



Ramnath Agarwal Charitable Trust's

Vishwakarma Institute of Technology

(An Autonomous Institute affiliated to University of Pune)

Structure & Syllabus of

Master of Computer Application

Pattern 'A-15'

Effective from Academic Year 2017-18

Prepared by: - Board of Studies in Information Technology

Approved by: - Academic Board, Vishwakarma Institute of Technology, Pune

Signed by

Chairman – BOS

Chairman – Academic Board

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Assessment and Evaluation Scheme w.e.f. A.Y. 2017-18

Mode of Assessment	Continuous Assessment (CA)		Written Examination 1 – Conducted in the Middle of Semester as per Academic Calendar			Written Examination 2 – Conducted in the End of Semester as per Academic Calendar		
Units Covered	Unit 1,2,3,4,5 and 6		Unit 1,2 and 3			Unit 4,5 and 6		
Assessment Details	Assessment for	Converted to	Duration of Examination	Assessment for	Converted to	Duration of Examination	Assessment for	Converted to
	100 Marks	30 Marks	3 Hours	100 Marks	35 Marks	3 Hours	100 Marks	35 Marks

SEMESTER V

T. Y. MCA Structure with effect from Academic Year 2017-18

Semester V

Code	Subject	Type	Teaching Scheme			Credits
			Theory	Project	Lab	
IT901THL	Network & Information Security	THL	3	--	2	4
IT921TH	Advanced Database Management Systems	TH	3	--	--	3
IT903TH	Software Testing	TH	3	--	--	3
	Elective-I					
IT922TH	Organization Behavior	TH	3	--	--	3
IT923TH	Marketing Management					
IT924TH	Cyber Law and IPR					
IT925TH	Information Security Management and Quality Assurance					
	Elective-II					
IT905THL	Mobile Application Development	TH	3	--	2	4
IT926THL	Cloud Computing					
IT907THL	Linux Programming					
IT927THL	Advanced Internet Technologies					
IT908LTH	Entrepreneurship Development	LTH	1	--	2	2
IT928LAB	Application Development Technology Lab	LAB	--	2	2	2
Total Credits /Hours			16	2	8	21

F No. : 654	
IT901THI::NETWORK AND INFORMATION SECURITY	
Credits: 4	Teaching Scheme:T-3,L-2 Hours / Week
Unit 1: Introduction & Elementary Ciphers	
	(7 Hours)
Worms, viruses, Trojans, Bots, Types of Attacks: DoS, IP spoofing, replay, DNS poisoning, Phishing, Need of security, attributes of security, authentication, confidentiality, integrity and cryptography, Vulnerabilities in OSI model, layers, Bioinformatics security, Mathematical background for security, Substitution Techniques: Ceaser cipher, Playfair cipher, Hill cipher, Vigenere cipher, One time pad, Transposition Techniques, Product Cipher, Steganography	
Unit 2: Secret Key Cryptography	
	(7 Hours)
Block Cipher Principle, S-DES, DES, Double DES, Triple DES, Man in the middle attack, RC4, AES, S-AES	
Unit 3: Public Key Cryptography	
	(6 Hours)
RSA Algorithm, Elliptic Curve Arithmetic, Elliptic curve Cryptography, El Gamal Cryptosystem, Knapsack public key algorithm	
Unit 4: Key Management & Distribution	
	(7 Hours)

Diffie-Hellman Key Exchange Technique, ECC Diffie-Hellman Key Exchange Technique, Symmetric Key Distribution using symmetric encryption, Symmetric Key Distribution using asymmetric encryption, Distribution of public keys, X.509 Certificates, Public key infrastructure, Remote user authentication principles, Remote user authentication principles using symmetric encryption, Kerberos, Remote user authentication principles using asymmetric encryption	
Unit 5: Cryptographic Data Integrity Algorithms	(7 Hours)
Applications of cryptography, Hash Functions, SHA, Whirlpool, Message Authentication, MAC, HMAC, CMAC, Digital Signature, EL Gamal Digital Signature Scheme, Digital Signature Standard.	
Unit 6: Network & Internet Security	(6 Hours)
Transport Layer Security, Secure Socket Layer, HTTPS, Secure Shell(SSH), Wireless network security, Wireless transport layer security, Wireless application layer protocol(WAP) end to end security, E-mail Security, PGP, S/MIME, IP security, Firewall security.	
List of practicals:	
<ol style="list-style-type: none">1. Implement Caesar Cipher & perform brute force attack on it.2. Implementation of Playfair cipher.3. Implement Vigenere Cipher4. Implementation of Hill cipher.5. Implementation of RC4 algorithm.6. Implementation of S-DES.7. Implementation of S-AES8. Implementation of RSA.9. Implementation of Diffie-Hellman key exchange technique.	

10. Implementation of ECC.
11. Implement Hash algorithm.
12. Implementation of packet sniffer.
13. Kerberos simulation

Text Books

1. “Network Security and Cryptography”, by Bernard Menezes, Cengage Learning, 2010, ISBN 81-315-1349-1, 1st Edition.
2. “Cryptography and Network Security-Principles and Practices” by William Stallings, Pearson Education, 2006, ISBN 81-7758-774-9, 4th Edition.

Reference Books

1. “Computer Security: Art and Science”, by Matt Bishop, Pearson Education, 2002, ISBN 0201440997, 1st Edition.
2. “Network security, private communication in a public world”, by Charlie Kaufman, Radia Perlman and mike speciner, Prentice Hall, 2002, ISBN 9780130460196, 2nd Edition.

Course Outcomes:

Upon completion of the course, post graduates will be able to -

1. Identify the various types of attacks by analyzing the behaviour of data in the networks
2. Design a secure system for protection from the various attacks for 7 layer model by determining the need of security from various departments of an organization
3. Investigate the vulnerabilities in the existing system for the development of new system by following laws of security.
4. Perform authentication of individuals or groups with cost effective Engineering solutions.
5. Examine the importance of network security applications for current and future needs of organizations.
6. Estimate future needs of security for a system by researching current environment on a continuous basis for the benefit of society.

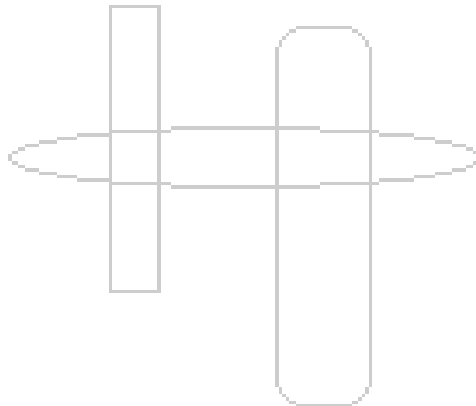
FF No. : 654	
IT921TH::ADVANCE DATABASE MANAGEMENT SYSTEM	
Credits: 3	Teaching Scheme:T-3 Hours / Week
Unit 1: Text databases :	
	(6 Hours)
Information retrieval - overview, Relevance ranking using terms and hyperlinks, synonyms, homonyms, ontologies, Indexing of documents, measuring retrieval effectiveness, web search engines, Information retrieval and structured data. Implementation issues of Relevance ranking Algorithm. Document Retrieval Strategies for Any- <i>k</i> Queries.	
Unit 2: Graph based database:	
	(7 Hours)
What is graph based database , comparison of relational and graph based database. GraphDB vs NOsql. Overview of open source graph database like Neo4g etc. APIs and graph query-programming languages	
Unit 3:Databases on the Web and Semi Structured Data :	
	(7 Hours)
Introduction, Structure of XML Data, XML Document Schema, DTD, Querying and Transformation: XQuery, FLOWR, XPath, XML validation, Web server, API to XML, Storage of XML Data, XML Applications: web services, Web based system, Implementation of XML validations, Use of web servers. XML and DTD implementation, Use of Web service like Amazon web service or Microsoft Azure.	

Unit 4: Object oriented data base:	(6 Hours)
<p>Overview of Object–Oriented Concepts. Object Identity, Object Structure, and Type Constructors, Encapsulation of Operations, Methods, and Persistence, Type Hierarchies and Inheritance, Type extents and Queries, Complex Objects; Database Schema Design for OODBMS; OQL, Persistent Programming Languages; OODBMS Architecture And Storage Issues; Transactions and Concurrency control. Example of ODBMS.</p>	
Unit 5: Object Relational and Extended Relational Databases :	(7 Hours)
<p>Database Design For An ORDBMS – Nested Relations and Collections; Storage And Access methods, Query processing and Optimization; An Overview of SQL3, Implementation Issues for Extended Type; Systems. Comparison of RDBMS, OODBMS, ORDBMS. Applications of ORDBMS.</p>	
Unit 6:Parallel databases:	(7 Hours)
<p>introduction, Parallel database architecture, speedup, scale-up I/O parallelism, Inter-query and Intra-query parallelism, Inter-operational and Intra-operational parallelism, parallel query evaluation, Design of parallel systems, Implementation issues of Parallel query evaluation, Design of parallel systems, Comparison of Inter-query and Intra-query parallelism.</p>	
<p>Text Books</p> <ol style="list-style-type: none"> 1. Ian Robinson, Jim Webber and Emil Eifrem,” Graph Databases”, O’Reilly’s 2nd edition. 2. Raghu Ramkrishnan, Johannes Gehrke Second , Database Management System, 3rd Edition, (McGraw Hill International), 3rd edition. Publisher MCGH ISBN: 9780071231510, 007123151X <p>Reference Books</p> <ol style="list-style-type: none"> 1. Alexis Leao, Mathews Leon, (leon press), Database Management System. 2. Avi Silberschatz, Henry F. Korth,S. Sudarshan , Database System Concepts, Sixth Edition. 	

Course Outcomes:

Upon completion of the course, post graduates will be able-

1. Identify information retrieval and associated processes from text database.
2. Differentiate Graph based database from relational database .
3. Describe semi-structured data and XML.
4. Review object-oriented databases.
5. Learn object-relational databases concept and its applications.
6. Characterize Parallel databases and its usage.



FF No. : 654	
IT903TH:: SOFTWARE TESTING	
Credits: 03	Teaching Scheme: Th 03 Hours / Week
UNIT I : Principles of Testing	(6 Hrs)
Testing Concepts: Purpose of Software Testing, Testing Principles, Goals of Testing, Testing aspects: Requirements, Test Scenarios, Test cases, Test scripts/procedures, Strategies for Software Testing, Testing Activities, Mistakes, Faults & Failures, Planning Verification and Validation, Software Inspections, Automated Static Analysis, Verification and Formal Methods, Test Plan	
UNIT II : White Box and Black Box Testing	(7 Hrs)
White-Box Testing: Test Adequacy Criteria, Static Testing, Structural Testing, Code Complexity Testing, Mutation Testing, Data Flow Testing, Black-Box Testing: Test Case Design Criteria, Requirement Based Testing, Positive and Negative Testing, Boundary Value Analysis, Equivalence Partitioning State Based Testing, Domain Testing	
UNIT III : Functional Testing	(7 Hrs)
Test Plan, Test Management, Test Execution and Reporting, Test Specialist Skills, Tester's Workbench and Tool Categories, Test Maturity Model and Test Process Assessment, Debugging	

& Root Cause Analysis, Software Items, Component & Units, Test Bed, Traceability and Testability, Attributes of Testable Requirements, Test Matrix, Benefits of Formal Test Documentation, Types of Testing Documentation, Verification Testing, Validation Testing, Integration Testing, System and Acceptance Testing, GUI Testing, , Regression Testing	
UNIT IV: Static & Dynamic Testing	(6 Hrs)
Software Defects: Origins of Defects, Defect Classes, Defect Repository / Test Design, Developer/Tester Support for Defect Repository, Need for Testing , Static Testing Techniques : Review types: Informal Review, Technical or peer review, Walkthrough and Review Meeting , Review Reporting & Record keeping, Review guidelines, Data flow analysis, Control flow analysis, Cyclometric Analysis	
UNIT V : Higher Order Testing	(7 Hrs)
Specification Based Testing, Performance Testing, Ad-hoc Testing, Usability and Accessibility Testing, Risk-based Testing, Exploratory Testing, Scenario-based Testing, Random Testing Compatibility Testing, User Documentation Testing, Client –Server System Testing, RAD Testing, Configuration Testing, Testing internal Controls, Multiplatform Environment Testing, Security Testing, Web-based System Testing, Testing VS Test Automation, Tool evaluation and selection, Automation team roles, Architectures, Planning and implementing test automation process	
UNIT VI : Standards and Documents	(7 Hrs)
IEEE Standards Related to Testing, ISO 12207 & IEEE/EIA Std12207on Testing, ISO 9000:2000 on Testing, ISO 9003, IEEE Std 1012, IEEE Std 1028, ISO IEC 29119, IEEE 829 test documentation,	
Text Books :	

1. Desikan, Ramesh, “ Software Testing: principles and Practices”, Pearson Education.
2. William E. Perry, “ Effective Methods for Software Testing”, John Wiley and Sons.

Reference Books:

1. Fenton, Pfleeger, “Software Metrics: A Rigorous and practical Approach”, Thomson Brooks/Cole.
2. Burnstein, “Practical Software Testing”, Springer International Edition.

Course Outcomes:

Upon completion of the course, post graduates will be able-

1. Design a software test process for a software project through test plan.
2. Understand software testing techniques.
3. Investigate the scenario and select the appropriate testing technique
4. Develop an ability of formal communication method(s) to conduct review.
5. Understand Higher Order Testing.
6. Generate documents according to quality standards.

FF No. : 654	
IT922TH::ORGANIZATION BEHAVIOR	
Credits: 3	Teaching Scheme:T-3 Hours / Week
Unit I: Introduction to Organization Behavior (7 Hours)	
Introduction: A review of the Manager’s Job Management Functions, Management Roles, Management Skills, Effective versus Successful Managerial Activities. Definition, Importance, Scope, Fundamental Concepts of OB, Challenges and Opportunities of OB Different models of OB - autocratic, custodial, supportive, collegial and SOBC. Disciplines That Contribute to the OB Field - Psychology, Social Psychology, Sociology, Anthropology. Responding to Economic Pressures, Responding to Globalization, Managing Workforce Diversity, Improving Customer Service.	
Unit II: Organizational Change and Stress Management (7 Hours)	
Types of changes: Dilemma of change, Pressure of change, Resistance to change Force field analysis, Change process, Overcoming the resistance to change, Approaches to Managing Organizational Change: Lewin’s Three-Step Model, Creating a Culture for Change: Stimulating a Culture of Innovation, Creating a Learning Organization, Work Stress and Its Management: What Is Stress? Potential Sources of Stress, Individual Differences, Cultural Differences, temporariness, Consequences of Stress, Managing Stress, balance Work–Life Conflicts.	
Unit III: Motivation (6 Hours)	

Definition, Importance, Motives – Characteristics, Classification of motives - Primary & Secondary motives. Theories of Motivation - Maslow’s Theory of need hierarchy - Herzberg’s theory, Goal-Setting, Self-Efficacy Theory , Reinforcement Theory , Equity Theory, Expectancy Theory , Motivating by Job Design: How Can Jobs BeRedesigned? Alternative Work Arrangements, Employee Involvement Programs, Using Rewards to Motivate Employees.	
Unit IV: Group Dynamics and Team building	
	(7 Hours)
Concept of Group & Team, Differences Between Groups and Team, Theories of Group Formation - Formal and Informal Groups. Importance of Team building, Stages of Group Development - The Five-Stage Model, Group Decision Making, Groups versus the Individual, Problem-Solving Teams, Self-Managed Work Teams, Creating Effective Teams, Leadership, Quality Circle.	
Unit V: MBO Techniques	
	(5 Hours)
Concept of MBO technique and details, phases, Concept of personality: Development of personality – Attributes of personality, perception, values, and attitudes. Learning Behavior - Emotional Intelligence in organization. Johari window - Nature and dimensions of attitude – Developing the right attitude.	
Unit VI: Organization Culture	
	(8 Hours)
Concept of Organizational Culture, Culture’s Functions, Creating an Ethical Organizational Culture, Creating a Positive Organizational Culture, What Is Spirituality? Spirituality and Organizational Culture, Why Spirituality Now? Characteristics of a Spiritual Organization, Achieving a Spiritual Organization, Criticisms of Spirituality, How a Culture Begins, Creating and Sustaining Culture, Keeping a Culture Alive.	
Text Books	
1. Fundamentals of Organizational Behavior by Nancy Langton , Stephen P.Robbins 2. Organizational Behavior : Stephen Robbins, Timothy Judge : Pearson Publications : 13th Edition 3. Organizational Behavior: Concepts, Controversies and Applications : Stephen Robbins 4. The Fundamentals of Organizational Behavior : Henry Tosi And Neal P. Mero : Black Well Publishing	
Reference Books	
1. Essentials of Organizational Behavior : Laurie J. Mullins : Pearson Education : 2nd	

Edition

2. Organizational Behavior : Individuals, Groups and Organisation, 3rd Edition : Ian Brooks : Pearson Publication
3. Organizations: Structures, Processes, and Outcomes : Richard H. Hall.

Course Outcomes:

Upon completion of the course, post graduates will be able-

1. Describe the concepts of organizational behavior and management practices.
2. Summarize the problems occurring due to organizational change and Analyze how the theories and empirical evidence can help to solve contemporary organizational issues.
3. Apply theories of motivation to practical problems in organizations in a critical manner.
4. Justify the role of leadership qualities.
5. Apply MBO technique to achieve the organizational objectives .
6. Develop the skills that are necessary for making ethical decisions in Professional life.

FF No. : 654	
IT923TH:: MARKETING MANAGEMENT	
Credits: 03	Teaching Scheme: Th 03 Hours / Week
UNIT I : Essentials of Marketing	(6 Hrs)
Definitions, Scope , Core concepts of marketing - Need, Want, Demand, Customer Value, Exchange, Customer & Consumer, Customer Satisfaction, Customer Delight, Customer Loyalty, Marketing v/s Market, Markets: Definition of Market, Competition, Key customer markets, Marketplaces, Market spaces	
UNIT II : Marketing Mix	(7 Hrs)
Company Orientation towards Market Place: Product, Production, Sales, Marketing, Societal, Transactional, Relational, Holistic Marketing Orientation. Selling versus Marketing, e-Marketing , Concept of Marketing Mix, 4Ps of Marketing- People, Processes & Physical Evidence, Marketing Environment – macro and micro components and their impact on marketing decisions;	
UNIT III : Customer Behavior	(7 Hrs)

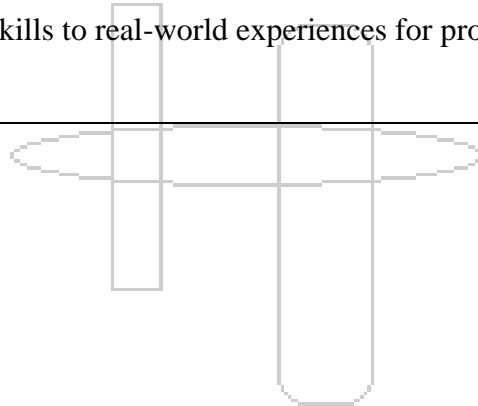
Definition & importance of consumer behavior, Comparison between Organizational Buying behavior and consumer buying behavior, Buying roles, Steps buyer decision process, Market segmentation and positioning; Buyer behavior; consumer versus organizational buyers	
UNIT IV : Segmenting and Targeting Online Customers	(6 Hrs)
Business – Government and Customer Markets, Geographic segments for E-Marketing, Demographic segments, Psychographic segments, Behavior segments, Targeting online customers, Differentiation and Positioning Strategies Product – Service – Personnel – Channel and Image differentiation, Differentiation Strategies – site atmospherics, making the intangible tangible, building trust efficient and timely order processing, pricing, customer experience	
UNIT V : e-Marketing	(7 Hrs)
Product Mix : Product, Creating Customer Value online, Product benefits, Enhanced product development, Price: Buyers & sellers perspectives, Pricing strategies, Distribution System	
UNIT VI : Distribution Channels and Physical Distribution Decisions	(7 Hrs)
Nature, functions, and types of distribution channels; Distribution channel intermediaries; Channel management decisions; Retailing and wholesaling. Promotion Decisions: Communication Process; Promotion mix – advertising, personal selling, sales promotion, publicity and public relations; Determining advertising budget; Copy designing and testing; Media selection; Advertising effectiveness; Sales promotion – tools and techniques.	
<p>Text Books:</p> <ol style="list-style-type: none"> 1. Philip Kotlar, Kevin Keller, “Marketing Management”, Pearson Education 2. Rajan Saxena, “Marketing Management”, Tata McGraw Hill <p>Reference Books:</p>	

1. V.S.Ramaswamy and S.Namakumari, “Marketing Management – Indian Context, Global Perspective”
2. Dhruv Grewal, “Marketing”, Tata McGraw Hill

Course Outcomes:

Upon completion of the course, post graduates will be able to -

1. Understand core concepts of marketing and the role of marketing in business and society.
2. State the role and functions of marketing within a range of organizations.
3. Describe key marketing concepts, theories and techniques for analyzing a variety of marketing situations.
4. Analyze the relevance of e-Marketing concepts and theories in evaluating the impacts of environmental changes on marketing planning, strategies and practices.
5. Analyze e-Marketing problems and provide solutions based on a critical examination of marketing information.
6. Apply knowledge and skills to real-world experiences for product promotion activities



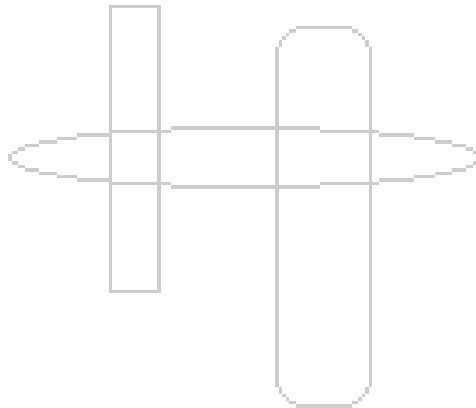
FF No. : 654	
IT924TH::CYBER LAWS and IPR	
Credits: 3	Teaching Scheme:T-3 Hours / Week
Unit I: Introduction to Cyber crimes (7 Hours)	
Definition, cybercrime and information security, Classes of cybercrime and categories, Cyber offences, Cybercrimes with mobile and wireless.	
Unit II: Intellectual property Rights (7 Hours)	
Intellectual Property law basics, Types of Intellectual Property, Agencies responsible for Intellectual Property registration ,International organizations, Agencies and Treaties ,Increasing importance of Intellectual Property Law.	
Unit III: Jurisdiction in the cyber world across the world (6 Hours)	
Cybercrime law in Asia, Cybercrime & federal laws, legal principles on jurisdiction and jurisdictional disputes W.R.T. the internet in united states of America, Cybercrime legislation in African region, Foreign judgments in India. Principles of Jurisdiction on the Internet.	
Unit IV: Indian IT act (7 Hours)	
Information Technology Act, 2000(Complete including digital signature, certifying authorities and E-governance), Positive aspects, weak areas,Amendments to the Information Technology Act, 2008, Challenges to Indian law and cybercrime	

scenario in India, Protection of cyber consumers in India. Cyber Laws in India.	
Unit V: Emerging Electronic System	(5 Hours)
<p>E – commerce, E – governance; Concept of Electronic Signature, Credit Cards; Secure Electronic Transactions. Intellectual property Rights: Intellectual Property law basics, Types of Intellectual Property, Agencies responsible for Intellectual Property</p> <p>Registration, International organizations, Agencies and Treaties, Increasing importance of Intellectual Property Law. IPR Policy and ownership of intellectual property.</p>	
Unit VI: Copyright issues in Cyberspace	(8 Hours)
<p>Relevant provisions under Copyright Act, 1957 regulating copyright issues in Cyberspace; Online Software Piracy – legal issues involved; Analysis of sufficiency of provisions of Copyright Act to deals with Online Software</p> <p>Piracy. Trademark issues in Cyberspace: Domain Name; Cyber squatting as a form of Domain Name dispute; Case law.</p>	
Text Books :	
<ol style="list-style-type: none"> 1. Herman T. Tavani. Ethics & Technology, Ethical Issues in an Age of Information and Communication Technology, 3rd Edition, John Wiley & Sons, Inc., 2011 2. Cyber Laws – Singh Yatindra 3. Cyber Crime – Bansal S K 4. Cyber law , E-commerce & M-Commerce – Ahmand Tabrez 	
Reference Books :	
<ol style="list-style-type: none"> 1. Handbook of Cyber and E-commerce laws – Bakshi P M & Suri R K 2. The Indian Cyber Law, Second Edition 2001, Vishwanathan Suresh T., Bharat Law 3. House. 4. Law Relating to Information Technology (Cyber Laws), 1st edition 2001- Asia Law 5. House, Prasad T.V.R. Satya 	

Course Outcomes:

Upon completion of the course, post graduates will be able-

1. Identify cybercrime with mobile and wireless
2. Describe Intellectual Property law basics, organizations, agencies, and registrations.
3. Distinguish cyber laws in different regions and dispute WRT Internet.
4. Identify positive and weak areas of IT Act.
5. State the importance of Intellectual Property Law.
6. Compare issues in Cyberspace.



FF No. : 654	
IT925TH: INFORMATION SECURITY MANAGEMENT AND QUALITY ASSURANCE	
Credits: 03	Teaching Scheme: Th 03 Hours / Week
UNIT I : Information Security Management	(6 Hrs)
<p>Concepts and Definitions : Information security policy concepts , Asset and asset types, Asset value and asset valuation, Threat, vulnerability, impact and risk, The types, uses and purposes of controls, Identity, authentication, authorization, Accountability, audit and compliance, The Information Security Management System (ISMS).</p>	
UNIT II: Information Risk	(7 Hrs)
<p>Threats to and vulnerabilities of information systems : Types of deliberate threats, Sources of deliberate threat, Vulnerability categorization, Vulnerabilities of specific information system types, Risk management process, Strategic and Tactical options for dealing with risks, operational and technical types of controls, Principles of information classification strategies , The role of management in accepting risk</p>	
UNIT III : Organization and Responsibilities	(7 Hrs)
<p>Organization’s management of security, Organizational policy standards, and procedures, Information Security Governance, Information Security implementation, Security Information system, Security standards and procedures - ISO/IEC 27001: 2013</p>	

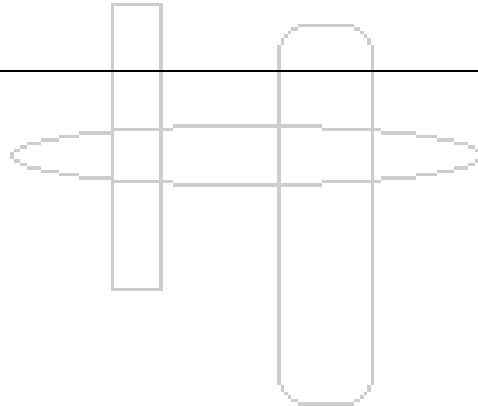
UNIT IV : Procedural / People Security Controls	(6 Hrs)
<p>People, User access controls, Training and awareness, Technical Security Controls : Protection from Malicious Software, IT Infrastructure , Physical and environmental security controls, Disaster recovery and Business Continuity Management</p>	
UNIT V : Quality Assurance in Software	(7 Hrs)
<p>Quality Concepts, Software Quality Assurance activities, Six Sigma Principles, Edward Deming’s Principles, Total Quality Management, Product Quality Metrics, In-Process Quality Metrics, Ishikawa’s Tool, McCall’s Factors of software quality, Software Quality Standards – ISO, IEEE</p>	
UNIT VI : Quality Assurance in Software Project	(7 Hrs)
<p>Quality planning (QP), QP inputs and tools and techniques, Stakeholders and customers : Types, Importance of identification, Prioritization, Project quality requirements, Benchmarking, Quality function deployment (QFD), QP outputs, quality assurance, Quality audits, Quality path vs. critical path, QA and change control, QA outputs , Quality control , QC inputs and tools and techniques, Plan-do-check-act (PDCA) cycle.</p>	
<p>Text Books:</p> <ol style="list-style-type: none"> 1. Nina Godbole, Information Systems Security: Security Management, Metrics, Frameworks and Best Practices (WIND), Wiley. 2. Nina Godbole, “Software Quality Assurance: Principles And Practice”, Alpha Science International, Ltd. <p>Reference Books:</p>	

1. Ronald Radice, “Software Inspections”, Tata McGraw Hill
2. Capers Jones, ” Software Assessments, Benchmarks, and Best Practices” ,Burlington, Vermont
Publisher: Addison-Wesley Professional

Course Outcomes:

Upon completion of the course, post graduates will be able to -

1. Demonstrate understanding various aspect of information security management to safeguard organizational assets.
2. Develop the necessary skills to examine security management progression within an organization as well as integration of project management techniques.
3. Exercise the process of Risk Analysis.
4. Utilize analytical skills in articulating information technology investment strategies that align with business strategies.
5. Specify the quality attributes a software system must satisfy.
6. Justify the interrelation between product quality and process quality.



FF No. : 654	
IT905THL::MOBILE APPLICATION DEVELOPMENT	
Credits: 4	Teaching Scheme:T-3,L-2 Hours / Week
Unit 1: Android Basics	
(6 Hours)	
Fundamentals of Java for Android Application Development, Introduction to Mobility, Mobile Platform, App development approaches, Android Platform Architecture, Development Environment for Android, Android app project structure, Logical components of Android app, Android Tool Repository, Introduction of Apple and Window mobile OS Architecture	
Unit 2: UI Components & Event Listeners	
(7 Hours)	
Activity life cycle, UI resources, String resources, Image resources, Common attributes of View, Event handling associated with Button, EditText, CheckBox, ListView, ImageView, AlertDialog, Navigation between Activities, Fragments, Life cycle of Fragment, Interaction between Fragments, ActionBar, Menu, Introduction to Material Design Pattern, Layouts, Recycler View, Fragments, Intents	
Unit 3: Data Storage Management	
(7 Hours)	
Internal and External File storage Operation, SharedPreferences, SQLite database, Remote database operations, Notification, Thread, AsyncTask, JSON data access.	
Unit 4: Graphics Animations & Multimedia	
(7 Hours)	

Graphics and Animation, Multimedia, Audio, Video, Camera	
Unit 5: Services	(6 Hours)
Service, Broadcast Receivers, SMS and Telephony API, Threads & Services, Invading the home screen	
Unit 6: Advanced Functionalities	(7 Hours)
Location services and Maps, Geocoding, Sensor, Emailing & Networking in android, Bluetooth, NFC, Wifi, Publishing, monetizing and distributing android application, Paranoid Android, Cloud to device messaging	
List of practicals:	
<ol style="list-style-type: none">1. Download Install and Configure Android Studio on Windows/ Linux environment.2. Building Simple User Interface using UI Widgets, Layouts and Adapters use Material Design Pattern.3. Design an android based application using content provider.4. Develop an android based application to implement file operations and Shared Preference.5. Develop an android based application using SQLite/remote database.6. Develop an application having animation on views.7. Design an android based application to demonstrate GPS services using Google map.8. Design an android based application to implement HTTP operations for internet communication.9. Design an android based application to implement chat application using socket programming.	

10. Design an android based application to take a snapshot by using the Camera in your mobile. Save the snapshot in the image or video format. Use Camera Media API provided Android.

Text Books

1. “Head First Android Development”, Jonathan Simon, O’Reilly Media, Inc., 1005 Gravenstein Highway North, Sebastopol, CA 95472, ISBN: 978-1-449-39330-4, 2011
2. “Beginning Android™ Application Development”, Published by Wiley Publishing, Inc.10475 Crosspoint Boulevard Indianapolis, IN 46256. ISBN: 978-1-118-01711-1, 2011

Reference Books

1. “Professional Android™ Application Development”, Published by Wiley Publishing, Inc.10475 Crosspoint Boulevard Indianapolis, IN 46256, ISBN: 978-0-470-34471-2, 20.
2. “Pro Android 4”, Published by Apress,Satya Komatineni, Dave MacLean, ISBN 978-1-4302-3930-7, 2012.

Course Outcomes:

Upon completion of the course, post graduates will be able to -

1. Simplify the data manipulation using Content Providers, Shared Preferences, embedded database SQLite, Flat files and Multi Media files
- 2.Design UI-rich apps using all the major UI components
- 3.Choose suitable software tools, IDE and APIs for the development of Mobile Application
- 4.Trace and identify the location of specific/ specialized handheld or mobile devices using Google map and other alternative techniques
- 5.Develop android social media applications using HTTP and Socket communication protocol
- 6.Package and prepare real world apps for deploying on mobile device

FF No. : 654	
IT926THL::CLOUD COMPUTING	
Credits: 4	Teaching Scheme:T-3 L-2Hours / Week
Unit I: Introduction to Cloud Computing	
(7 Hours)	
Introduction to Cloud Computing, Definition, Characteristics, Components, Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, Administering & Monitoring cloud services, benefits and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS Cloud computing platforms: Infrastructure as service: Amazon EC2, Platform as Service: Google App Engine, Microsoft Azure.	
Unit II: Cloud Technologies	
(7 Hours)	
Introduction to Cloud Technologies, Study of Hypervisors Compare SOAP and REST Webservices, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization Multitenant software: Multi-entity support, Multi-schema approach, Multitenance using cloud data stores.	
Unit III: Data in the cloud	
(6 Hours)	
Relational databases, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo. Map-Reduce and extensions: Parallel computing, The map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development,	

Example/Application of Mapreduce.	
Unit IV: Cloud Security	(7 Hours)
<p>Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud Cloud computing security architecture: Architectural Considerations-General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures; Identity Management and Access controlIdentity management, Access control, Autonomic Security Cloud computing security challenges: Virtualization security managementvirtual threats, VM Security Recommendations, VM-Specific Security techniques.</p>	
Unit V: Open Stack Architecture	(7 Hours)
<p>Open Cloud Architecture &Openstack: OCA Overview, Openstack Overview, Concepts : Compute, Storage and Network Virtualization, Orchestration, Metering, Monitoring. Monitoring and Management:An Architecture for Federated Cloud Computing; SLA Management in Cloud Computing: A Service Provider’s Perspective; Performance Prediction for HPC on Clouds.</p>	
Unit VI: Cloud Issues and Optimizations	(6 Hours)
<p>Issues in cloud computing, Implementing real time application over cloud platform Issues in Intercloud environments, QOS Issues in Cloud, Dependability, data migration, streaming in Cloud. Quality of Service (QoS) monitoring in a Cloud computing environment. Cloud Middleware. Mobile Cloud Computing. Inter Cloud issues. A grid of clouds, Sky computing, load balancing, resource optimization, resource dynamic reconfiguration, Cloud computing platforms.</p>	
<p>List of practical:</p> <ol style="list-style-type: none"> 1. Study of OpenStack architecture and networking requirements. 2. Working with the web based tools for managing the cloud and working with VMs. 3. Working with command line based tools for interacting with and managing the cloud. 4. Working with API based interfaces in cloud. 5. Creating and configuring new pre-configured images. 6. Import and export of VM images. 7. Study of cloud security 	

Text Books

1. Cloud Computing for Dummies by Judith Hurwitz, R.Bloor, M.Kanfman, F.Halper (Wiley India Edition)
2. Enterprise Cloud Computing by GautamShroff,Cambridge
3. Cloud Security by Ronald Krutz and Russell Dean Vines, Wiley-India

Reference Books:

1. Google Apps by Scott Granneman,Pearson Cloud Security & Privacy by Tim Malhar, S.Kumaraswamy, S.Latif(SPD,O'REILLY)
2. Cloud Computing : A Practical Approach, Antohy T Velte, et.al McGraw Hill,
3. Cloud Computing Bible by Barrie Sosinsky, Wiley India
4. R. Buyya, Cloud Computing Principles and Paradigms, Wiley, 2014.
5. K. Hwang, G. Fox and J. Dongarra, Distributed and Cloud Computing, Morgan Kauffman, 2012.
6. KailashJayaswal, JagannathKallakurchi, Donald J. Houde, Cloud Computing Black Book, Dreamtech Publication, 2014.

Course Outcomes:

Upon completion of the course, post graduates will be able to -

1. Distinguish between different types of architectures and services in the cloud computing.
2. Analyze different techniques of cloud security.
3. Explain high performance computing achievement by using cloud infrastructure.
4. Describe management in cloud computing.
5. Describe the characteristics and different components of different cloud implementations in the real world.
6. State the issues of cloud computing.

FF No. : 654	
IT907THL::LINUX PROGRAMMING	
Credits: 4	Teaching Scheme:T-3,L-2 Hours / Week
Unit 1: Linux System Overview (6 Hours)	
Introduction, Linux Architecture, Logging in, Files & Directories, Input and Output, Programs and processes, Error Handling, Signals, User Identification, Time Values, System calls, Shell Script, AWK Programming	
Unit 2: Files & Directories (7 Hours)	
Stat, fstat, lstat, file types, file access permissions, chmod, fchmod functions, sticky bit, chown, fchown, lchown functions, file truncation, link, unlink, remove, delete functions, symbolic links, utime, chdir, mkdir,	
Unit 3: Process Environment (7 Hours)	
fork, vfork, wait, exec, changing user and group id, system function, orphan process, zombie process, signals, threads	

Unit 4: Inter-process Communication & Network Inter-process Communication	(7 Hours)
Shared memory, pipes, fifos, Message Queues, semaphores, Linux sockets	
Unit 5: Advanced Interprocess Communication	(6 Hours)
Streams based pipes, Linux domain sockets, file descriptors, open server version 1, open server version 2, Communication with network printer,	
Unit 6: I/O subsystem and rebuilding of kernel	(7 Hours)
Driver interfaces, Disk driver, Terminal drivers, Streams. Loadable kernel module: Types, Utility commands, Basic Program for rebuilding of the kernel, Unix System Administration	
List of practicals:	
<ol style="list-style-type: none"> 1. Shell Script Exercise. 2. AWK programming exercise. 3. File related system call exercise. 4. Process related system call exercise. 5. Write a program for communication between two processes using signals. 6. Write a program for communication between two processes using pipes. 7. Write a program for communication between two processes using shared memory. 8. Write a program for communication between two processes using message queue. 9. Socket Programming using TCP and UDP in Linux. 10. Write a program for communication with network printer. 	
Text Books	
<ol style="list-style-type: none"> 1. Network Routing: Algorithms, Protocols, and Architectures, Deepankar Medhi and Karthikeyan Ramasamy (Morgan Kaufmann Series in Networking), ISBN-0120885883. 	

2. Network Algorithmics: An Interdisciplinary Approach to Designing Fast Networked Devices George Varghese (Morgan Kaufmann Series in Networking), ISBN-0120884771.

Reference Books

1. George Varghese, Network Algorithms: An interdisciplinary approach to develop fast network devices, ISBN-0120884771.
2. Leon-Garcia-Wadjaja, "Communication Networks- Fundamental Concepts and Key Architectures", Tata McGraw-Hill Publications, ISBN 0-07-040235-3

Course Outcomes:

Upon completion of the course, post graduates will be able to -

1. Understand Linux system architecture.
2. Illustrate file related system calls.
3. Prepare C language programs using process related system calls.
4. Develop programs which will do communication between two processes on same machine and different machines.
5. Construct program which can communicate with network printer.
6. Design operating system kernel.

F No. : 654	
IT927THL :: ADVANCED INTERNET TECHNOLOGIES	
Credits: 4	TeachingScheme:T-3, L-2 Hours / Week
Unit 1: Web Development Process, Front End Tools	
	(8 Hours)
Introduction to web technology, internet and www, Web site planning and design issues, HTML5: structure of html document, HTML elements: headings, paragraphs, line break, colors & fonts, links, frames, lists, tables, images and forms, , CSS, Bootstrap , XML.	
Unit 2: Client Side Technologies	
	(6 Hours)
HTML5 forms Validation, JavaScript: Overview of JavaScript, Data types, Control Structures, Arrays, Functions and Scopes, Objects in JS, DOM: DOM levels, DOM Objects and their properties and methods, Manipulating DOM, JQuery: Introduction to JQuery, Loading JQuery, Selecting elements, changing styles, creating elements, appending elements, removing elements, handling events. Introduction to JSON	
Unit 3: Server Side Technologies -I	
	(6 Hours)

Server Side technology and TOMCAT, Servlet: Introduction to servlet, need and advantages ,Servlet Lifecycle, Creating and testing of sample servlet, session management. JSP: Introduction to JSP, advantages of JSP over Servlet , elements of JSP page: directives, comments, scripting elements, actions and templates, JDBC, MongoDB	
Unit 4: Server Side Technologies -II	(7 Hours)
PHP: Introduction to PHP, Features, sample code, PHP script working, PHP syntax, conditions & Loops, Functions, String manipulation, Arrays & Functions, Form handling, Cookies & Sessions, File Handling, Exception Handling, E-mail, MySQL with PHP, AJAX.	
Unit 5: Web Technology Frameworks	(6 Hours)
Angular JS : Overview, MVC architecture, directives, expression, controllers, filters, tables, modules, forms, includes, views, scopes, services, dependency injection, custom directives, Internationalization, NodeJS.	
Unit 6: Web Services	(7 Hours)
Web Services: Overview, types of application web services, SOAP, REST, EJB, JNDI lookup, Content Management System(CMS)	
List of project Areas :	
1. Design and deploy web based application using front end technologies HTML5, CSS, Bootstrap and XML. Perform validation using Java script/JQuery/HTML5.	
(For Example: Course Registration System, Voter System for Election, e-Shopping	

<p>System, e-Governance System, On-line Trading System etc)</p> <p>2. Develop dynamic web application essence as an extension to project 1 using either (JSP/Servlet, Tomcat, MySQL/MongoDB) or (PHP, Apache, MySQL/MongoDB) server side technologies.</p>
<p>Text Books:</p> <ol style="list-style-type: none">1. "Complete reference HTML", Thomas A. Powell , 4th edition, Tata McGraw-Hill Publications, ISBN: 948-0-07-058281-12. "Beginning PHP 5", Dave Mercer, Allan Kent, Dreamtech Publications, ISBN: 81-265-0539-7 <p>Reference Books:</p> <ol style="list-style-type: none">1. "JavaScript The definitive guide", David Flanagn, SPD Publications, ISBN: 81-7366-382-32. "Web Enabled Commercial Applications-Development using. HTML, DHTML, Javascript, Perl CGI", Ivan Bayross, PBP Publications, ISBN: 81-7656-274-2
<p>Course Outcomes:</p> <p>Upon completion of the course, post graduates will be able to –</p> <ol style="list-style-type: none">1. Design the front end view of web pages using HTML5, CSS with Bootstrap framework2. Perform client side web page forms validation.3. Refine dynamic web pages with JSP, Servlet4. Deliver realistic and extensible light weight web application using PHP.5. Practice and utilize web framework paradigms and principles for Web development.6. Develop reliable, efficient, scalable web services

IT908LTH:: ENTREPRENEURSHIP DEVELOPMENT

Credits: 02

Teaching Scheme: Th -1 Hours L-2 Hours / Week

List of Practicals: (For THL, TLP courses)

1. Administration inputs to entrepreneurship – planning scheduling, time management
2. Preparation of Business cards
3. How to formulate a business and project plan
4. Process evaluation assignment for chosen business.
5. Market potential analysis of the business.
6. Tax and relativity of moral ethics in adverse business (corrupt) environments.
7. Study of Shop ACT.

Text Books :

1. Dr J. S. Juneja, “Small and Medium Enterprise: Challenges and opportunities”, ,
2. Kondalah, Chukka, “Enterprise in the new millennium”, , McGraw-Hill publication

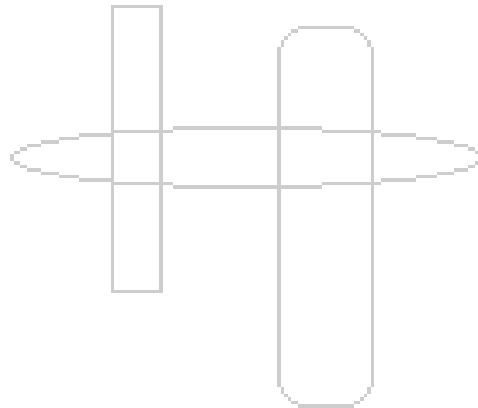
Reference Books :

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|--|
| 1. Rabindra N Kanungo, Entrepreneurship & Innovation Models for Development |
| 2. Harvard Business Review on Enterprise : Harvard Business Review, McGraw-Hill publication. |
| |

Course Outcomes:

Upon completion of the course, post graduates will be able-

- | |
|---|
| 1. Identify entrepreneurial quality. |
| 2. Develop the ability to select potential areas for self-employment. |
| 3. Analyze appropriate agency(s) for technical and financial support. |
| 4. Generate project proposal. |
| 5. Perform market analysis. |
| 6. Identify risk factors of project and their remedial measures. |



FF No. : 654

**IT928LAB :: APPLICATION DEVELOPMENT TECHNOLOGY
LABORATORY**

Credits: 2

TeachingScheme:L-2, P-2 Hours / Week

List of Practical:-

1. Design web page for an application using standard controls.
2. Design a customer registration form for an application using validation controls.
3. Design an application using themes.
4. Design an application using session and application variables.
5. Design an application for storing the related data using ADO.NET and display it using different data access controls.
6. Enhance an application with add, delete, update facilities.
7. Design web application for on line joining form of the college and add all these data on database.
8. Develop an application for presenting airline reservation web service that receives information regarding type of seat the customer wishes to reserve and then makes reservation if such a seat is available.

List of project Areas :

The objective of this project is to understand practical applications of c# .net/ ASP.net. Student will select individually a commercial/technical project based on c# .net/ ASP.net. Development of Web application/ Web services can be selected as project

Text Books:

1. "ASP.NET 4 Unleashed", Stephen Walther, Kevin Hoffman, Nate Dudek, Pearson Publications, ISBN: 978-81-317-5841-0
2. "ASP.NET 3.5 Black Book", Dreamtech Press, ISBN: 978-81-7722-831-1

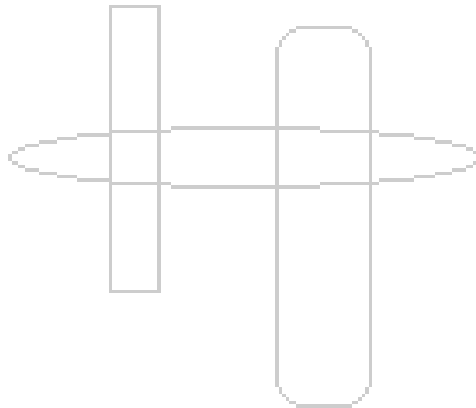
Reference Books:

1. "The Complete Reference ASP.NET", Matthew MacDonald, Tata McGraw-Hill Publications, ISBN-13: 978-0-07-049536-4
2. "ASP.NET 1.1", Chris Ullman, John Kauffman, Dreamtech Press, ISBN: 81-265-0504-4

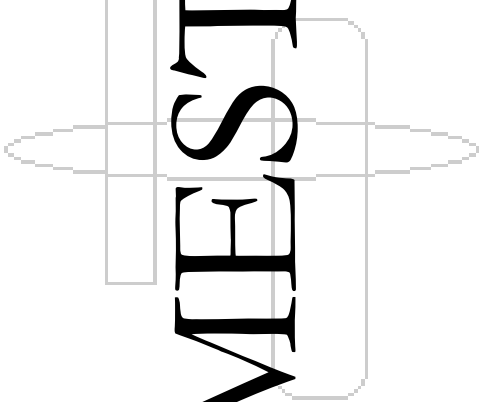
Course Outcomes:

Upon completion of the course, post graduates will be able to –

1. Learn development phase of windows application, web application, web services.
2. Create practical application software using c# .net/ ASP.net.
3. Implement current way of application development.
4. Create application development with VB.NET/C#.net, ASP.NET.
5. Develop database-driven web applications using a formal design method.
6. Construct and maintain a well designed web site

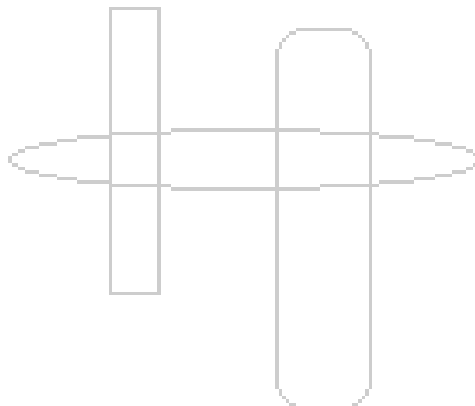


SEMESTER VI



T. Y. MCA Structure with effect from Academic Year 2017-18
Semester VI

Code	Subject	Type	Teaching Scheme			Credits
			Theory	Project	Lab	
IT951INT	Industry Internship	Internship	--	--	--	10
IT952INT	Internship Assessment	Internship	--	--	--	8
IT953INT	Internship Report	Internship	--	--	--	8
Total Credits /Hours						26



FF No. : 654	
IT951INT :: Industry Internship	
Credits: 10	Teaching Scheme: Hours / Week
<p>A semester long (6 Months) Internship will be carried out in an Industry / Research organization by an individual student. The faculty guiding the student shall be called the internal guide and the scientist / manager guiding the student (at site) shall be called as external guide. The evaluation for credits mentioned shall be awarded on the basis of evaluation carried out by external guide. The parameters for evaluation shall be provided by the department to the external guide/ company. The student must submit the sponsorship letter in the beginning of semester to the department and completion letter at the end of the internship period.</p>	
<p>Course Outcomes: Upon completion of the course, post graduates will be able to –</p> <ol style="list-style-type: none">1. Analyze real life industry problems.2. Create solutions to problems with the help of appropriate tool(s)/ platform.3. Maintain work ethics in organized sector.4. Cooperate with diverse teams and effectively communicate with all the stakeholders.5. Adapt to changing work environments.6. Produce solutions within the technological guidelines and standards.	

FF No. : 654	
IT952INT :: Internship Assessment	
Credits: 8 Week	Teaching Scheme: Hours /
<p>A semester long (6 Months) Internship will be carried out in an Industry / Research organization by an individual student. The faculty guiding the student shall be called the internal guide and the scientist / manager guiding the student (at site) shall be called as external guide. The evaluation for credits mentioned shall be awarded on the basis of evaluation carried out by internal guide. The parameters for evaluation shall be provided by the department to the internal guide.</p>	
<p>Course Outcomes: Upon completion of the course, post graduates will be able to –</p> <ol style="list-style-type: none">7. Analyze real life industry problems.8. Understand role of each team member responsible for implementation of solution identified.9. Prepare the plan for implementation of solution identified.10. Illustrate the design(s) of solution identified for assigned problem.11. Present work assigned in an internship in power point format.12. Relate real world problem scenarios in Computer Applications.	

FF No. : 654

IT953INT :: Internship Report

Credits: 8
Hours / Week

Teaching Scheme:

A semester long (6 Months) Internship will be carried out in an Industry / Research organization by an individual student. The faculty guiding the student shall be called the internal guide and the scientist / manager guiding the student (at site) shall be called as external guide. The evaluation for credits mentioned shall be awarded on the basis of internship report prepared by student. The parameters for evaluation shall be provided by the department.

Course Outcomes:

Upon completion of the course, post graduates will be able to –

1. Understand importance of documentation in internship activities.
2. Select appropriate format of document.
3. Prepare format of document(s)
4. Integrate the document(s) to form a internship report
5. Improve the writing skills of technical documents
6. Implement documentation guidelines and standards prescribed by IEEE.