the Enterprise , Implementing Security in the Campus Implementing Security in the Data Center Implementing Security in the EnterpriseEdge Network Management Protocols, Simple Network Management Protocol SNMP Components , MIB SNMP Message Versions SNMPv1 SNMPv2 SNMPv3 , Other Network Management Technologies RMON , RMON2 NetFlow Compared to RMON and SNMP , CDP LLDP Syslog	

Textbook:
1. CCDA200-310Official Cert Guide,ANTHONY BRUNO, CCIE No. 2738,STEVE JORDAN, CCIE No. 11293, CiscoPress

2. Network Warrior, Gary A Donabue, O Reilly, 2nd Edition,2011

Course: SBIT605	Cyber Law (Credits : 02 Lectures/Week: 05)	
	Objectives: ➢ To create more awareness about cyber legal issues andchallenges ➢ To provide advice, inputs as also guidance to people on their day-to-day legal issues concerning the use ofcyberspace ➢ To work on research and development on cutting-edge issues and challenges incyberspace ➢ To contribute to the global debate on evolving Cyberlawjurisprudence **Outcomes:** ➢ Understanding of the Cyber law with respect to Indian IT/Act2000 ➢ To identify and analyze statutory, regulatory, constitutional, and organizational laws that affects the information technologyprofessional. ➢ To locate and apply case law and common law to current legal dilemmas in the technologyfield. ➢ To apply diverse viewpoints to ethical dilemmas in the information technology field and recommend appropriateactions.	
Unit I	**Power of Arrest Without Warrant Under the IT Act, 2000:** A Critique, Crimes of this Millennium, Section 80 of the IT Act, 2000 – A Weapon or a Farce? Forgetting the Line Between Cognizable and Non-Cognizable Offences, Necessity of Arrest without Warrant from Any Place, Public or Otherwise, Check and Balances Against Arbitrary Arrests, Arrest for "About to Commit" an Offence Under the IT Act: A Tribute to Draco, Arrest, But NOPunishment! **Cyber Crime and Criminal Justice: Penalties, Adjudication and Appeals Under the IT Act, 2000:** Concept of "Cyber Crime " and the IT Act , 2000, Hacking, Teenage Web Vandals, Cyber Fraud and Cyber Cheating, Virus on the Internet, Defamation, Harassment and Email Abuse, Cyber Pornography, Other IT Act Offences, Monetary Penalties, Adjudication and Appeals Under IT Act , 2000, Network Service Providers, Jurisdiction and Cyber Crime, Nature of Cyber Criminality, Strategies to Tackle Cyber Crime and Trends, Criminal Justice in India and Implications on Cyber Crime.	**12 L**
Unit II	**Contracts in the Infotech World:** Contracts in the Infotech World, Click-Wrap and Shrink-Wrap Contract: Status under the Indian Contract Act, 1872, Contract Formation Under the Indian Contract Act, 1872, Contract Formation on the Internet, Terms and Conditions of Contracts. **Jurisdiction in the Cyber World:** Questioning the Jurisdiction and Validity of the Present Law of Jurisdiction, Civil Law of Jurisdiction in India, Cause of Action, Jurisdiction and the Information Technology Act,2000, Foreign Judgements in India, Place of Cause of Action in Contractual and IPR Disputes, Exclusion Clauses in Contracts, Abuse of Exclusion Clauses, Objection of Lack of Jurisdiction, Misuse of the Law of Jurisdiction, Legal Principles on Jurisdiction in the United State of America, Jurisdiction Disputes w.r.t. the Internet in the United State of America.	**12 L**

	Battling Cyber Squatters and Copyright Protection in the Cyber	12 L
Unit III	**World:** Concept of Domain Name and Reply to Cyber Squatters, Meta-Tagging, Legislative and Other Innovative Moves Against Cyber Squatting, The Battle Between Freedom and Control on the Internet, Works in Which Copyright Subsists and meaning of Copyright, Copyright Ownership and Assignment, License of Copyright, Copyright Terms and Respect for Foreign Works, Copyright Infringement, Remedies and Offences, Copyright Protection of Content on the Internet; Copyright Notice, Disclaimer and Acknowledgement, Downloading for Viewing Content on the Internet, Hyper-Linking and Framing, Liability of ISPs for Copyright Violation in the Cyber World: Legal Developments in the US, Napster and its Cousins: A Revolution on the Internet but a Crisisfor Copyright Owners, Computer Software Piracy.	
Unit IV	**E-Commerce Taxation: Real Problems in the Virtual World:** A Tug of War on the Concept of „Permanent Establishment‟, Finding the PE in Cross Border E-Commerce, The United Nations Model Tax Treaty, The Law of Double Taxation Avoidance Agreements and Taxable Jurisdiction Over Non-Residents, Under the Income Tax Act, 1961, Tax Agents of Non-Residents under the Income Tax Act,1961 and the Relevance to E-Commerce, Source versus Residence and Classification between Business Income and Royalty, The Impact of the Internet on Customer Duties, Taxation Policies in India: At a Glance. **Digital Signature, Certifying Authorities and E-Governance:** Digital Signatures, Digital Signature Certificate, Certifying Authorities and Liability in the Event of Digital Signature Compromise, E-Governance in India: A Warning to Babudom!	12 L
Unit V	**The Indian Evidence Act of 1872 v. Information Technology Act, 2000:** Status of Electronic Records as Evidence, Proof and Management of Electronic Records; Relevancy, Admissibility and Probative Value of E-Evidence, Proving Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages, Other Amendments in the Indian Evidence Act by the IT Act, Amendments to the Bankers Books Evidence Act, 1891 and Reserve Bank of India Act, 1934. **Protection of Cyber Consumers in India:** Are Cyber Consumers Covered Under the Consumer Protection Act? Goods and Services, Consumer Complaint, Defect in Goods and Deficiency in Services, Restrictive and Unfair Trade Practices, Instances of Unfair Trade Practices, Reliefs Under CPA, Beware Consumers, Consumer Foras, Jurisdiction and Implications on cyber Consumers in India, Applicability of CPA to Manufacturers, Distributors, Retailers and Service Providers Based in Foreign Lands Whose Goods are Sold or Services Provided to a Consumer in India. Amendments in Indian IT Act 2000	12 L

Textbook:
1. Cyber Law Simplified, Vivek Sood, TMH Education,2001
2. Cybersecurity Law, Jeff Kosseff, Wiley,2017

Semester VI – Practical

Course: SBIT601 PR	Project Implementation (Credits : 02 Practicals/Week:01)

	1. INTRODUCTION
	  a) Background
	  b) Objectives
	  c) Purpose, Scope, andApplicability
	  d) Achievements
	  e) Organisation ofReport
	
	2.SURVEY OFTECHNOLOGIES
	
	3. REQUIREMENTS ANDANALYSIS
	  a) ProblemDefinition
	  b) RequirementsSpecification
	  c) Planning andScheduling
	  d) Software and HardwareRequirements
	  e) Preliminary ProductDescription
	  f) ConceptualModels
	
	4. SYSTEMDESIGN
	  a) BasicModules
	  b) DataDesign
	  c) SchemaDesign
	  d) Data Integrity andConstraints
	  e) ProceduralDesign
	  f) LogicDiagrams
	  g) DataStructures
	  h) AlgorithmsDesign
	  i) User interfacedesign
	  j) SecurityIssues
	  k) Test CasesDesign
	
	5. IMPLEMENTATION ANDTESTING
	  a) ImplementationApproaches
	  b) Coding Details and CodeEfficiency
	  c) TestingApproach
	  d) Modifications andImprovements
	  e) TestCases
	
	6. RESULTS ANDDISCUSSION
	  a) TestReports
	  b) UserDocumentation
	
	7. CONCLUSIONS
	  a) Conclusion
	  b) Significance of theSystem
	  c) Limitations of theSystem
	  d) Future Scope of theProject

Course: SBIT602 PR	Security in Computing Practical (Credits : 02Practicals/Week:01)
	1.Configure Routers a)OSPF MD5 authentication. b)NTP. c) to log messages to the syslogserver. d) to support SSHconnections. **2.Configure AAA Authentication** a)Configure a local user account on Router and configure authenticate on the console and vty lines using localAAA b) Verify local AAA authentication from the Router console and the PC-Aclient **3.Configuring Extended ACLs** a)Configure, Apply and Verify an Extended Numbered ACL **4.Configure IP ACLs to Mitigate Attacks and IPV6 ACLs** a)Verify connectivity among devices before firewallconfiguration. b)Use ACLs to ensure remote access to the routers is available only from management stationPC-C. c)Configure ACLs on to mitigateattacks. d)Configuring IPv6ACLs **5.Configuring a Zone-Based Policy Firewall** **6.Configure IOS Intrusion Prevention System (IPS) Using the CLI** a)Enable IOSIPS. b)Modify an IPSsignature. **7.Layer 2 Security** a)Assign the Central switch as the rootbridge. b)Secure spanning-tree parameters to prevent STP manipulation attacks. c)Enable port security to prevent CAM table overflowattacks. **8.Layer 2 VLANSecurity** **9.Configure and Verify a Site-to-Site IPsec VPN Using CLI** **10.Configuring ASA Basic Settings and Firewall UsingCLI** a) Configure basic ASA settings and interface security levels using CLI b) Configure routing, address translation, and inspection policy using CLI c) Configure DHCP, AAA, and SSH d)Configure a DMZ, Static NAT, andACLs

Course:	Business Intelligence Practical (Credits:02 Practicals/Week:01)
SBIT603 PR	1) Import the legacy data from different sources such as (Excel, SqlServer, Oracle etc.) and load in the target system. (You can download sample database such as Adventureworks, Northwind, foodmart etc.)
	2) Perform the Extraction Transformation and Loading (ETL) process to construct the database in theSqlserver
	3) A)Create the Data staging area for the selecteddatabase. B)Create the cube with suitable dimension and fact tables based on ROLAP, MOLAP and HOLAP model
	4) A)Create the ETL map and setup the schedule for execution. B)Execute the MDX queries to extract the data from the datawarehouse.
	5) A)Import the datawarehouse data in Microsoft Excel and createthe Pivot table and PivotChart. B)Import the cube in Microsoft Excel and create the Pivot tableand Pivot Chart to perform dataanalysis.
	6) Apply the what – if Analysis for data visualization. Designand generate necessary reports based on the data warehousedata.
	7) Perform the data classification using classificationalgorithm
	8) Perform the data clustering using clusteringalgorithm.
	9) Perform the Linear regression on the given data warehousedata.
	10) Perform the logistic regression on the given data warehousedata.

Course	Enterprise Networking Practical (Credits:02 Practicals/Week:01)

SBIT604 PR	**1. Configuring OSPF –I**
	    a) Single-Area OSPF Link Costs and InterfacePriorities
	    b) Multi-Area OSPF with Stub Areas andAuthentication
	2. Configuring OSPF –II
	    a) OSPF Virtual Links and AreaSummarization
	    b) OSPF over FrameRelay
	3. Redistribution and AdministrativeDistances
	    a) Redistribution Between RIP andOSPF
	    b) Manipulating AdministrativeDistances
	4. BGP
	    a) Configuring BGP with Default Routing
	    b) Using the AS_PATHAttribute
	    c) BGP Route Reflectors and Route Filters
	5. IPv6
	    a) Configuring OSPF forIPv6
	    b) Configuring 6to4Tunnels
	6. VLANs andEtherChannel
	    a) Static VLANS, VLAN Trunking, and VTP Domains andModes
	    b) ConfiguringEtherChannel
	7. Spanning TreeProtocol
	    a) Spanning Tree Protocol (STP) DefaultBehavior
	    b) Modifying Default Spanning TreeBehavior
	8. VLAN and SpanningTree
	    a) Per-VLAN Spanning TreeBehavior
	    b) Multiple SpanningTree
	9. Internal VLANRouting
	    a) Inter-VLAN Routing with an ExternalRouter
	    b) Inter-VLAN Routing with an Internal RouteProcessor
	10. Configure NATServices

Course:	Advanced Mobile Programming (Credits:02 Practicals/Week:01)
SBIT605 PR	1) Introduction to Android, Introduction to Android StudioIDE, Application Fundamentals: Creating a Project, Android Components, Activities, Services, Content Providers, Broadcast Receivers, Interface overview, Creating Android Virtual device, USB debugging mode, Android Application Overview. Simple "Hello World" program 2) Programming Resources Android Resources: (Color, Theme,String, Drawable, Dimension,Image), 3) Programming Activities and fragments Activity Life Cycle, Activity methods, Multiple Activities, Life Cycle of fragments and multiple fragments. 4) Programs related to differentLayouts Coordinate, Linear, Relative, Table, Absolute, Frame, List View, Grid View. 5) P6rogramming UI elements AppBar, Fragments, UIComponents 6) Programming menus, dialog, dialogfragments 7) Programs on Intents, Events, Listeners and Adapters The Android Intent Class, Using Events and EventListeners 8) Programs on Services, notification and broadcastreceivers 9) Database Programming withSQLite 10) Programming threads, handles and asynchronizedprograms 11) Programming Media API and TelephoneAPI 12) Programming Security andpermissions 13) Programming Network Communications and Services(JSON) **Text Books:** 1) Android A Programmers Guide, J.F. DiMarzio, McGrawHill Education,2018 2) Developing Android on Android: Automate Your Device with Scripts and Tasks, Mike Rilly, SPD,2018 3) Learn To Master Android , Star Edu Solutions,2018

Evaluation Scheme

[A] Evaluation scheme for Theory courses

V. Continuous Assessment (C.A.) - 25 Marks

   (ix)Internal:Test – 20 Marks of 40 mins.Duration

   (x) Class Participation : 05 Marks

VI.   Semester End Examination (SEE)- 75Marks

Q.1	**Answer any 3**	**15 Marks**
Q.2	**Answer any 3**	**15 Marks**
Q.3	**Answer any 3**	**15 Marks**
Q.4	**Answer any 3**	**15 Marks**
Q.5	**Answer any 3**	**15 Marks**

[B] Evaluation scheme for Practical courses

Practical Exam – 50 marks of 2 hours 30 mins duration