

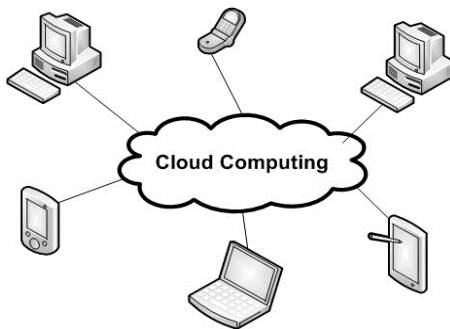
**VASAVI COLLEGE OF ENGINEERING(AUTONOMOUS)
Ibrahimbagh, Hyderabad-31**

Approved by A.I.C.T.E., New Delhi and
Affiliated to Osmania University, Hyderabad-07

**Sponsored by
VASAVI ACADEMY OF EDUCATION
Hyderabad**



**SYLLABI UNDER AUTONOMY FOR
FOURTH YEAR B.E (IT)
WITH EFFECT FROM 2017-18
(For the students admitted in 2014-15)**



**DEPARTMENT OF INFORMATION TECHNOLOGY
+91-40-23146050, 23146051
Fax: +91-40-23146090
Website: www.vce.ac.in**

VISION

To be a centre of excellence in core Information Technology and multidisciplinary learning and research, where students get trained in latest technologies for professional and societal growth.

MISSION

To enable the students acquire skills related to latest technologies in IT through practice- oriented teaching and training.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EXAMINATION
B.E- IV Year I SEMESTER WITH EFFECT FROM THE ACADEMIC YEAR 2017-18
IV YEAR I-SEMESTER

S No.	Course Code	Course Name	Scheme of Instruction				Scheme of Examination			
			Hours per week				Duration in Hrs	Maximum Marks		Credits
			L	T	D	P		SEE	CIE	
1	IT4010	Distributed & Cloud Computing	3	1	-	-	3	70	30	3
2	IT4020	Embedded Systems	3	1	-	-	3	70	30	3
3	IT4030	Information Security	3	1	-	-	3	70	30	3
4	IT4040	VLSI Design	3	1	-	-	3	70	30	3
5	IT4XX0	Elective I	3	1	-	-	3	70	30	3
6	IT4XX0	Elective II	3	1	-	-	3	70	30	3
PRACTICALS										
7	IT4121	Distributed & Cloud Computing Lab	-	-	-	2	3	50	25	1
8	IT4131	Embedded SystemsLab	-	-	-	2	3	50	25	1
9	IT4145	Project Seminar	-	-	-	2	-	-	25	1
Total			18	6	-	6	-	520	255	21
Grand Total			30				-	775		

Elective-I		Elective-II	
IT4050	Wireless & Mobile Communications	IT4080	Information Retrieval Systems
IT4060	Ad-hoc & Sensor Networks	IT4090	Information Storage Management
IT4070	Network Security	IT4100	Digital Image Processing
ME4150	Entrepreneurship	IT4110	Artificial Intelligence

with effect from the academic year 2017-18

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF INFORMATION TECHNOLOGY

SYLLABUS FOR B.E IV YEAR I SEMESTER

DISTRIBUTED & CLOUD COMPUTING

Instruction: 3+1Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4010
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
<ol style="list-style-type: none">1. examine state-of-the-art distributed systems2. understand distributed resource management3. provide students with the fundamentals and essentials of Cloud Computing.4. Understand the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing.5. explore some important cloud computing driven commercial systems such as Google Apps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.6. Understand the importance of protocols and standards in computing	<ol style="list-style-type: none">1. understanding of the principles of distributed system and be able to demonstrate this by explaining them;2. will understand the basic concepts and the synchronization and communication mechanisms used in distributed systems;3. compare the strengths and limitations of Cloud computing4. Identify the appropriate cloud services for a given application;5. Evaluate the comparative advantages and disadvantages of Virtualization technology;6. Understand the importance of protocols and standards in management for cloud services

UNIT I

Characterization of Distributed Systems: Introduction, Examples of distributed systems, Resource sharing and the web, Challenges; Hardware concepts; Software Concepts

System Models: Introduction, Architectural models, Fundamental models.

Time and Global States: Introduction, Clocks events and process states, synchronizing physical clocks, Logical Clocks, Global states, Distributed debugging.

UNIT-II

Coordination and Agreement: Introduction, distributed mutual exclusion, Election, Multicast communication, Consensus and related problems.

Replication: Introduction, System model and group communication, Fault-tolerant services.

Distributed File Systems: Introduction; File service architecture; Case study: Sun Network File System;

UNIT-III

Cloud Computing Overview – History of Computing Technologies, Origins of Cloud computing – Cloud components - Essential characteristics – On-demand self-service, Broad network access, resource pooling , Rapid elasticity , Measured service. Cloud Deployment Model: Public Clouds – Private Clouds – Community Clouds - Hybrid Clouds. Service Models: IAS, PAS, SAS. Benefits of Cloud computing, Cluster vs Grid computing vs Cloud computing, pros and cons of Cloud Computing.

UNIT-IV

Virtualization: Introduction, Types and Technologies. Accomplishing Virtualization, Importance of Virtualization in Cloud Computing.

Case Studies: Xen Virtual machine monitors - Xen API. VMware - VMware products- VMware Features, Microsoft Virtual Server- Features of Microsoft Virtual Server

UNIT-V

Cloud Taxonomy, Cloud computing architectures over Virtualized Data Centers: Data center design and Interconnection networks, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, GAE, AWS, Azure, Inter-Cloud Resource Management.

Case studies : Amazon Web Services, Google App Engine

Common Standards in Cloud Computing: The open Cloud Consortium, the Distributed Management Task force. Standards for Application Developers, Standards for Messaging. Internet Messaging Access Protocol (IMAP), Standards for Security, Examples of End-User Access to Cloud Computing.

Suggesting Readings:

1. Colouris, Dollimore, Kindberg, "Distributed Systems concepts and Design" 5thEd. Pearson Education, 2011
2. Andrew S. Tanenbaum, Van Steen, "Distributed Systems", Pearson Education, 2010.
3. Kai Hwang, Geoffrey C Fox, Jack J. Dongarra, "Distributed and cloud Computing", Morgan Kaufmann
4. RajkumarBuyya, James Broberg, Andrzej M Goscinski "Cloud Computing: Principles & Paradigms, Wiley Series on Parallel and Distributed computing, 2011

5. Singhal M, Shivratri N.G, "Advanced Concepts Introduction, Operating Systems" McGraw Hill, 2001
6. Pradeep K Sinha, " Distributed Operating Systems: Concepts and Design", Pearson Education Asia India, 2007.
7. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-172-performance-engineering-of-software-systems-fall-2010/video-lectures/lecture-20-distributed-systems>
8. <http://nptel.ac.in/downloads/106106107/>
9. https://onlinecourses.nptel.ac.in/noc17_cs23/preview

with effect from the academic year 2017-18

**DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
EMBEDDED SYSTEMS**

Instruction: 3+1Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4020
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Apply the concepts 8051 micro controller and Real time Operating Systems in the design of Embedded Systems.	<ol style="list-style-type: none"> 1. Explain the basic Embedded System design process. 2. Explain the architecture of 8051 and its programming. 3. Analyze internal and external components of 8051 and program them using Assembly language. 4. Design simple interfacing circuits for 8051 Microcontroller. 5. Explain the concepts of RTOS and use them in Embedded System Design.

UNIT – I

Embedded Computing: Introduction, Complex Systems and Microprocessor, Embedded System Design Process, Formalisms for System Design, Design Examples.

UNIT – II

The 8051 Architecture: Introduction to 8051 Micro controller Hardware and Instruction set and Assembly Language Programming, Input/Output Ports and Circuits and port programming.

UNIT – III

Timer and counter programming, serial port programming, Interrupts, Interrupt Programming, Stepper Motor Interfacing, DC Motor Interfacing.

UNIT – IV

Introduction to Real- Time Operating Systems: Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment. Basic Design Using a Real-Time Operating System: Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source)

UNIT-V

Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System.

Learning Resources:

1. Wayne Wolf, "Computers and Components", Elsevier.
2. Muhammad Ali Mazidi, Janice GillispieMazidi, Rolin D. McKinlay, " The 8051 Micro controller and Embedded Systems using Assembly and C", Prentice Hall India, 2nd Edition.
3. Kenneth J.Ayala, "The 8051 Microcontroller", Third Edition, Thomson.
4. David E. Simon, "An Embedded Software Primer", Pearson Education
5. Raj Kamal, "Embedded Systems", Tata McGraw Hill.
6. Ajay V Deshmilkhi, "Micro Controllers", Tata McGraw Hill.
7. Frank Vahid, Tony Givargis, John Wiley, "Embedded System Design, Wiley Student Edition
8. <http://www.nptelvideos.in/2012/11/embedded-systems.html>

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
INFORMATION SECURITY

Instruction: 3+1Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4030
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
understand the basics of information security, to know the legal, ethical and professional issues in information security, know the aspects of risk management.	<ol style="list-style-type: none">1. Define key terms and concepts in Information Security2. Understand how risk is identified and assessed3. Understand management's role in Information Security4. Plan for and respond to intruders in an information system5. Explain the basic principles of cryptography

UNIT- I

Introduction: History, critical characteristics of information, NSTISSC security model, Components of an information system, Securing the components, balancing security and access, The SDLC, The security SDLC

Need for Security: Business needs, Threats, Attacks-secure software development

UNIT-II

Legal, Ethical and Professional Issues: Law and ethics in information security, relevant U.S laws-international laws and legal bodies, Ethics and information security

Risk Management: Overview, Risk Identification, risk assessment, Risk Control strategies, selecting a risk control strategy, Quantitative versus qualitative risk control practices, Risk management discussion points, recommended risk control practices

UNIT-III

Planning for Security: Security policy, Standards and practices, Security blue print, Security education, Continuity strategies.

Security Technology: Firewalls and VPNs: Physical design, firewalls, protecting remote connections.

UNIT-IV

Security Technology: Intrusion detection, Access control and other security tools: Intrusion detection and prevention systems, Scanning and analysis tools, Access control devices.

Cryptography: Foundations of cryptology, cipher methods, cryptographic Algorithms, Cryptographic tools, Protocols for secure communications, Attacks on cryptosystems

UNIT-V

Implementing Information Security: information security project management, technical topics of implementation , Non- technical aspects of implementation, Security certification and accreditation

Security and Personnel: Positioning and staffing security function, Employment policies and practices, internal control strategies.

Information security Maintenance: Security management models. The maintenance model, Digital forensics.

Learning Resources:

1. Michael E. Whitman and Hebert J Mattord, Principles of Information Security, 4th edition, Ed. Cengage Learning 2011
2. Thomas R Peltier, Justing Peltier, John Blackley, Information Security. Fundamentals, Auerbacj Publications 2010
3. Detmar W Straub, Seymor Goodman, Richard L Baskerville, Information Security. Policy proceses and practices PHI 2008
4. Marks Merkow and Jim Breithaupt, Information Security. Principle and Practices, Pearson Education, 2007.
5. https://onlinecourses.nptel.ac.in/noc17_cs08/preview
6. <http://nptel.ac.in/courses/106106129/>

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
VLSI DESIGN

Instruction: 3+1Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4040
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Develop Verilog HDL code and apply fundamental concepts and structures in designing digital VLSI systems.	<ol style="list-style-type: none">1. Develop Verilog HDL code for logic circuits in various level of abstraction.2. Explain the electrical characteristics of MOSFET and design simple CMOS logic circuits.3. Understand the fabrication process and use that knowledge in the design of layouts.4. Apply design rule to layout and Analyse characteristics of a basic CMOS inverter circuit5. Able to design functional units.

UNIT – I

An overview of VLSI, Moore's law, VLSI Design flow, Introduction to HDLs, Basic Concepts of Verilog, Data Types, System Tasks and Compiler Directives, structural gate level modeling, gate primitives, gate delays, switch level modeling, behavioral and RTL operators, timing controls, blocking and non blocking assignments, conditional statements, Data flow modeling and RTL

UNIT – II

Electrical Conduction in Silicon, Electrical Characteristics of MOSFETs Threshold voltage, nFET Current-Voltage equations, square law and linear model of a FET, MOS capacitances, gate source and gate drain capacitances, junction capacitances in a MOSFET, RC model of a FET, modeling small MOSFET, scaling. MOSFET as switches, pass characteristics, logic gates using CMOS, Bubble pushing, XOR and XNOR gates, AOI and OAI logic gates, transmission gates. TG based 2-to-1 MUX, XOR, XNOR, OR circuits.

UNIT – III

MOS and CMOS fabrication Process flow, IC layers, layers used to create a MOSFET, Top and side view of MOSFETs, Silicon patterning or layouts for series and parallel connected FETs. Layouts of Basic Structure: nwells, active area definition, design of n+ , p+ regions, masks for the nFET, active contact cross section and mask set, metal1 line with active contact, poly contact: cross section and layout, vias and higher level metals. Stick and layout diagram representations of NOT gate, Transmission gate, NAND , NOR gates, complex logic gates.

UNIT-IV

Design rules: minimum space width, minimum spacing, surround, extension, cell concepts and cell based design, logic gates as basic cells, creation of new cell using basic gates. DC characteristics of the CMOS inverter symmetrical inverter, layouts, Inverter switching characteristics, RC switch model equivalent for the CMOS inverter, fanout, input capacitance and load effects, rise time and fall time calculation, propagation delay, driving large capacitive loads, delay minimization in an inverter cascade.

UNIT – V

Comparator and priority encoder barrel shifter, D latch Master slave D type flip-flop, Arithmetic circuits; half adder, full adder, AOI based, TG based, ripple carry adders, carry look ahead adders, High speed adders, multipliers.

The SRAM, 6T SRAM cell design parameters, writing to an SRAM, resistor model, Dynamic RAMs: 1T RAM cell, charge leakage and refresh in a DRAM cell, NOR based ROM, ROM array using pseudo nMOS circuitry, floating gate MOSFET, effect of charge storage on the floating gate, A E2 PROM word using floating gate nFETs, logic gate diagram of the PLA, NOR based design, CMOS PLA, Gate arrays.

Learning Resources:

1. Samir Palnitkar, *Verilog HDL: A Guide to Digital Design and Synthesis*, 2/e, Pearson Education, 2008.
2. John P. Uyemura, *Introduction to VLSI Circuits and Systems*, Wiley India Pvt. Ltd., 2011.
3. Michael D. Ciletti, *Advanced Digital Design with Verilog HDL*, PHI, 2005.
4. Kamran Eshraghian, Douglas A. Pucknell, and Sholeh Eshraghian, *Essentials of VLSI circuits and systems*, PHI, 2011.
5. <http://www.nptelvideos.in/2012/12/vlsi-design.html>

with effect from the academic year 2017-18

**DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
WIRELESS & MOBILE COMMUNICATIONS (Elective-I)**

Instruction: 3+1Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4050
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Familiarize with the evolution of mobile radio communications, modulation techniques, development of wireless networks.	<ol style="list-style-type: none">1. Understand the basic wireless communication systems.2. Describe the various propagation mechanisms.3. Demonstrate the different modulation techniques.4. Summarize the multiple access techniques, wireless systems and standards.5. Understand the use of network layer and transport layer protocols mobile communication.

UNIT –I

Introduction to Wireless Communication Systems: Evolution of Mobile Radio Communications, Examples of Wireless Communication Systems. Modern Wireless Communication Systems : Second Generation (2G) Cellular Networks, Third Generation (3G) Wireless Networks, Wireless local Loop, Wireless Local Area Networks. The Cellular Concept: Introduction, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies, Interference and Systems Capacity, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular Systems.

UNIT –II

Mobile Radio Propagation : Large Scale - :Path Loss : Introduction to Radio Wave Propagation, Free Space Propagation Model, Three Basic Propagation Mechanisms, Reflection, Ground Reflection, Diffraction, Scattering, Outdoor Propagation Models, Indoor Propagation Models, Signal Penetration into Buildings.

UNIT –III

Modulation Techniques for Mobile Radio : Digital Modulation, Linear Modulation Techniques, Constant Envelop Modulation, Spread Spectrum Modulation Techniques.

UNIT –IV

Multiple Access Techniques for Wireless Communications : FDMA, TDMA, Spread Spectrum Multiple Access, Space Division Multiple Access, Capacity of Cellular

Systems. Wireless Networking : Introduction, Difference between Wireless and Fixed Telephone Networks, Development of Wireless Networks. Wireless Systems and Standards: Global System for Mobile (GSM), GPRS, CDMA Digital Cellular Standard

UNIT –V

Mobile Network Layer: Mobile IP : Goals & Requirements, Terminology, IP Packet Delivery, Agent Advertisement & Discovery, Registration, Tunneling and Encapsulation, Optimizations, Reverse Tunneling. Dynamic Host Configuration protocol. Mobile Transport Layer: Traditional TCP, Snooping TCP, Mobile TCP, Fast Retransmit/Fast Recovery, Transmission/Time-Out Freezing, Selective retransmission, Transaction oriented TCP

Learning Resources:

- 1) Erik Dahlman, Stefan Parkvall, Johan Skold, "4G: LTE/LTE-Advanced for Mobile Broadband", Second Edition, Academic Press Inc., 2013.
- 2) Maritn Sauter, "From GSM to LTE: An Introduction to Mobile Networks and Mobile Broadband", John Wiley and Sons, 2011.
- 3) Theodore S. Rappaport, "Wireless Communications Principles and Practice", 2nd Edition, Pearson Education, 2003.
- 4) Jochen Schiller, "Mobile Communication", 2nd Edition, Pearson Education.
- 5) <http://nptel.ac.in/courses/117102062/>

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
ADHOC AND SENSOR NETWORKS (Elective-I)

Instruction: 3+1Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4060
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Know the basics of ad hoc and sensor networks, Learn the different types of MAC protocols, ad-hoc routing protocols and also architecture and protocols of wireless sensor networks.	<ol style="list-style-type: none">1. Understand the needs of Adhoc networks in current scenario of technology.2. Discuss the challenges in designing ad-hoc networks.3. Discuss the challenges in designing routing and transport protocols for Ad-hoc networks4. Evaluate the QoS related performance measurements of ad hoc networks5. Explain the principles and characteristics of wireless sensor networks.

UNIT-I

Wireless Transmission Technology and Systems: Introduction, Radio Technology Primer, Available Wireless Technologies. Medium Access Control Protocols for Wireless Networks: Introduction, Background, Fundamentals of MAC Protocols.

UNIT-II

Adhoc Networks: Introduction and Definitions, Adhoc Network Applications, Design Challenges. Evaluating Adhoc Network Protocols -the Case for a Test bed. Routing in Mobile Adhoc Networks: Introduction, Flooding. Proactive Routing. On Demand Routing. Proactive Versus On Demand Debate. Location based Routing.

UNIT-III

Multicasting in Adhoc Networks: Introduction, Classifications of Protocols, Multicasting Protocols, Broadcasting. Protocol Comparisons, Overarching Issues. Transport layer Protocols in Adhoc Networks: Introduction, TCP and Adhoc Networks, Transport Layer for Adhoc Networks: Overview, Modified TCP, TCP-aware Cross-Layered Solutions. Adhoc Transport Protocol.

UNIT-IV

QoS Issue in Adhoc Networks: Introduction, Definition of QoS, Medium Access Layer, QoS Routing, Inter- Layer Design Approaches. Security in Mobile Adhoc Networks: Vulnerabilities of Mobile Adhoc Networks, Potential Attacks, Attack Prevention Techniques. Intrusion Detection Techniques.

UNIT-V

Basic Wireless Sensor Technology: Introduction, Sensor Node Technology, Sensor Taxonomy. Introduction and Overview of Wireless Sensor Networks: Introduction, Overview MAC Protocols for Wireless Sensor networks. Applications of Wireless Sensor Networks: Examples of Category 1 and Category 2 WSN applications.

Learning Resources:

- 1) Shivaram Murthy and B. S. Manoj, "Adhoc Networks – Principles and Protocols", Pearson Education, 2012.
- 2) Holger Karl and Andreas Willig, —Protocols and Architectures for Wireless Sensor Networks, John Wiley and Sons, 2009.
- 3) Prasant Mohapatra and Srihanamurthy, "Ad Hoc Networks Technologies and Protocols", Springer, Springer International Edition, 2009.
- 4) Kazem Sohraby, Daniel Minoli, Taieb Znati, "Wireless Sensor Networks", A John Wiley & Sons, Inc., Publication-2007.
- 5) https://onlinecourses.nptel.ac.in/noc17_cs07/preview

with effect from the academic year 2017-18

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
NETWORK SECURITY (Elective-I)

Instruction: 3+1Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4070
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Understand OSI security architecture, Acquire fundamental knowledge on the concepts of finite fields and number theory, block cipher and models. Describe the principles of public key cryptosystems, hash functions and digital signature.	<ol style="list-style-type: none">1. Describe the network security model and basics of number theory.2. Compare various Cryptographic Techniques3. Design Secure applications.4. Understand the various security practices.5. Describe web, communication and e-mail security

UNIT I:INTRODUCTION & NUMBER THEORY

Services, Mechanisms and attacks- the OSI security architecture- Network security model. FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic Euclid's algorithm-Finite fields- Polynomial Arithmetic –Prime numbers-Fermat's and Euler's theorem ,Testing for primality -The Chinese remainder theorem- Discrete logarithms.

UNIT II: BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange ,Elliptic curve arithmetic-Elliptic curve cryptography.

UNIT III :HASH FUNCTIONS AND DIGITAL SIGNATURES

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 - SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS – El Gamal.

UNIT IV: SECURITY PRACTICE & SYSTEM SECURITY

Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology-Types of Firewalls - Firewall designs - SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security.

UNIT V: E-MAIL, IP & WEB SECURITY

E-mail Security: Security Services for E-mail-attacks possible through E-mail - establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME. IPSecurity: Overview of IPsec - IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). Web Security: SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSLAttacks fixed in v3- Exportability-Encoding-Secure Electronic Transaction (SET).

Learning Resources:

1. William Stallings, Cryptography and Network Security, 6 th Edition, Pearson Education, March 2013. (UNIT I,II,III,IV).
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002. (UNIT V).
3. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2007.
4. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
5. <http://www.nptelvideos.in/2012/11/cryptography-and-network-security.html>

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
ENTREPRENEURSHIP (ELECTIVE-I)

Instruction: 3+1Hrs/ week	SEE Marks: 70	Sub Ref Code: ME4150
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course objectives	Course Out comes
The objectives of the course are to make student learn:	<i>On completion of the course, the student will be able to:</i>
1. Indian industrial environment- opportunities and challenges. 2. Characteristics of Entrepreneurs. 3. Project formulation 4. Project Management. 5. Behavioural aspects of entrepreneurs.	1. analyse the relationship between entrepreneurship and economic growth, types of enterprises and their objectives. 2. analyse the Qualities of first generation entrepreneurs; Problems faced by women entrepreneurs and their remedies; Sources of ideas. 3. analyse market demand analysis; Financial analysis; Technical Analysis ; and Project Financing in India. 4. analyse Project Organisation; Project planning and control. 5. analyse Personality determinants; Leadership; Motivation; Time Management.

UNIT – I

Indian Industrial Environment – competence, Opportunities and Challenges. Entrepreneurship and Economic growth. Small scale Industry in India, Objectives, Linkage among small, medium and heavy industries. Types of enterprises.

UNIT – II

Identification and characteristics of entrepreneurs. Emergence of First generation entrepreneurs, environmental influence and women entrepreneurs. Concepts and evaluation of ideas and their sources. Choice of Technology – Collaborative interaction for Technology development.

UNIT – III

Project formulation, Analysis of market demand, Financial and profitability analysis and Technical analysis. Project financing in India.

UNIT – IV

Project Management during construction phase, project organization, project planning and control using CPM, PERT techniques. Human aspects of project management. Assessment of tax burden.

UNIT – V

Behavioural aspects of entrepreneurs. Personality – determinants, attributes and models. Leadership concepts and models. Values and attitudes. Motivation aspects. Change behaviour. Time Management: Various approaches of time management, their strengths and weaknesses. The urgency addiction and time management matrix.

Learning Resources:

1. Entrepreneurship: successfully launching new ventures, 3rd edition, Bruce R. Barringer and R. Duane Ireland, Pearson Prentice Hall (2009).
2. P. Denning and R. Dunham, the Innovator's Way, MIT Press: Cambridge, Massachusetts, 2010.
3. Arya Kumar, Entrepreneurship, Pearson, Delhi, 2012.
4. Michael H. Morris, et. al., Entrepreneurship and Innovation, Cengage learning, New Delhi, 2012
5. Peter F. Drucker, Innovation and Entrepreneurship.
6. A. SAhay, M.S. Chhikara, New Vistas of Entrepreneurship: Challenges & Opportunities.
7. Learning material from NEN portal.

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DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
INFORMATION RETRIEVAL SYSTEMS [Elective-II]

Instruction: 3+1Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4080
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Gain knowledge on important concepts, algorithms, and data/file structures that are necessary to design, and implement Information Retrieval (IR) systems.	<ol style="list-style-type: none">1. Identify the differences between past, present and future retrieval systems along with different Information Retrieval Models.2. Analyze Structured Text Retrieval Models and retrieval evaluation.3. Design and implementation of retrieval systems for text and other media.4. Generate classification among the web pages using clustering and compression techniques.5. Determine relevant data using sequential search and pattern matching, and analyze Parallel and distributed Information Retrieval.

UNIT-I

Introduction: Basic concepts, Past present and Future of IRS, Retrieval Process. Modeling: Introduction, A Taxonomy of IR Models, Retrieval: Adhoc and Filterig, A formal characterization of IR Models, Classic IR, Set Theoretic Models, Algebraic Models, Probabilistic Models

UNIT-II

Structured Text Retrieval Models, Models for Browsing, Retrieval Evaluation: Introduction, Reference Collections. Query languages: Introduction, Keyword-based querying, pattern Matching, Structural, Queries, Query Protocols.

UNIT-III

Query operations: Introduction, User Relevance Feedback, Automatic Local Analysis, Automatic Global Analysis. Text and Multimedia Languages and Properties: Introduction, Meta Data, Text, Markup Languages, Multimedia.

UNIT-IV

Text operations: Introduction, Document Preprocessing, Document Clustering, Text, Compression, Comparing Text Compression Techniques. Indexing: Introduction, Inverted Files, Other Indices for Text Searching, Boolean Queries,

UNIT-V

Searching: Sequential Searching, Pattern Matching, Structural Queries, Compression. Parallel and Distributed IR: Introduction, Parallel IR, Distributed IR.

Learning Resources:

1. Ricardo, Baeza-yates, Berthier Ribeiro-Neto, "Modern Information Retrieval" Pearson Education, 2008
2. David A. Grossman, Ophir Frieder, "Information Retrieval - Algorithms and Heuristics", Springer, 2nd Edition (Distributed by Universities Press), 2004.
3. Gerald Kowalski, "Information Retrieval Systems: Theory and Implementation", Kluwer Academic Publishers, 1997.
4. William B. Frakes, Ricardo Baeza- Yates, "Information Retrieval – Data Structures & Algorithms", Pearson Education, 2008.
5. http://videolectures.net/Top/Computer_Science/Information_Retrieval/

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
INFORMATION STORAGE & MANAGEMENT [Elective-II]

Instruction:3+1Hrs/ week	SEE Marks:70	Sub Ref Code :IT4090
Credits : 3	CIE Marks:30	Duration of SEE:3Hrs

Course Objectives	Course Outcomes
Student should be able to apply	At the end of the course student will be able to:
The knowledge of different Storage techniques to practice scalable data universe generated by heterogeneous devices and understand the role of a storage system for a highly available self sustainable business solutions that are robust and secure.	<ol style="list-style-type: none">1. Explain the need for storage management and differentiate between the types of storage architectures and demonstrate the key data center elements in a classic, virtualized environments2. Describe the components of a storage device, evaluate the need for data protection using RAID and illustrate the role of an Intelligent Storage Systems.3. Describe storage networking technologies such as FC-SAN, IP-SAN, NAS, and Object-based storage solutions4. Determine the role of business continuity solutions that include backup, recovery, archival, local and remote replication.5. Elaborate the importance of information, storage security domains by Identifying parameters for managing, monitoring and providing solutions to the storage infrastructure.

UNIT-I

Introduction to Storage Technology: Data creation and The value of data to a business, Information Lifecycle, Challenges in data storage and data management, Solutions available for data storage, Core elements of a Data Center infrastructure, role of each element in supporting business activities.

UNIT-II

Storage Systems Architecture: Hardware and software components of the host environment, Key protocols and concepts used by each component ,Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications, Concept of RAID and its components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Integrated and Modular storage systems ,high-level architecture and working of an intelligent storage system

UNIT-III

Introduction to Networked Storage: Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfil the need, Understand the appropriateness of the different networked storage options for different application environments.

UNIT-IV

Information Availability, Monitoring & Managing Data Center: Reasons for planned/unplanned outages and the impact of downtime, Impact of downtime. Differentiate between business continuity (BC) and disaster recovery (DR), RTO and RPO, Identification of single points of failure in a storage infrastructure and solutions to mitigate these failures, Architecture of backup/recovery and the different backup/ recovery topologies, replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities. Key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor storage infrastructure.

UNIT-V

Securing Storage and Storage Virtualization: Information Security, Critical security attributes for information systems, Storage security domains, Analyze the common threats in each domain. Storage Virtualization: Forms, Configurations and Challenges. Types of Storage Virtualization: Block-level and File-Level.

Learning Resources:

1. G.Somasundaram, Alok Shrivastava, EMC Education Series, " Information Storage and Management", Wiley, Publishing Inc., 2011.
2. Robert Spalding, "Storage Networks: The Complete Reference",TataMcGrawHill,Osborne, 2003.
3. Marc Farley, "Building Storage Networks",TataMcGraw Hill, Osborne. 2001.
4. MeetaGupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.
5. <http://nptel.ac.in/courses/106108058/>

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
DIGITAL IMAGE PROCESSING (Elective-II)

Instruction: 3+1Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4100
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Understand the basic digital image processing techniques.	<ol style="list-style-type: none">1. Identify the basic concepts of Image processing and compute the different transforms used in image processing.2. Apply the different spatial and frequency domain methods for Image enhancement.3. Use different techniques for Image segmentation.4. Identify the different methods for Image compression.5. Apply different morphological algorithms for image processing.

UNIT – I

Fundamentals of Image Processing and Image Transforms: Basic steps of Image Processing System, Sampling and Quantization of an image, relationship between pixels. Image Transforms: 2 D- Discrete Fourier Transform, Discrete Cosine Transform (DCT)

UNIT – II

Image Processing Techniques: Image Enhancement: Spatial domain methods: Histogram processing, Fundamentals of Spatial filtering, Smoothing spatial filters, Sharpening spatial filters. Frequency domain methods: Basics of filtering in frequency domain, image smoothing, image sharpening, Selective filtering.

UNIT – III

Image Segmentation: Segmentation concepts, Point, Line and Edge Detection. Thresholding, Region Based segmentation.

UNIT – IV

Image Compression: Image compression fundamentals - Coding Redundancy, Spatial and Temporal redundancy, Compression models: Lossy & Lossless, Huffman coding, Arithmetic coding, LZW coding, Run length coding, Bit plane coding, Transform coding, Predictive coding, Wavelet coding, JPEG Standards.

UNIT-V

Preliminaries of morphological Image processing, Erosion and Dilation, Basic Morphological algorithms like boundary extraction, hole filling, extraction of connected components.

Learning Resources:

1. Gonzalez and Woods ,Digital Image Processing , 3rd ed., Pearson Education.
2. <http://www.nptelvideos.in/2012/12/digital-image-processing.html>

with effect from the academic year 2017-18

**DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
ARTIFICIAL INTELLIGENCE [Elective-II]**

Instruction: 3+1Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4110
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Gain generic problem solving skills that have applicability to a wide range of real-world problems.	<ol style="list-style-type: none">1. Apply AI techniques to a wide range of problems, including complex problem solving via search, knowledge-base systems, etc.,2. Represent a natural language description as statements in logic.3. Apply knowledge representation techniques to real-world problems4. Explain the architecture of expert systems and issues involved in designing an expert system, and able to identify probabilistic reasoning techniques to solve problems with noise, incomplete information, and uncertainty.5. Explain the key aspects of Artificial Neural Networks.

UNIT-I

Introduction to AI: Introduction, Intelligent Systems, Foundations of AI, Sub areas of AI, Applications.

Problem Solving - State-Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques, Iterative-Deepening A*, Constraint Satisfaction

UNIT-II

Game Playing: Bounded Look-ahead Strategy and use of Evaluation Functions, Alpha-Beta Pruning.

Logic Concepts and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming.

UNIT-III

Prolog Programming Language: Introduction, Prolog Program, Control Strategy of Prolog, Programming Techniques in Prolog.

Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

UNIT-IV

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of Shells and Tools.

Uncertainty Measure - Probability Theory: Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory.

UNIT-V

Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer Feed-Forward Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

Learning Resources:

1. Saroj Kaushik, Artificial Intelligence. Cengage Learning, 2011.
2. Russell, Norvig, Artificial intelligence, A Modern Approach, Pearson Education, Second Edition. 2004
3. Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.
4. <http://www.nptelvideos.in/2012/11/artificial-intelligence.html>

**DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
DISTRIBUTED & CLOUD COMPUTING LAB**

Instruction: 2Hrs/ week	SEE Marks: 50	Sub Ref Code : IT4121
Credits : 1	CIE Marks: 25	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
<ol style="list-style-type: none">1. be able implement simple distributed software laboratory work with sockets and RMI interface.2. understand distributed resource management3. study about virtualization and cloud resource management4. be able to setup Cloud environment and implement a distributed application.	<ol style="list-style-type: none">1. design and develop distributed programs using sockets and RPC/RMI.2. implement distributed resource management3. implement virtualization and cloud resource management4. implement a distributed application using Map Reduce.

List of Experiments

1. Implement a chat server using JAVA
2. Develop an FTP client, Provide a GUI interface for the access of all the services
3. Review of Inter-process communication in UNIX and Remote procedure call; Case study: Java RMI
4. Study of NFS
5. Study of Virtualization (Type-1 and Type-2)
6. Install Hadoop and manipulate a large dataset and run on Hadoop

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
EMBEDDED SYSTEMS LAB

Instruction: 2Hrs/ week	SEE Marks: 50	Sub Ref Code : IT4131
Credits : 1	CIE Marks: 25	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Learn the instruction set and interfacing techniques of ARM and 8051 microcontrollers and their usefulness in implementing real time embedded system applications	<ol style="list-style-type: none">1. Write programs using ARM and 8051 microcontrollers2. Write programs for interfacing different I/O devices3. Write programs for developing real time applications for embedded system using VxWorks

- A. Use of 8-bit and 32-bit Microcontrollers, (such as 8051 Microcontroller, ARM2148 / ARM2378, LPC 2141/42/44/46/48) Microcontroller and C compiler (Keil, Ride etc.) to:
1. Interface Input-Output and other units such as: Relays, LEDs, LCDs, Switches, Keypads, Stepper Motors, Sensors, ADCs, Timers
 2. Demonstrate Communications: RS232, IIC and CAN protocols
 3. Develop Control Applications such as: Temperature Controller, Elevator Controller, Traffic Controller
- B. Development of Embedded Application using FPGAs, CPLDs, VHDL and Xilinx Programmable Logic Design Tools:
1. Four bit ALU
 2. Pseudo Random Number Generator
- C. Development and Porting of Real Time Applications on to Target machines such as Intel or other Computers using any RTOS
- I. Understanding Real Time Concepts using any RTOS through Demonstration of:
1. Timing
 2. Multi-Tasking
 3. Semaphores
 4. Message Queues
 5. Round-Robin Task Scheduling
 6. Preemptive Priority based Task Scheduling
 7. Priority Inversion
 8. Signals
 9. Interrupt Service Routines
- II. Application Development using any RTOS:
1. Any RTOS Booting
 2. Application Development under any RTOS

with effect from the academic year 2017-18

**DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E IV YEAR I SEMESTER
PROJECT SEMINAR**

Instruction: 2Hrs/ week	SEE Marks:--	Sub Ref Code :IT4145
Credits : 1	CIE Marks:25	Duration of SEE:3Hrs

The objective of the project seminar is to actively involve the student in the initial work required to undertake the final year project. It may comprise of:

1. Problem definition and specifications.
2. A broad understanding of the available technologies/ tools to solve a problem of interest.
3. Presentation (Oral and Written) of the project.

Seminar topics may be chosen by the students with advice from the faculty members.

First 4 weeks of IV year 1st semester will be spent on special lectures by faculty members, research scholar speakers from industries and R&D institutions. The objective of these talks is to be expose students to real life /practical problems and methodologies to solve them.

A seminar schedule will be prepared by the coordinator for all the students. It should be from the 5th week to the last week of the semester and should be strictly adhered to.

Each student will be required to

1. Submit a one page synopsis of the seminar to be delivered for display on notice board.
2. Give a 20 minutes presentation followed by 10 minutes discussion.
3. Submit a technical write up on the talk delivered.

At least two teachers will be associated with the evaluation of the project seminar for the award of the sessional marks which should be on the basis of performance on all the three items stated above.

In the first Semester the student is expected to complete problem definition, requirements specification and analysis, design.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EXAMINATION
B.E IV YEAR II-SEMESTER WITH EFFECT FROM THE ACADEMIC YEAR 2017-18

IV Year II-Semester

S No.	Course Code	Course Name	Scheme of Instruction				Scheme of Examination			
			Periods per week				Duration in Hrs	Maximum Marks		Credits
			L	T	D	P		SEE	CIE	
1	IT4XX0	Elective III	3	-	-	-	3	70	30	3
2	IT4XX0	Elective IV	3	-	-	-	3	70	30	3
PRACTICALS										
3	IT4215	Project Work / Internship				18	Viva	50	50	9
Total			6	-	-	18	-	190	110	15
Grand Total			24				-	300		

Elective-III		Elective-IV	
IT4150	Software Reuse Techniques	IT4190	Machine Learning
IT4160	Software Project Management	IT4200	Natural Language Processing
IT4170	Middleware Technologies	ME4210	Intellectual Property Rights
IT4180	Software Testing	CE4530	Disaster Management

with effect from the academic year 2017-18

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

**DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV YEAR II SEMESTER
SOFTWARE REUSE TECHNIQUES (Elective-III)**

Instruction: 3Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4150
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
develop reusable components and apply in business applications	<ol style="list-style-type: none">1. Understand the basics of software reuse.2. Identify various design patterns3. Apply architectural patterns using case studies.

UNIT-I

Software reuse success factors, Reuse driven software engineering business, Object oriented software engineering, applications and component sub systems, use case components, object components.

UNIT-II

Design Patterns – Introduction, Creational patterns, factory, factory method, abstract factory, singleton, builder prototype.

UNIT-III

Structural Patterns- Adapters, bridge, composite, decorator, façade, flyweight, proxy.

Behavioral Patterns – Chain of responsibility, command, interpreter.

UNIT-IV

Behavioral Patterns – Iterator, mediator, memento, observer, state, strategy, template, visitor, other, design patterns- Whole part, master- slave, view handler, forwarder- receiver, client – dispatcher- server, publisher – subscriber.

UNIT-V

Architectural patterns – Layers, pipes and filters, black board, broker, model-view controller, presentation- abstraction – control, micro kernel, reflection.

Learning Resources :

1. Ivar jacobson, Martin Griss, Patrick Hohson – Software Reuse. Architecture, Process and Organization for Bussiness Success, ACM Press, 1997.
2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides – Design Patterns- Addison, 1995, Pearson Education.
3. Frank Buschmann etc. – Pattern Oriented Software Architecture – Volume 1, Wiley 1996.
4. James W Cooper – Java Design Patterns, a tutorial, Addison 2000, Pearson Education.
5. <http://nptel.ac.in/courses/106101061/27>
6. <http://www.nptelvideos.com/video.php?id=910>

with effect from the academic year 2017-18

DEPARTMENT OF INFORMATION TECHNOLOGY SYLLABUS FOR B.E. IV YEAR II SEMESTER SOFTWARE PROJECT MANAGEMENT (Elective-III)

Instruction: 3Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4160
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Understand the fundamental principles of Software Project management & will also have a good knowledge of responsibilities of project manager and how to handle these	<ol style="list-style-type: none">1. Describe the fundamentals of Project Management2. Recognize and use Project Scheduling Techniques3. Familiarize with Project Control Mechanisms4. Understand Team Management5. Recognize the importance of Project Documentation and Evaluation

UNIT-I

Conventional Software Management: The waterfall model, conventional software Management performance, Evolution of Software Economics, Improving Software Economics: Reducing Software product size. The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT-II

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases. Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, pragmatic artifacts, Work Flows of the process, Checkpoints of the process.

UNIT-III

Iterative Process Planning: work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning, Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

UNIT-IV

Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, Tailoring the Process: Process discriminants. Managing people and organizing teams.

UNIT-V

Future Software Project Management: modern Project Profiles, Next generation Software economics, modern process transitions. Process improvement and mapping to the CMM.

Learning Resources:

- 1) Walker Royce, Software Project Management: A Unified Framework, Pearson Education 1998
- 2) Bob Hughes and Mike Cotterell – Software Project Management, 4th Edition – Tata McGraw Hill – 2006
- 3) Pankaj Jalote, Software Project Management, Pearson Education – 2002
- 4) <http://nptel.ac.in/courses/106101061/29>

**DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV YEAR II SEMESTER
MIDDLEWARE TECHNOLOGIES (Elective-III)**

Instruction: 3Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4170
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Know the role of middleware in the distributed environment and its common services. Get on awareness in different technologies like struts, EJBS, CORBA and also basics of .NET	<ol style="list-style-type: none">1. Know client server computing models and can establish communication between them.2. Understand the basics of Web Services and struts framework.3. Develop EJB applications.4. Demonstrate how middleware facilitates the development of distributed applications in heterogeneous environments using CORBA.5. Develop programming using C#.net

UNIT-I

CLIENT/SERVER CONCEPTS: Client – Server – File Server, Database server, Group server, Object server, Web server. Middleware – General middleware – Service specific middleware. Client/Server Building blocks – RMI-Messaging – Peer – to – Peer.

UNIT-II

Web Services- SOA, SOAP, WSDL, REST Services, JDBC API, Applications.

STRUTS: An introduction to Struts Framework, Basic components of struts, Model Layer, view Layer, Controller Layer, and Validator.

UNIT-III

EJB ARCHITECTURE: EJB –EJB Architecture – Overview of EJB software architecture – View of EJB – Conversation – Building and Deploying EJBs – Roles in EJB.

EJB APPLICATIONS: EJB Session Beans – EJB entity beans – EJB clients – EJB Deployment – Building an application with EJB.

UNIT-IV

CORBA: CORBA – Distributed Systems – Purpose – Exploring CORBA alternatives – Architecture overview – CORBA and networking model – CORBA object model – IDL – ORB – Building an application with CORBA.

UNIT-V

COM: COM – Data types – Interfaces – Proxy and stub – Marshalling – Implementing server/Client – Interface pointers – Object Creation, Invocation, Destruction – Comparison COM and CORBA – Introduction to .NET – Overview of .NET architecture–Marshalling – Remoting

Learning Resources :

1. Ian Gorton, "Essential Software Architecture", Springer, 2nd Edition, 2011.
2. Gustavo Alonso, Fabio Casati, Harumi Kuno, Vijay Machiraju, "Web Services: Concepts, Architectures and Applications", Springer, 2010.
3. G. Sudha Sadasivam, Radha Shankarmani, "Middleware and Enterprise Integration Technologies", Wiley, 2009.
4. Robert Orfali, Dan Harkey and Jeri Edwards, "The Essential Client/server Survival Guide", Galgotia publications Pvt. Ltd., 2002.(Unit 1)
5. Tom Valesky, "Enterprise Java Beans", Pearson Education, 2002.(Unit 2 & 3)
6. Jason Pritchard. "COM and CORBA side by side", Addison Wesley,2000 (Unit 4 & 5)
7. Jesse Liberty, "Programming C#", 2nd Edition, O'Reilly press,2002. (Unit 5)
8. Struts: the complete reference By James Holmes Edition: 2, illustrated Published by McGraw- Hill Professional, 2006(added)(unit-2)
9. Mowbray, " Inside CORBA", Pearson Education, 2002.
10. <http://www.nptelvideos.in/2012/11/internet-technologies.html>

with effect from the academic year 2017-18

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV YEAR II SEMESTER
SOFTWARE TESTING (Elective-III)

Instruction: 3Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4180
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Develop various strategies of software testing in their project.	<ol style="list-style-type: none">1. Identify various methodologies of software testing.2. Design test cases by using various testing techniques3. Estimate metrics used for testing4. Identify the process of testing on various applications.5. Apply the testing strategies and methodologies in their projects

UNIT-I

Introduction: Software-Testing, Terminology and Methodology: Software testing terminology, Software Testing Life Cycle (STLC), Software Testing Methodology

Verification and Validation: V & V activities, verification of requirements, verification of HLD and LLD, validation

UNIT-II

Dynamic Testing: Black Box Testing Techniques, White Box Testing Techniques, Static Testing, Validation Activities, Regression Testing.

UNIT-III

Test Management: Test Organization, Structure, Planning, Detailed test design and test specification, Software Metrics, Size Metrics, Testing Metrics for Monitoring and Controlling the Testing Process, Efficient Test Suite Management.

UNIT-IV

Testing Process: Testing Objected Oriented Software, Testing Web Based Systems, Debugging

UNIT-V

Software Testing Tools-case study: Overview of Testing Tools, Testing an Application using WinRunner, Load Runner, JMeter, QTP

Learning Resources :

1. Naresh Chauhan, Software Testing Principles and Practices, Oxford University Press, 2010.
2. Dr.K.V.K.K.Prasad, Software Testing Tools, Dreamtech press, 2008.
3. William E. Perry, Effective Methods for Software Testing, Third Edition, Wiley & Sons, 2006.
4. Srinivasan Desikan, Gopalaswamy Ramesh, Software Testing: Principles and Practices, Pearson Education, 2006.
5. Testing and Quality Assurance for Component-based Software, by Gao, Tsao and Wu, Artech House Publishers
6. Software Testing Techniques, by BorriesBeizer, Second Edition, Dreamtech Press
7. Managing the Testing Process, by Rex Black, Wiley
8. Handbook of Software Quality Assurance, by G. Gordon Schulmeyer, James I.McManus, Second Edition, International Thomson Computer Press
9. <http://www.nptelvideos.in/2012/11/software-engineering.html>
10. https://onlinecourses.nptel.ac.in/noc16_cs16/preview

with effect from the academic year 2017-18

**DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV YEAR II SEMESTER
MACHINE LEARNING (Elective-IV)**

Instruction: 3Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4190
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The main objective of this course is to	At the end of the course student will be able to:
introduce the fundamental concepts in Machine Learning and popular machine learning algorithms.	<ol style="list-style-type: none">1. Apply an appropriate algorithm for a given problem2. Prove basic results in the theory of learning3. Apply machine learning techniques in the design of computer systems.4. Demonstrate knowledge of the machine learning literature5. Explain the relative strengths and weaknesses of different machine learning methods.

UNIT I

Introduction to Machine Learning: Introduction, Types of Learning: Supervised Learning, Unsupervised Learning, Reinforcement Learning, Probability Basics, Linear Regression, Logistic Regression

UNIT II

Decision Tree Learning: Introduction to Decision Trees, Learning Decision Tree, Overfitting, K-Nearest Neighbor, Feature Selection, Feature Extraction, Collaborative Filtering.

UNIT III

Support Vector Machine & Neural Networks: Introduction, Support Vector Machine, Kernel function and Kernel SVM, Multilayer Neural Network, Backpropagation, Introduction to deep Neural Network

UNIT IV

Bayesian Learning: Introduction, Naive Bayes, Bayesian Network.

Computational Learning Theory: Introduction, PAC Learning Model, Sample Complexity, VC Dimension, Ensemble Learning: Bagging and Boosting

UNIT V

Clustering, K-means Clustering, Hierarchical Clustering, Spectral Clustering, Gaussian Mixture Model

Learning Resources:

1. Tom Mitchell, Machine Learning , First Edition, McGraw-Hill, 1997
2. Christopher Bishop. Pattern Recognition and Machine Learning. Second Edition.
3. Ethem Alpaydin , Introduction to Machine Learning, Second Edition
4. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2008.
5. <http://nptel.ac.in/courses/106106139/>

with effect from the academic year 2017-18

**DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV YEAR II SEMESTER
NATURAL LANGUAGE PROCESSING (Elective-IV)**

Instruction: 3Hrs/ week	SEE Marks: 70	Sub Ref Code : IT4200
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course Objectives	Course Outcomes
The main objective of this course is to	At the end of the course student will be able to:
introduce the fundamental techniques of natural language processing and to design and build computer systems that are able to analyze natural languages, and that generate their outputs in a natural language.	<ol style="list-style-type: none">1. Apply fundamental algorithms and techniques in the area of natural language processing2. Assess / Evaluate NLP based systems3. Choose appropriate solutions for solving typical NLP sub-problems4. Describe the typical problems and processing layers in NLP5. Analyze NLP problems to decompose them in adequate independent components

UNIT- I

Introduction to Natural Language Processing: The study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English syntax,

UNIT- II

Grammars and Parsing: Grammars and sentence Structure, Top-Down and Bottom-Up Parsers, Transition Network Grammars, Top- Down Chart Parsing.

Feature Systems and Augmented Grammars: Basic Feature system for English, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks.

UNIT- III

Ambiguity Resolution - Statistical Methods:Basic Probability Theory, Estimating Probabilities, Part-of-Speech Tagging, Obtaining Lexical Probabilities, Probabilistic Context-Free Grammars, Best First Parsing.

UNIT- IV

Semantics and Logical Form: Word senses and Ambiguity, Encoding Ambiguity in the Logical Form, Thematic Roles, Speech Acts and Embedded Sentences, Defining Semantic Structure: Model Theory

UNIT-V

Linking Syntax and Semantics: Semantic Interpretation and Compositionality, A Simple Grammar and Lexicon with Semantic Interpretation, Prepositional Phrases and Verb Phrases, Lexicalized Semantic Interpretation and Semantic Roles, Handling Simple Questions, Semantic Interpretation Using Feature Unification, Generating Sentences from Logical Form.

Learning Resources :

1. James Allen, "Natural Language Understanding", Pearson Education
2. Christopher D Manning and Hinrich Schütze, "Foundations of Statistical Natural Language Processing" MIT Press, 1999.
3. Akshar Bharti, Vineet Chaitanya and Rajeev Sangal, "NLP: A Paninian Perspective", Prentice Hall, New Delhi
4. D. Jurafsky, J. H. Martin, "Speech and Language Processing", Pearson
5. <http://www.nptelvideos.in/2012/11/natural-language-processing.html>

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV YEAR II SEMESTER
INTELLECTUAL PROPERTY RIGHTS (ELECTIVE-IV)

Instruction: 3Hrs/ week	SEE Marks: 70	Sub Ref Code : ME4210
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

Course objectives	Course Out comes
The objectives of this course are to: 1. have an insight on various intellectual properties. 2. know the procedure to file patents. 3. analyse the classes of articles registrable under industrial designs. 4. understand registered and unregistered trademarks. 5. know the subject matter of copyrights and the procedure to apply for copyright protection.	On completion of the course, the student will be able to: 1. Learn the meaning and nature of IPR and have knowledge of various international conventions 2. Awareness about how to file a patent and rights and obligations of a patentee 3. Knowledge of the aspects of industrial design and the articles eligible for registration 4. Know the importance of protecting trademarks and the associated goodwill 5. Learn the procedure to apply for copyrights and the various forms of copyrights

UNIT – I

Introduction: Overview of intellectual property (IP), importance of IP, Types of IP, territoriality of IP, impact of IP in socio-economic development, International organizations, treaties, and conventions associated with intellectual property; WTO, WIPO, GATT, TRIPS & TRIMS

UNIT – II

Patents: Meaning of a patent, commercial significance, patentable subject matter, filing and obtaining of a patents, rights and obligations of a patentee, specification, register of patents, rights and obligations of a patentee, compulsory licenses - revocation, surrender, infringement. Utility models differences between a utility model and a patent.

UNIT – III

Industrial Design: Meaning of an industrial designs, registration, rights conferred by registration, infringement of "copyright in design".

Trade Marks: Meaning of a trade mark, purpose of protecting trademarks, trademarks registry, assignment, transmission, and licensing of trade marks, passing off.

UNIT – IV

Copy Rights: Nature of copy right, subject-matter of copyright, rights conferred by copyright, broadcasting, publication, computer programme, database, assignment, transmission, and relinquishment of copyright, infringement of copy right.

UNIT – V

Other forms of intellectual property: confidential information, know-how, industrial and trade secrets, and geographical indications.

Enforcement of Intellectual Property Rights: Infringement of intellectual property rights, enforcement measures, emerging issues in intellectual property protection.

Unfair Competition: meaning of unfair competition, relation between unfair competition and intellectual property laws.

Learning Resources:

1. P.Narayanan, Intellectual property law, 3rdedn., Eastern Law House Revised 2017
2. B.L.Wadehra, Law Relating to Patents, Trade Marks, Copyright, Designs & Geographical Indications, 5th edition, Universal law Publishing Pvt. Ltd., India 2014

References:

3. Cronish W.R., Intellectual property - patents, copyright, trademarks and allied rights, Sweet & Maxwell, 1999
4. Deborah E. Brouchoux, Intellectual Property, 3rd edition, Cengage learning 2012

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV YEAR II SEMESTER
DISASTER MANAGEMENT (ELECTIVE – IV)

Instruction: 3Hrs/ week	SEE Marks: 70	Sub Ref Code : CE4210IT4160
Credits : 3	CIE Marks: 30	Duration of SEE: 3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
<i>Objectives of this course are to:</i>	<i>Upon the completion of this course the students will be expected to:</i>
<ol style="list-style-type: none">1. know about the state of art of disaster management in world and explore the history of the disasters and comprehend how past events have helped shape the future.2. Study the various natural and manmade disasters and apply the mitigation measures3. Expose students to various technologies used for disaster mitigation and management.	<ol style="list-style-type: none">1. Attain knowledge on various types, stages, phases in disaster with international & national policies & programmes with reference to the disaster reduction.2. Understand various types of natural disaster, their occurrence, Effects, Mitigation and Management Systems in India3. Understand different types of manmade disasters, their occurrence, Effects, Mitigation and Management Systems in India.4. Explain the utility of geography information systems (GIS), Remote sensing technology in all phases of disaster mitigation and management.5. Develop understanding on the concepts of risk, vulnerability, warning and forecasting methods in disaster management.

UNIT-I

Introduction – Hazard, vulnerability and risk, Types of disasters , Disaster management cycle, role of civil engineers in disaster management, Progress of disaster management in world, vulnerability profile of India, Disaster management act, Disaster management in India

UNIT-II

Natural Disasters – Hydro - meteorological based disasters – Tropical cyclones, floods, drought and desertification zones, Geographical based disasters – Earthquake, Tsunamis, Landslides and avalanches – Causes, Types, effects and Mitigation measures, coastal zone management

UNIT-III

Human induced hazards – chemical industrial hazards, major power breakdowns, traffic accidents, etc. Case studies

UNIT-IV

Introduction to remote sensing and GIS, its applications in disaster mitigation and management, case studies

UNIT-V

Risk assessment and hazard mapping – mitigation and management options – warning and forecasting.

Suggested Reading:

1. Rajib, S and Krishna Murthy, R.R.(2012) "*Disaster Management Global Challenges and Local Solutions*", Universities Press, Hyderabad.
2. Navele, P & Raja, C.K. (2009), *Earth and Atmospheric Disasters Management, Natural and Manmade*, B.S. Publications, Hyderabad.
3. Fearn-Banks, K(2011), *Crises Computations Approach: A case book approach*, Route ledge Publishers, Special Indian Education, New York & London.
4. Battacharya, T. (2012), *Disaster Science and Management*, Tata McGraw Hill Company, Delhi.

with effect from the academic year 2017-18

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV YEAR II SEMESTER
PROJECT WORK / INTERNSHIP

Instruction: 18Hrs/ week	SEE Marks: 50	Sub Ref Code : IT4215
Credits : 9	CIE Marks: 50	Duration of SEE: --

Focus of U.G. Project should be on *Solving a Real Life Problem*.

Faculty members should prepare project briefs well in advance. They should be made available to the students at the departmental library.

A project may be classified as hardware/software/modeling/simulation. It should involve elements of such as analysis, design, coding, testing, etc.,

The department will appoint a project coordinator who will be incharge of the following:

- Grouping of students (a maximum of three in a group)
- Allotment of projects and project guides
- Project monitoring at regular intervals

Project allotments is to be completed by the 4th week of 1st Semester of IV years to that students get sufficient time for completion of their projects.

All projects are to be based on the grade/marks, awarded by a monitoring committee comprising of faculty members as well as by the supervisor.

Efforts are to be made so that some of the projects are carried out in industries.

Projects may also be invited from industries.

Norms for final documentation of the project report are to be provided by the department.

* Excellent / Very Good / Good / Satisfactory / Unsatisfactory.

Note: Three periods of contact load will be assigned to each project guide.