YESHWANTRAO CHAVAN COLLEGE OF ENGINEERING
B.E. (Computer Technology)
SCHEME OF EXAMINATION

S. No.	Code	Subject	L	T	P	Total Contact Hours	Credits	Evaluation Scheme					
								MSE-I	MSE-II	TA	ESE	Total	ESE Hrs
SEMESTER VII													
1	CT401	Software Engineering	4	0	0	4	4	15	15	10	60	100	3
2	CT402	Software Engineering Laboratory	0	0	2	2	1			40	60	100	
3	CT450	Object Oriented Modeling	3	1	0	4	4	15	15	10	60	100	3
4		Professional Elective 2	4	0	0	4	4	15	15	10	60	100	3
5		Professional Elective 3	4	0	0	4	4	15	15	10	60	100	3
6		Free Elective 2	4	0	0	4	4	15	15	10	60	100	3
7	CT413	STR (TRAINING)	0	0	0	0	3			100		100	
8	CT440	Seminar 2	0	0	2	2	1			100		100	
9	CT414	Project Phase 1 (Analysis & Design)	0	0	6	6	4			40	60	100	
Total			19	1	10	30	29						
	CT405	PE2: Embedded Systems	4	0	0	4	4	15	15	10	60	100	3
	CT406	PE2: Neural Network & Fuzzy Logic	4	0	0	4	4	15	15	10	60	100	3
	CT407	PE2: Ad-hoc Wireless Networks	4	0	0	4	4	15	15	10	60	100	3
	CT408	PE3:Cloud Computing	4	0	0	4	4	15	15	10	60	100	3
	CT409	PE3:Operations Research	4	0	0	4	4	15	15	10	60	100	3
	CT410	PE3: Artificial Intellegience	4	0	0	4	4	15	15	10	60	100	3
	EL412	FE 2 : Electrical Energy Audit and Safety	4	0	0		4	15	15	10	60	100	
	EL413	FE 2: Utilisation of Electrical Energy	4	0	0		4	15	15	10	60	100	
	CV418	FE 2 : Elements of Earthquake Engineering	4	0	0	4	4	15	15	10	60	100	
	CV419	FE 2 : Air Pollution & Solid Waste Management	4	0	0	4	4	15	15	10	60	100	
	ET411	FE2 : Soft Computing	4	0	0	4	4	15	15	10	60	100	
	ET412	FE2 : Industrial Instrumentation	4	0	0	4	4	15	15	10	60	100	
	ME429	FE 2 : Total Quality Management	4	0	0	4	4	15	15	10	60	100	
	ME430	FE 2 : Reliability Engineering	4	0	0	4	4	15	15	10	60	100	
	EE411	FE 2 :Fuzzy Logic & Neural Network	4	0	0	4	4	15	15	10	60	100	
	EE429	FE 2 :Basic of Analog and Digital Communication Systems	4	0	0	4	4	15	15	10	60	100	
SEMESTER VIII													
1	GE408	Cyber laws	4	0	0	4	4	15	15	10	60	100	3
2	CT415	Network Security	4	0	0	4	4	15	15	10	60	100	3
3		Professional Elective 4	4	0	0	4	4	15	15	10	60	100	3
4		Professional Elective 4 Laboratory	0	0	2	2	1			40	60	100	
5		Professional Elective 5	4	0	0	4	4	15	15	10	60	100	3
6		Professional Elective 5 Laboratory	0	0	2	2	1			40	60	100	
7	CT425	Comprehensive viva	0	0	0	0	3			40	60	100	
8	CT426	Project Phase 2 (Implementation)	0	0	6	6	6			40	60	100	
9	CT427	Extra/Co-curricular / Competitive Examination	0	0	0	0	2			100			
Total			16	0	10	26	29						
	CT418	PE4: Digital Image Processing	4	0	0	4	4	15	15	10	60	100	3
	CT419	PE4: Digital Image Processing Laboratory	0	0	2	2	1			40	60	100	
	CT420	PE4: Pattern Recognition	4	0	0	4	4	15	15	10	60	100	3
	CT421	PE4: Pattern Recognition Laboratory	0	0	2	2	1			40	60	100	
	CT422	PE4: Mobile Operating Systems	4	0	0	4	4	15	15	10	60	100	3
	CT423	PE4: Mobile Operating Systems Laboratory	0	0	2	2	1			40	60	100	
	CT 430	PE 5: Business Intelligence and its Applications	4	0	0	4	4	15	15	10	60	100	3
	CT431	PE 5: Business Intelligence and its Applications Laboratory	0	0	2	2	1			40	60	100	
	CT432	PE5: Software Project Management	4	0	0	4	4	15	15	10	60	100	3
	CT433	PE5: Software Project Management Lab.	0	0	2	2	1			40	60	100	
	CT434	PE5: Speech Processing	4	0	0	4	4	15	15	10	60	100	3
	CT435	PE5: Speech Processing Lab.	0	0	2	2	1			40	60	100	

Chairperson	Aravind	Date of Release	May 2013	Applicable for

YESHWANTRAO CHAVAN COLLEGE OF ENGINEERING

B.E. (Computer Technology)

SCHEME OF EXAMINATION

S. No.	Code	Subject	L	T	P	Total Contact Hours	Credits	Evaluation Scheme					
								MSE-I	MSE-II	TA	ESE	Total	ESE Hrs
Dean (Acad. Matt.)			Version				1.03			AY2013-14 Onwards			

SEMESTERVII								
CT401	SOFTWARE ENGINEERING				L=4	T=0	P=0	Credits = 4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3 Hrs		

OBJECTIVES	OUTCOMES
1. To introduce basic software engineering methods /models/ practices and their appropriate application. 2. To understand concepts , principles , and strategies applicable to the analysis of software requirements and design activity. 3. To understand various testing strategies and types of testing. 4. To understand configuration management , version control and change control process. 5. To understand project management , planning, scheduling , risk management , project and process metrics. 6. To get an overview of open source Software Engineering tool viz. Subversion and understand some concepts such as Re-engineering.	1. Choose appropriate Software Process Model for given Project depending on requirements and resources at hand. 2. Perform requirements analysis and create design for a given case study. 3. Choose appropriate testing strategy and apply testing principles for testing a given application. 4. To understand basics of software configuration management , version control and change control. 5. To calculate effort and cost estimate for given requirements and assess risks. 6. To perform basic operations on Sub-version.

PO, PSO MAPPING:a,b,c,d,e,f,g,h,I,j,k,l,m

SYLLABUS

UNIT I Introduction to Software Engineering. A Generic View of process, Process models: Water fall Mode l, RAD Model, Prototyping Model, Component Development Model, Requirement Engineering: Requirement Engineering Task Initialization Eliciting Requirement, Developing Use Case, Analysis Model, Negotiation, Validation

UNIT II Building the Analysis mode: Requirement Analysis, Analysis Modeling Approaches, Data Modeling Concept, Object Oriented Analysis, Types of Modeling, Design Engineering: Design Concept, Design Model.

UNIT III Testing Strategies : Strategic Approach, Strategic issues, Strategies for conventional Software, Strategies for Object Oriented Software, Validation Testing, Testing Tactics: White-Box Testing, Basis Path testing: Flow Graph Notation, Independent Program Paths, Control Structure Testing, Black Box Testing, Introduction to object oriented testing.

UNIT IV Configuration Management: Base lines, Software Configuration items, The SCM Process, Identification of Objects in the Software Configuration ,Version Control, Change Control, Configuration Audit, Status Reporting, SCM Standards.

UNIT V Project Management, Metrics for Process and Projects, Project Estimation , Risk Management: Reactive vs. Proactive Risk Strategies , Software Risks, Risk Identification, Risk Projection.

UNIT VI Advanced Topic sin Software Engineering : Reengineering Computer Aide software engineering, Open source SE tools introduction, Example-Subversion : Overview, Typical subversion usage and workflow.

TEXT BOOKS:

1. Software Engineering – A Practitioner's Approach (Sixth Edition) by Roger S. Pressman– Mc Graw Hill.
2. Object Oriented Software Engineering by Leth bridge , Pearson Edu.

Chairperson		Date of Release	May 2013	Applicable for AY 2013-14 Onwards
Dean (Acad. Matters)		Version	1.00	

CT402	SOFTWARE ENGINEERING LABORATORY	L=0	T=0	P=2	Credits=1
Evaluation Scheme	Continuous Evaluation	ESE		Total	ESE Duration
	40	60		100	

Practical List:

Sr.No.	PracticalName
1	Introduction to Software Engineering fundamentals.
2	Introduction to RATIONAL ROSE Interface.
3	Overview and Case study of UML.
4	To study and draw Use Case diagram for the given case study.
5	To create use case documents for the given case study.
6	To study and create Software Requirement Specification document.
7	To study and draw UML Class diagram.
8	To study and draw UML Activity diagram.
9	To create SRS for Mini Project including appropriate UML diagrams.
10	To study basic operations on a Subversion Repository under Windows.
Beyond Syllabus Practical List:	
1.	To study Manual /Automated testing.
2.	To study Microsoft Project Plan.

SEMESTER: VII							
CT403	OBJECT ORIENTED MODELING				L=4	T=0	P=0	Credits = 4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1. To distinguish between procedure oriented and Object Oriented Methodology. 2. To understand the features of Object Oriented Programming. 3. To Understand the basic building blocks of C++ language. 4. To Understand the Utility and difference of various Data Structure. 5. To Understand the need of Exception. 6. Exception Handling Mechanisms of OOP Methodology using C++. 7. To study the concept of Templates . 8. To Understand the OOP methodology and relate to it day to day applications. 9. To relate various practical examples with the OOP Methodology.	1. Compare different types of Programming Languages 2. Describe Real World object, Structure and Class. 3. Implement the Programming Examples. 4. Implement the Concept of abstract class, Concept of Interface. 5. Define and classify Data Structure. 6. Implement the Mechanisms and Concept of Exception , Types of Exception 7. Define stream, the Concept of File, Opening and Closing of File

PO, PSO MAPPING:a,c,e,g,i,j,k,l,m

SYLLABUS

UNIT I Introduction : object orientation, Object Oriented development, modeling as a design technique, Class modeling:- the three models, object, classes, links and associations, navigation of class models, aggregation, abstract classes, metadata, packages.

UNIT II State Modeling: events & states, transitions and conditions, state diagrams behavior, concurrency advanced state modeling concepts, nested state diagrams, concurrency, relation of class & state models. Interaction modeling : Use case. Sequence and activity models, relationships among the models.

UNIT III System Analysis :
Development life cycle and development style, system conception, domain analys is application analysis

UNIT IV System Design : Overview, estimating performance, making are use plan, breaking into sub systems, identifying concurrency, allocation of sub systems, management of data storage, handling global resources, choosing software control strategy, handling boundary conditions, setting trade off priorities, common architectur all styles.

UNIT V Class Design, implementation modeling, object oriented languages.

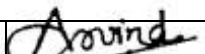
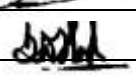
UNIT VI Databases : implementing structures basic and advanced, implementing functionality, object oriented databases. Object oriented programming style, reusability, extensibility, robustness.

TEXT BOOKS:

1. Object oriented modeling and design with UML by James Rumbaugh, Michal Blaha , Pearson Prentice Hall Second Edition.

REFERENCE BOOKS:

1. Practical Object Oriented Design with UML by Mark Priestley TMH 2nd Edition.
2. The Unified Modeling Language user guide by Booch , Rumbaugh, Jacobson Addison Wesley 2nd Edition.

Chairperson		Date of Release	May 2013	Applicable for AY 2013-14 Onwards
Dean (Acad. Matters)		Version	1.00	

Professional Elective 2								
CT405	PE2: EMBEDDED SYSTEM				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1. To make the students aware of the Embedded Systems surrounding them. 2. Students should know about the types of processors & architectures used, design & codesign concepts usedin ES. 3. To learn the concept of Real Time Operating System, Mobile Operating System. The working of micro controller to be used in ES.	1. Using the Basics of ES, decide the components of a particular ES. 2. Design & implement the hardware & software and integrate them to develop the final device. 3. Choose appropriate processors and Real Time operating system for ES design. 4. Use assembly or high level languages for S/W development & decide which development & debugging tool will be suitable for ES development. 5. Choose proper microcontroller / microprocessor for a particular ES design . 6. Develop the program for core functionality & communication of ES with other devices.
PO, PSO MAPPING : - a,c,d,e,h,i,k,l,m	

SYLLABUS

UNIT I — Embedded Systems concepts and definition , Embedded System design : Requirement analysis, Hardware and Software Design, co-design, I/O interface co-design for distributed embedded system, Applications of Embedded system.

UNIT II — Embedded Computing platform Software Development tools and debugging technologies Host and Target machines, Cross Assemble & Cross Compiler, Linker/Loader for embedded software, study and use of simulator, EPROM emulator, In Circuit Emulator, concept of tool chain.

UNIT III — Concept of Real Time Operating System, Real Time IO, R/T Multitasking & multithreading processes, RTOS Task Scheduling models Inter-task Communication, memory management.

UNIT IV — Overview of Embedded Operating Systems, Real Time operating System, Handheld operating system, Some Representative Embedded Systems.

UNIT V — ARM Architecture Block Diagram, Pin Description Memory Organization, Register Description, I/O Ports, Interrupts.

UNIT VI — Thumb Instruction Set and Programming Timers, Serial communication, Interfacing with analog and digital circuits.

TEXT BOOKS:

1.An Embedded software primer by David E. Simon, Pearson Edu. Asia.
2.Embedded System by Raj Kamal.
3.ARM System on Chip Architecture by Steve Furber, Pearson Edu. Asia.

REFERENCE BOOKS:

1. Real–time system : design principles for distributed embedded application by H. Kopetz .
2. Embedded system design by Krishna & Shinn .
3. Embedded Real -Time Systems : Concepts , Design & Programming by Dr. K. V. K. K. Prasad.

Chairperson	Aravind	Date of Release	May 2013	Applicable for AY 2013-14 Onwards
Dean (Acad. Matters)		Version	1.00	

SEMESTER: VII								
CT406	PE2: NEURAL NETWORKS & FUZZY LOGIC				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1. This course provides introduction various aspect so fneuralnet works, with emphasison element of design no ftrainable systems. The course introduces students to the fundamental theory, mathematics and modeling tools necessary to analyze and simulate natural and engineered systems.	1. Apply training and classification using the discrete perceptron and single layer continues perceptron networks for linearly separable classification . 2. Summarize Operations on fuzzy sets by solving the problem. 3. Compute fuzzy numbers. 4. Construct arithmetic operations on intervals and arithmetic operations on fuzzy numbers. 5. Apply lattice fuzzy numbers and Fuzzy equations to solve fuzzy controller problem.
PO, PSO MAPPING :- a,b,c,e,h,i,j,l	

SYLLABUS

UNIT I Fundamentals concepts and model so fartificial neural systems: Biological neurons and their artificial models, models of artificial neural networks, learning and adaptation, neural network learning rules, overview of neural networks, Simple Programming exercisein 'C'.

UNIT II Single-layer perceptron classifiers: Discriminant functions, linear machine and minimum distance classification, training and classification sing the discrete perceptron : algorithm and example, single layer continuous perceptron networks forlinearly separable classification.

UNIT III Multi layer feedback networks: linearly non-separable pattern classification, delta learning rule. Feed forward recall and error back-propagation training, learning factors, Hopfield networks, Applications of Neural Networks.

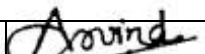
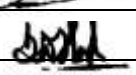
UNIT IV From classical (CRISP) sets to fuzzy sets: introduction crispsets: an overview, fuzzy sets: basic types, fuzzy sets: basic concepts, characteristics and significant of the paradigms hift. Fuzzy set sversuscrisp sets, representation of fuzzy sets, alpha cuts,cardinality, Operations on fuzzy sets : types of operations, fuzzy complements, fuzzy intersection : t-norms, fuzzy unions: t-Conorms, Distinction between Probability, Fuzzy and Random System.

UNIT V Linguistics variables, linguistic edges, Fuzzy relations, Binary Operation on as ingle set, projection and cylindrical extension, Extension principles for fuzzy sets, Fuzzy Arithmetic: fuzzy numbers, arithmetic operations on fuzzy numbers, Fuzzy Equations.

UNIT VI Defuzzification methods, design fuzzy rule base, Fuzzy Inference Systems: Mamdani Vs Sugeno, Steps indesign of a fuzzy controller, applications of fuzzy logic, Use of MATLAB for Design and Arguments

TEXT BOOKS:

1. Introduction to Artificial Neural System by J. M. Zurada, Jaico Publishing House, India.
2. Fuzzy logic & Neural Network b y T. J. Ross, TMH.

Chairperson		Date of Release	May 2013	Applicable for AY 2013-14 Onwards
Dean (Acad. Matters)		Version	1.00	

SEMESTER: VII							
CT407	PE2: ADHOC WIRELESS NETWORK				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1. Understand the design issues and application areas of Ad hoc network. 2. Understand the design goals of MAC protocols, classification of MAC protocols. 3. Introduce design issues and various types of routing protocols. 4. Understand design issues, operation and classification of multicast routing protocol. 5. Understand issues and challenges in the design of transport protocol and security aspect of communication in ad hoc network. 6. Introduce Quality of Service and energy management techniques in Ad-hoc network.	1. Identify the need of Ad hoc network. Compare infrastructure base and infrastructure less wireless network 2. Identify the design issues involved in the design of MAC protocol and classify the different MAC protocols. 3. Compare proactive and reactive routing protocols, Classify routing protocols. 4. Compare tree based and mesh based multicast routing protocols, identify advantage and drawback involved in each protocol. 5. Identify the various types of attack in ad hoc network and classify various types of transport layer protocol. 6. Classify QoS approaches and Identify the need of energy management in ad hoc network.

PO, PSO MAPPING :- a,c,d,f,h,k,l

SYLLABUS

UNIT I Ad hoc Wireless Networks: Introduction, Issues in Ad hoc wireless Networks, Ad hoc Wireless Internet.

UNIT II MAC Protocols for Ad hoc Wireless Networks: Introduction, issues in designing MAC protocol, Design goals of MAC protocols, classification, Contention based protocols: MACAW. Floor acquisition multiple access Protocols. Contention based protocols with reservation mechanism: Distributed Packet reservation multiple access protocol, Collision avoidance Time allocation protocol. Contention based MAC protocols with scheduling mechanism: Distributed priority scheduling and medium access in ad hoc networks.

UNIT III Routing Protocols for Ad hoc Wireless Networks: Introduction, Issues in designing routing protocol, classification, table driven routing protocols: DSDV, cluster head gateway switch routing protocol. On demand routing protocols: DSR, AODV. Hybrid routing protocols: core extraction distributed routing protocol, Zone routing protocol. Routing protocols with efficient flooding mechanisms, hierarchical routing protocols, Power aware routing protocols.

UNITIV Multicast routing in ad hoc wireless networks: Introduction, Issues in designing multicast routing protocol, operation of multicast routing protocols, An architecture reference model, classification, Tree based multicast routing protocol: Bandwidth efficient multicast routing protocol, Multicast routing protocol based on zone routing, Multicast core extraction distributed Ad hoc routing, MAODV. Mesh based multicast routing protocols: on demand multicast routing protocol, Dynamic core based multicast routing protocol. Energy efficient Multicasting: Energy efficient reliable broadcast and multicast protocols, A distributed power aware multicast routing protocol. Multicasting with Quality of Service guarantees, Application dependent multicast routing.

CT407	PE2: ADHOC WIRELESS NETWORK				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

UNIT V

Transport layer and security protocols: Introduction, Issues in designing transport layer protocol, design goals of transport layer protocol, Classification of transport layer solutions, TCP over ad hoc wireless networks, Other transport layer protocols for ad hoc wireless network, security in ad hoc wireless network, network security requirements, Issues and challenges in security provisioning, Network security attacks, Key management, Secure routing in AD hoc Wireless networks: Requirements of secure routing protocol, security aware ad hoc routing protocol.

UNIT VI

Quality of service and energy management in Ad hoc Wireless networks: Introduction, Issues and challenges in providing Quality of service, classification of Quality of service solutions. Introduction to energy management, Need for energy management, classification, Battery management schemes, transmission power management schemes, system power management schemes.

TEXT BOOKS:

1. Ad Hoc Wireless Networks Architecture and protocols by C. Siva Ram Murthy, B. S. Manoj. Pearson Publication.

REFERENCE BOOKS:

1. Ad hoc Networking by Charles E. Perkins Addison ,Wesley.
2. The hand book of ad hoc wireless networks by Mohammad Ilyas, CRC press.

SEMESTER: VII								
CT408	CLOUD COMPUTING				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1. Main objective is to create, promote and exploit an open-source Cloud API and platform targeted for designing and developing multi-Cloud-oriented applications.	1. Explain software and hardware support for enterprise and cloud computing. 2. Perform data modeling for enterprise and cloud knowledge bases. 3. Design enterprise and cloud software applications. 4. Implement and run distributed and cloud applications. 5. Ensure security and privacy in enterprise and cloud applications.
PO, PSO MAPPING :- a,b,c,d,e,f,g,h,i,k,l,m	

SYLLABUS

UNIT I Introduction to Cloud Computing: Defining Cloud Computing; Cloud Types and different models-The NIST model, The Cloud Cube Model, Deployment models, Service models; Examining the Characteristics of Cloud Computing; Benefits of cloud computing; Disadvantages of cloud computing; Assessing the Role of Open Standards.

UNIT II Cloud Architecture, Services and Applications: Exploring the Cloud Computing Stack, Connecting to the Cloud, Infrastructure as a Service, Platform as a Service, Saas Vs. Paas, Using PaaS Application Frame works, Software as a Service, Identity as a Service, Compliance as a Service .

UNIT III Abstraction and Virtualization: Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hyper visors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Context.

UNIT IV Exploring Cloud Infrastructures: Managing the Cloud-Administrating the Clouds, Management responsibilities, Lifecycle management Cloud Management Products, Emerging Cloud Management Standards, Understanding Service Oriented Architecture-Introducing Service Oriented Architecture.

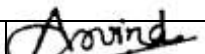
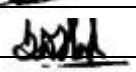
UNIT V Managing & Securing the Cloud: Administrating the Clouds, Cloud Management Products, Emerging Cloud Management Standards, Securing the Cloud, Securing Data, The security boundary, Security service boundary, Security mapping, Brokered cloud storage access, Establishing Identity and Presence.

TEXT BOOKS:

1. Cloud Computing Bible, by Sosinsky B. Wiley India.
2. Cloud Computing: Web Based Applications that Change the Way You Work and Collaborate Online by Miller Michael, Pearson Education India .

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigm by Buyya R. Broberg, J. Goscinski, A. John Wiley & Sons.
2. Cloud Computing – A practical Approach by T. Velte , A. Elsenpeter, R. Tata McGraw Hill.
3. Cloud Computing and SOA Convergence in Enterprise by Linthicium D. Pearson Education India.
4. Enterprise Cloud Computing by Shroff G, Cambridge University Press
5. Private Cloud Computing by Smooth S. Tan, N. Morgan Kauffman.
6. Cloud Computing: Web Based Applications that Change the Way You Work and Collaborate Online by Miller Michael, Pearson Education India .

Chairperson		Date of Release	May 2013	Applicable for AY 2013-14 Onwards
Dean (Acad. Matters)		Version	1.00	

<table>
<tr><td colspan="8">SEMESTER: VII</td></tr>
<tr><td>CT409</td><td colspan="3">PE3: OPERATIONSRESEARCH</td><td>L=4</td><td>T=0</td><td>P=0</td><td>Credits=4</td></tr>
<tr><td rowspan="2">Evaluation Scheme</td><td>MSE-I</td><td>MSE-II</td><td>TA</td><td>ESE</td><td>Total</td><td colspan="2">ESE Duration</td></tr>
<tr><td>15</td><td>15</td><td>10</td><td>60</td><td>100</td><td colspan="2">3Hrs</td></tr>
<tr><td colspan="4">OBJECTIVES</td><td colspan="4">OUTCOMES</td></tr>
<tr><td colspan="4">1. To provide knowledge about basic deterministic methods of operations research (linear programming, network flows, integer programming and nonlinear programming) and their applications to resource allocation problems in business and industrial organizations.
2. To develop an ability to analyze any engineering problem in a simple and logical manner and to apply appropriate basic principles to its solution.</td><td colspan="4">1. Describe at an intuitive level the process of operations research: a real-time cycle of problem understanding, formulation, solution and implementation .
2. Identify and develop operational research models from the description of the real system.
3. Formulate simple reasoning, learning and optimization problems, in terms of the representations and methods presented .
4. Manipulate the basic mathematical structures underlying these methods, such as system state, search trees, plan spaces, model theory, constraint systems, linear programs and integer programs.
5. Demonstrate the hand execution of basic reasoning and optimization algorithms on simple problems .
6. Use the mathematical tools that are needed to solve optimization problems.
7. Use mathematical software to solve the proposed models.</td></tr>
<tr><td colspan="8">PO, PSO MAPPING :- a,b,c,d,e,h,i,k,l,m</td></tr>
</table>

SYLLABUS

UNIT I Definitions, characteristics and limitations of O. R. phases of O. R. modelinging O. R. tools and techniques of O.R. .

UNIT II Linear programming , formulation, solution of L.P.P., graphical method, simplex method.

UNIT III Duality in L.P.P. and Integer Programming.

UNIT IV Allocation models – Assignment models multiple optima, prohibited assignment, transport model.

UNIT V Prohibited and preferred routes, and degeneracy ,Sequencing & Scheduling.

UNIT VI Karush-Kuhn-Tucker (KKT) Conditions for Constrained Optimization , exposure to tools e.g. Mathematica.

TEXT BOOKS:

1. Optimization technique by Radrin pearson ,Ed. Publication.
2. Problems in Operation Research by P.K.Gupta & Man Mohan ,Khanna Pub.
3. Mathematical Model sin Operation Research by J. K. Sharma, Mac millan Pub.

REFERENCE BOOKS:

1. Introduction to Operation research by Hiller & Liberman (Holden Day Inc. San Francisco).
2. Operation Research by Kantiswaroop & Gupta, S.Chand Pub.
3. Principles of Operation Research by Wagner ,PHI Pub.
4. Operation Research by Dr. B. S. Goel & S. K. Mittal , Pragati Prakashan.
5. Optimization Technique by S. S. Rao.

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SEMESTER: VII							
CT410	PE3: ARTIFICIAL INTELLIGENCE			L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration	
	15	15	10	60	100	3Hrs	

OBJECTIVES	OUTCOMES
1. The study of Artificial Intelligence course will equip the students with the sound understanding of AI concepts, perspectives to apply the AI themes to the challenging research are asrelated to AI. 2. To introduce the fundamental concepts in Artificial Intelligence, applications of AI, techniques in AI. 3. To concentrate on the basic algorithms for searching the goal, concepts of representation and control . 4. Provide the ability to assess the applicability, strengths, and weaknesses of the basic knowledge representation, various approaches. 5. To compare various Knowledge Representation methods and to understand Prolog fundamentals for Knowledge Representation. 6. To understand the reasoning process is carried out in Machines. 7. To understand how human thinking be emulated by a machine and Provide the ability to assess the applicability, strengths, and weaknesses of various learning methods.	1. Apply fundamentals of Artificial Intelligence for given problem statements. 2. Use basic algorithms for searching the goal, represent various knowledge structures in various applications of AI and related fields. 3. Assess the applicability, strengths , and weaknesses of the basic knowledge representation, problem solving, and learning methods in solving particular engineering problems. 4. Compare various knowledge representation approaches, solve problems based on knowledge representation methods. 5. Assess Monotonic and Non-monotonic reasoning methods. 6. Assess various learning methods, compare them.
PO, PSO MAPPING :- a,c,e,h,i,k,l	

SYLLABUS

UNIT I Introduction to AI : Definition of AI, early work in AI, the importance of AI,AI and related fields, distributed AI, task domain of AI, Problems, problem spaces and searches: defining the problem on a state space search, Introduction to intelligent agents, generic architecture of intelligent agents.

UNIT II Production systems and control strategies: depth first and breadth first search, back tracking, problem characteristics , issues in the design of search programs.
Heuristic search techniques: generate and test, hill climbing, best-first search, problem reduction, constraint satisfaction, means-ends analysis.

UNIT III Knowledge representation: issues, representation and mapping approaches, procedural Vsdeclarative knowledge, introduction to proposition logic, knowledge representation using predicate logic, unification and resolution algorithms.

UNIT IV Representation of knowledge using rules, logic programming, forward backward reasoning, matching, control knowledge. Knowledge representation using semanticnets, Prolog: Representation of Predicates, rules, and facts, recursion unification.

UNIT V Introduction to non-monotonic reasoning, logics for non-montonic reasoning Statistical reasoning: probability and Bay's theorem, certainty factors and rule based system.

UNIT VI Learning: general learning model, overview of different forms of learning, learning decision trees, Artificial Neural Networks (Introduction).

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CT410	PE3: ARTIFICIAL INTELLIGENCE				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

TEXT BOOKS:

1. Artificial Intelligence by E. Richand K. Knight and Nair .

REFERENCE BOOKS:

1. Introduction to Artificial Intelligence and Expert System by D. W. Patterson , PHI.
2. Principles of Artificial Intelligence by N. J. Nilsson, Narosa.
3. Artificial Intelligence by George F. Lugar, 4th Edition , Pearson Education.

SEMESTER: VII							
CT411	FE 2: MULTIMEDIA AND ANIMATION				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1. To learn basics of multimedia, applications of multimedia, requirements to make good multimedia. 2. To study Multimedia hardware, Macintosh and windows production platforms, multimedia authoring tools. 3. Multimedia building blocks. 4. The basics of animation, techniques of animation. 5. Animation in Flash. 6. To study 3D Animation, Types of 3D Animation Applications & Software of 3D Animation.	1. To understand the Basics of multimedia. 2. To understand multimedia hardware and multimedia authoring tools. 3. To develop skills in design, illustration, image manipulation, graphic designing, video editing, visual effects and game designing. 4. To apply the fundamental broad-based skills in traditional Animation techniques and emphasize to apply in practice. 5. To develop the skills in Flash Animation and apply it on some script. 6. To develop the 3D Animation skills.

PO, PSO MAPPING :- a,b,c,d,e,g,h,i,j,k,l

SYLLABUS

UNIT I Multimedia – definitions, CD-ROM and the multimedia highway. Applications of multimedia, introduction to making multimedia, the stages of project, requirements to make good multimedia, multimedia skills and training, the multimedia tech.

UNIT II Multimedia hardware, Macintosh and windows production platforms, hardware peripherals, connections, memory and storage devices, input devices output hardware, communication devices, media software, basic tools, making instant multimedia authoring tools.

UNIT III Multimedia building blocks – text- using text in multimedia, computers and text, font editing and design tools, Sound-the power of sound , multimedia system sound, Digital audio, preparing digital audio files, Audio file format, images- Making still Images, Color, Image file format, video- Broadcast video standard, Analog video, Digital video, optimizing video files for CDROM .

UNIT IV What is meant by Animation, Why we need Animation, History of Animation, Uses of Animation. Types of Animation, Principles of Animation, Some Techniques of Animation, and Animation on the WEB, Special Effects, and Creating Animation.

UNIT V Creating Animation in Flash: Introduction to Flash Animation – Introduction to Flash – Working with the Timeline and Frame-based Animation - Working with the Timeline and Tween-based Animation – Understanding Layers – Action script.

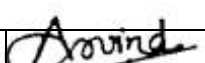
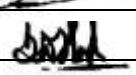
UNIT VI 3D Animation & its Concepts, Types of 3D Animation, Skeleton & Kinetic, 3D Animation Texturing & Lighting of 3D Animation, 3D Camera Tracking, Applications & Software of 3D Animation.

TEXT BOOKS:

1. Multimedia Making Work by Tay Vaughan (TMH), 3rd Ed.
2. Principles of Multimedia by Ranjan Parekh, 2007, TMH.
3. Multimedia Technologies by Ashok Banerji, Ananda Mohan Ghosh, McGraw Hill Publication.

REFERENCE BOOKS:

1. Multimedia systems design by K. Andleigh, K. Thakkrar, Phi Pub.
2. Multimedia: Computing, Communications & Applications by Raif Stein Metz and Kiara Nahrstedt.
3. Advanced Multimedia Programming by Steve Rimmer, McGraw Hill Pub.

Chairperson		Date of Release	May 2013	Applicable for AY 2013-14 Onwards
Dean (Acad. Matters)		Version	1.00	

SEMESTER: VII							
CT412	FE 2: CURRENT TRENDS AND TECHNOLOGIES				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1. The objective of this course is to make the students aware of the basic fundamentals of communication. 2. Growth of technologies in Internet, E-Technologies & E-Learning. 3. Students should know about the Green Computing and its implementation .	1. Using the Basics of Internet for deployment of various servers and recourses. 2. Designing and implementation of E-technologies 3. Design E-Learning Resources. 4. Choose appropriate processors and Real Time System for Green Computing. 5. Develop the Social Networking for next generation.
PO,PSO MAPPING :- a,b,c,d,e,f,g,h,i,j,k,l,m	

SYLLABUS

UNIT I Fundamentals of Communications: Types of communication- Wired, wireless, mobile, Modes of transmission: Simplex, Half Duplex, Full Duplex, Multiplexing techniques, History and evolution of wireless and mobile systems, Transition and characteristics of 1G, 2G, 3G, 4G, Spectrum, regulations, and frequency allocation.

UNIT II Fundamental of INTERNET: History, Internet working, Connections, Internet services, The World Wide Web, Tools for the WWW, Web servers, Web browsers, Web page makers and editors, Plug-ins and delivery vehicles.

UNIT III E-Technologies : Electronic Commerce: Framework, Media Convergence of Applications, Consumer, Applications, Organization Applications, Electronic Payment Systems: Digital Token, Smart Cards, Credit Cards, Risks in Electronic, Payment System, Designing Electronic Payment Systems, Electronic Data Interchange (EDI): Concepts, Applications, (Legal, Security and Privacy) issues, EDI and Electronic Commerce, Standardization and EDI, EDI Software, Implementation, EDI Envelope for Message Transport, Internet-Based EDI.

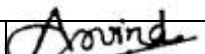
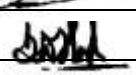
UNIT IV E-Learning: Definition, Introduction, Types of e-Learning: Learner-led e-Learning , Facilitated e-Learning , Instructor-led e-Learning , Embedded e-Learning, Tele monitoring And e-Coaching E-Learning Models: WBT, CBT, LMS, LCMS , Virtual School Systems, E-Learning Tools And Technologies: e-mail, Online Discussion, Chat and Instant Messaging, Voting, Whiteboard, Application Sharing, Conferencing, Online Meeting Tools ,Case study.

UNIT V Green Computing: Introduction, Why....Green Computing? Approaches to Green Computing-Virtualization, Power Management, Power supply, Storage, Video Card, Display, IT Equipment, Recycling, Remote Conferencing & Telecommuting Strategies, Product longevity, Resource allocation, Terminal servers, Operating system support, How to Implement? Industrial implementations of Green Computing- Blackle, Fit-PC, Zonbu computer, Sunray thin client.

UNIT VI Social Networking: Definition, Overview of Social Networking Sites, Types of Social Networking Sites: General purpose, Niche. Advantages of Social Networking Sites, Drawbacks of Social Networking Sites, Features and Need of Social Networking, Security Issues with Social Networking Sites, Case Studies.

TEXT BOOKS:

1. Impact of E-Business Technologies on Public and Private Organizations by OzlemBak, Nola Stair.
2. Mobile Computing by Tomasz Imielinski , Henry F. Korth .
3. Broadband telecommunications technology by Byeong Gi Lee, Minho Kang, Jonghee Lee.

Chairperson		Date of Release	May 2013	Applicable for AY 2013-14 Onwards
Dean (Acad. Matters)		Version	1.00	

CT412	FE 2: CURRENT TRENDS AND TECHNOLOGIES				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

REFERENCE BOOKS:

1. Introduction to broadband communication systems by Cajetan M. Akujuobi, Matthew, N. O. Sadiku.
2. E-Learning Tools and Technologies William Hortan, Katherine Hortan,Wiley Pub
3. Internet (Use of Search Engines Google & Yahoo etc).

SEMESTER: VIII Syllabus								
GE408	CYBER LAWS				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3 Hrs		

OBJECTIVES	OUTCOMES
1. This course will give an overview of the legal prospective of network security and in the process shall provide a detailed study of the law of e-commerce e-governance, e-documentation electronic and digital signature, hacking etc. The student shall be acquiring knowledge of the national and international regime of cyber issues and technology law along with issues of intellectual property law. Finally an understanding of the regulation and punishment related to cyber contravention shall be developed through a study of the relevant penal provisions.	

PO, PSO MAPPING :- a,d,f,h,i,j

SYLLABUS

UNIT I Evolution of the Law relating to information Technology –Legal environment in Information Age-Technology and law-The international regime, The National regime and initiatives in internet legislation-Issues of jurisdiction in cyber space – International Convention on cyber space 2001 OECD model treaty and E-commerce, WIPO copyright treaty (WCT) 1996,WIPO performance and phonograms treaty (WPPT) 1996.

UNIT II The basics of IT Act - Objectives, Scope and application of the Act of 2000, Application of the IP Code as a measure of penal statute to regulate cyber activities and cyber contracts.
Basic foundations in the Information Technology Act for the protection of E commerce, E Contracts and E documents, Digital signatures and identity-Access requirements, contract formation related nomenclature as defined in Section 2 of the IT Act.
Basic Contract Law – Formation of contracts, performance and discharge of contractual obligations under the Indian Contract Act, 1872.

UNIT III Legal aspect of Digital signature and Electronic signature:
Authentication of electronic record by electronic signature (5.3 and 3A),Legal recognition of e-contracts and e-documents of the governments-ss.4, 5, 6 ,7A and 10A, Securing e-records and e-signatures, Duties of subscriber ss.40-42 ss. 14 and 15, Certification of e-signature (s.35,36,37,38,39), Regulation of certifying authorities through licensing application for license ,renewal of license, procedure for grant or rejection of license, suspension or revolution of license.

UNIT IV Adjudication of cyber crime and contraventions under the I.T Act, 2000:
Power to adjudicate-5.46, Factors considered by adjudicating offers s.47, Composition of cyber appellate tributes S.49, Power of superintendence –S.52A, Appeal to CAT-S.57, Procedure and power of Cat S.58, S.59, S.60, S.62, S.63, S.64

UNIT V Treatment of cyber crimes under the IT Act 2000
Offence and penalties prescribed in I.T Act 2000, Controller's powers with respect to offences And their regulation. Law relating to Cyber crime Under Indian Penal Code (IPC) 1860
Making false electronic record (S.464 IPC) Punishment for forgery (S.465 IPC); forgery of public record etc. (S.466 IPC) and Forgery for purpose of cheating (S.468) Forged document or electronic record (S.470); Using as genuine a forged document or electronic record (S.471);
Counterfeiting device or mark used for authenticating documents or electronic record or possessing counterfeit marked material, Falsifying accounts. (S.474 and S.477A).

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GE408	CYBER LAWS				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3 Hrs		

UNIT VI Implication of cyber law on intellectual property related issues and commercial transaction:
Copyright Act-definition of computer and computer program (S.2ffb), Subsistence of copyright in computer programs, Copyright and Internet, Copyright in digital medium, Copyright in computer databases
Trade mark Act –Search engine and meta tags-
Domain Names: digital marks in the online medium, Resolving domain name disputes, Cyber Squatting /TYPO squatting Domain name in Indian law-
Cyber issues related Case study on Landmark and well known cases like -

1. Satyam infoway Ltd. Vs Sifynet solution Pvt. Ltd (2004) 6SCC145
2. Cadilla health care Ltd Vs. Cedilla pharmaceuticals Ltd AIR 2001 SC 1952(sc)
3. The Napster's story
4. NEC corporation Vs Inter corporation
5. Any other important and current case

TEXT BOOKS:

1. Vakul Sharna, Information Technology Law and Practice, Universal Law Publishing Company, New Delhi, Third ed. 2012.
2. S. V. JogaRao, Law of Cyber Crime and Information Technology Law, Wadhwa and Company, Nagpur, 2007.
3. S. V. JogaRao, Computer Contract and Capital IT Law (in 2 vol.),2005 Prolific Law Publication, New Delhi.
4. Kamlesh N and Murali, D. Tiwari (Ed), I.T and Indian Legal System, Macmillan India Ltd., New Delhi.
5. The information Technology Act (21 of 2000) Bare Act.
6. Cyber Laws, Justice Yatinder Singh, Universal Publishers.

REFERENCE BOOKS

National Legislations:

1. The Information Technology Act, 2000 .
2. The Indian Penal Code, 1860 .
3. The Indian Evidence Act, 1872 .
4. The Indian Contract Act, 1872 .

SEMESTER: VIII								
CT415	NETWORKSECURITY				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1. Understanding of basic issues, concepts , principles and mechanisms in n/w security, mathematics of cryptography, determine appropniate mechanisms for protecting networks.	1. To indentify n/w security threats and determine efforts to counter them. 2. To apply basic Principles, Theorems, Algorithms to solve the problem. 3. To use diffiesent encryption Algorithms. 4. To apply approtunate function and protocols for masseage authentication. 5. To desing solution for securied n/w application. 6. To analyze given system with respect to security.
PO, PSO MAPPING :- a,c,d,e,f,h,i,k,l,m	

SYLLABUS

UNIT I Introduction- Security trends, OSI Security Architecture. Security attacks, Security Services, Security Mechanisms, model for network security, Classical encryption techniques- Symmetric cipher model, substitution, transposition techniques, Rotor machines, Steganography.

UNIT II Mathematics of Cryptography-Mathematics of Symmetric Key and Asymmetric Key Cryptography-Groups, Fields-GF fields, Random Number generation, Introduction to Number theory- Prime and Relatively prime numbers, Modular arithmetic, Fermats and Euler's theorems ,Testing of Primality, Euclid's algorithm. The Chinese Remainder Theorem, Discrete logarithms.

UNIT III Simplified DES, differential and linear cryptanalysis, block cipher design principles, 3-DES, AES, IDEA, Blowfish, RC4, CAST, Public key encryption- Principle of public key cryptosystems, RSA algorithm, key management, Diffie- Hellman key exchange ,Elliptic Curve Cryptography.

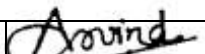
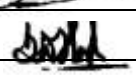
UNIT IV Message authentication and Hash functions- Authentication requirements, Authentication Functions, Codes, Hash functions, Security of Hash functions and MACs ,Message Digest Algorithm, SHA- 1, RIPEMD-160 , HMAC, Digital Signatures, Authentication Protocols, Digital Signature Standard (DSS).

UNIT V Authentication applications-Kerberos, X.509, PKI, E-mail Security-PGP, S/MIME, IP Security architecture, Authentication header, Encapsulating security pay load, Security Associations , Key management- IKE, Oakley, ISAKMP.

UNIT VI Security at transport Layer-Secure Sockets Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET), System Security- Intruders, Intrusion Detection, Viruses and related threats, Virus Countermeasures, Firewall- characteristics, types, trusted systems.

TEXT BOOKS:

1. Cryptography and Network Security Principles and Practices , 4/e, by William Stallings (Pearson Edu Asia).
2. Cryptography and Network Security, 2/e by Behrouz A. Forouzan, The McGraw-Hill Pub.
3. Networks Security Essentials, Applications and Standards,4/e by William Stalling (Pearson Edu).

Chairperson		Date of Release	May 2013	Applicable for AY 2013-14 Onwards
Dean (Acad. Matters)		Version	1.00	

SEMESTER: VIII								
CT418	PE4: DIGITAL IMAGE PROCESSING				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1. To provide understanding of basics of Digital Image Processing, discuss fundamental concepts of neighborhood pixel, Spatial Domain Image Processing, provide in sight of histogram processing, study the frequency Domain Image Processing, provide the details of segmentation and provide the regional and descriptors concept.	1. Apply Image Enhancement techniques in Spatial Domain. 2. Know and Apply Histogram Equalization, Histogram Processing, Local Enhancement, Image Subtraction, Image Averaging on images. 3. Perform Fourier Transform on images. 4. Understand and apply Homographic Filtering. 5. Apply different segmentation techniques on images.

PO, PSO MAPPING :- a,b,c,d,e,i,k,l

SYLLABUS

UNIT I Introduction: Fundamental Steps in Image Processing, Elements of DIP systems, Elements of Visual Perception, Fundamentals of Image processing, A Simple Image Model, Sampling and Quantization, Some Basic Relationships. between Pixels, Image Geometry in 2D.

UNIT II Image Enhancement in the Spatial Domain: Introduction to Spatial and Frequency methods, Basic Gray Level Transformations, Histogram Equalization, Histogram Processing, Local Enhancement, Image Subtraction, Image Averaging, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.

UNIT III Transforms: Introduction to the Fourier Transform, Discrete Fourier Transformation, Fast Fourier Transformation, Fourier Properties, 2DFT, inverse Fourier transform, Discrete Cosine Transform, Typical Applications

UNIT IV Image Enhancement in the frequency Domain: Filtering in the Frequency Domain, Correspondence between Filtering in the Spatial and Frequency Domain, Smoothing Frequency-Domain Filters, Sharpening Frequency-Domain Filters, Homomorphic Filtering, Implementation.

UNIT V Image Segmentation: Point Detection, Line Detection, Edge Detection, Gradient Operator, Edge Linking and Boundary Detection, Thresholding, Region-oriented Segmentation.

UNIT VI Image Representation: Chain Codes, Polygonal Approximations, Signatures, Boundary Segments, Skeleton of a Region. Description: Boundary Descriptors, Shape Numbers, Fourier Descriptors, Regional Descriptors, Simple Descriptors, Topological Descriptors. Introduction to color image processing: RGB and HSI color models, introduction to image file formats: TIFF, JPEG, BMP, etc.

TEXT BOOKS:

1. Digital Image Processing by Rafael C. Gonzalez and Richard, E. Woods, 3rd edition, Prentice Hall.
2. Digital Image Processing by Jayaraman, S. Esakkirajan, T. Veerakumar, publication Tata McGrawHill.

REFERENCE BOOKS:

1. Fundamentals of Digital Image Processing by A.K.Jain, Prentice Hall.
2. Image Processing Principles & Applications by Tinku Acharya & Ajoy K. Ray, Willey Inter-Science.

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CT419	PE4: DIGITAL IMAGE PROCESSING LABORATORY	L=0	T=0	P=2	Credits=1
Evaluation Scheme	Continuous Evaluation	ESE		Total	ESE Duration
	40	60		100	

Practical List:

Sr.No.	PracticalName
1	Study Practical on basic gray level transformation.
2	Write a program to create a contrast of image.
3	Create a histogram of given image.
4	Resize a given Image.
5	Write a program to create negative of an image.
6	Create a Binary Image.
7	Write a program to smooth an image.
8	Write a program to Sharpe an image.
9	Segment a given image.
10	Create a skeleton of region.
Beyond Syllabus Practical List:	
1	Apply wavelet transform to decompose an image.
2	Apply gabor filter to enhance an image.

SEMESTER: VIII							
CT420	PE4: PATTERNRECOGNITION				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1. The study of Pattern Recognition to equip the students with the brief knowledge of Statistica. 2. Decision Theory, Image processing, clustering, different error at esinpattern recognition, decision making techniques and application of pattern recognition in different fields.	1. Apply Pattern Recognition technique for recognition. 2. Know and Apply knowledge of Statistical Decision Theory. 3. Perform Image processing concepts on images. 4. Understand and apply clustering concepts on raw 5. Apply decision making techniques.
PO, PSO MAPPING :- a,b,d,e	

SYLLABUS

UNIT I Introduction: Statistical Decision Theory, Image Processing and Analysis, Probability-probabilities of events, random variables, joint distribution & densities.

UNIT II Moments of random variables, estimation of parameters from samples, minimum risk estimators.

UNIT III Non parametric decision Making - Histograms, kernel and window estimators, nearest neighbor classification techniques, adaptive decision boundaries, adaptive discriminate functions, minimum squared error, estimation functions, choosing a decision making technique.

UNIT IV **Linear Classifier** Introduction, Linear Discriminant Functions and Decision Hyperplanes, The Perceptron Algorithm, Least Squares Methods , Mean Square Estimation Revisited, Support Vector Machines.

UNIT V **Feature Generation** Introduction ,Basis Vectors and Images, The Karhunen-Loeve Transform ,The Singular Value Decomposition , Independent Component Analysis,The Discrete Fourier Transform,The Haar Transform.

UNIT VI Clustering-Introduction, hierarchical clustering, partition clustering.

TEXT BOOKS:

1. Pattern recognition & Image Processing by Ealr Gose, Richard Johnson daugh & Steve Jost. (PHIPub.).
2. Richard O. Duda, Peter E. Hart and David G. Stork, “Pattern Classification” 2nd Edition, John Wiley.

REFERENCE BOOKS:

1. Pattern recognition by Sergios Theodoridis, Konstantinos Koutroumbas 3rd Ed.

CT421	PE4: PATTERN RECOGNITION LABORATORY	L=0	T=0	P=2	Credits=1
Evaluation Scheme	Continuous Evaluation	ESE		Total	ESE Duration
	40	60		100	

Practical List:

Sr.No.	PracticalName
1	Enhance an image using Average Filter.
2	Detect the edges using Sobel operator.
3	Plot a histogram of a given image.
4	Classify an objects based on adadptive desion boundary technique.
5	Classify an objects based on nearest neighbor classification techniques.
6	Implement The Perceptron Algorithm.
7	WAP to implement SVM.
8	Extract features using ICA.
9	Extract features using DFT.
10	Extract features using Haar Transform.

SEMESTER: VIII							
CT422	PE4: MOBILE OPERATING SYSTEM				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1. To understand basic concepts about Mobile Operating System. 2. To understand features and development framework of Android platform. 3. To get an overview of various Android development tools, debugging techniques and performance optimization considerations. 4. To understand Android application development lifecycle and building process. 5. To understand User Interface elements for Android application and create UI designs. 6. To understand data storage, network connection and data parsing for Android applications.	1. To understand fundamentals of Mobile Operating System. 2. Create sample Android application and deploy on Android mobile. 3. Create Android Application using Android Application development tools, debug application and incorporate performance and memory optimization considerations. 4. To generate and study APK file content and manifest. 5. To design Android application User Interface, views, layouts and styles. 6. To create Android application with SQLite database connectivity and network connection.

PO, PSO MAPPING :- a,b,c,d,e,f,i,j,k,l

SYLLABUS

UNIT I Introduction to Mobile OS, Characteristics, comparison with desktop OS, examples, various mobile application development platforms (Android, iOS, Windows etc) comparative study in terms of features, technology and tools.

UNIT II Introduction to Android Computing Platform, History, Myths, features, Development framework. (basic deployment of application on android mobile, Application signing and distribution, Available market stores and update management, SQL Connectivity).

UNIT III Hardware requirements, Monitoring and Controlling of Hardware, Types of Android applications, Android development tools, application development and debugging, Using tools like Lint, Findbug, MAT, DDMS. Performance and memory optimization considerations.

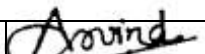
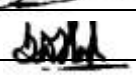
UNIT IV Building blocks of Android applications, Application life cycle, Priority, Process state, Activity and its states, Intent, Actions, Android manifest, Broadcast receivers, permissions, Services, APK file content and building process.

UNIT V User interface, Views, Layouts, Menus,Adapters, Dialogs, styles, theme, 9-patch images To design User Interface.

UNIT VI Persistence data storage using files, SQLite database and shared preferences, Content resolver and observers, Network connection over http and https, Data parsing using XML and JSON.

TEXT BOOKS:

1. Professional Android Application Development by Reto Meier, Wiley Publishing Inc.

Chairperson		Date of Release	May 2013	Applicable for AY 2013-14 Onwards
Dean (Acad. Matters)		Version	1.00	

CT423	PE4: MOBILE OPERATING SYSTEMS LABORATORY	L=0	T=0	P=2	Credits=1
Evaluation Scheme	Continuous Evaluation	ESE		Total	ESE Duration
	40	60		100	

Practical List:

Sr.No.	PracticalName
1	Create an application having login functionality. This should provide the facility of entering login name, password and “Remember Me” functionality. On successful login user should be taken to Home screen displaying the custom welcome message. On failed attempt user should be shown error dialog.
2	Create an application showing the list of fix number of contacts including name, photo, email and number. User should be able to call, SMS, email to any contact directly from the list.
3	Create an application to play audio/video file using native player. User should able to play/pause/stop at all time. User should get toast notification for each activity and confirmation dialog before exit/stop.
4	Create an application that supports entering two numbers and functionality to add/subtract/multiply/divide and display the result in next screen.
5	Create an application that provides the functionality of stop watch.
6	Create an application having one screen that change its color based on the selection of option menu.
7	Create an application which shows an image and spinner having list of options (at least 4). On selecting the item images should perform the selected animation.
8	Create an application that shows the list of employees with some basic information like first name, last name, designation. On selecting the list item application shows more details for particular employee and provide the option to edit the information. On Edit screen provide support for edit few (at least 4) filed.
9	Create an application that provides the option to enter the student information and save into database. App should provide the functionality to view the list of students.
10	Create an application that reads contacts from the native address book and supports edit/add new contact information.
Beyond Syllabus Practical List:	
1	Create an application which has the date/time picker dialog. Take user selection as input and provide the options to see selected date/time in different formats.
2	Create a demo application listing different type of notification mechanism available in android. On selecting create notification of specific type.

SEMESTER: VIII							
CT430	PE5: BUSINESS INTELLIGENCE AND ITS APPLICATIONS				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1 The proposed elective course exposes students to Business Intelligence domain. The objectives of this course include introduction to BI terminologies and framework, basics of data integration (Extraction Transformation Loading), introduction to multi-dimensional data modeling, basics of enterprise reporting and application of the concepts using open source/Microsoft tools.	1 Extract and transform data from an operational database to a data warehouse. 2 Map operational data to a data warehouse. 3 Design multidimensional data models. 4 Design reports using various reporting tools and methods . 5 Use BI tools to identify trends. 6 Exploit business analytics and performance measurement tools. 7 Design a BI solution for a business problem.

PO, PSO MAPPING :- a,b,c,d,e,f,g,i,j,k,l,m

SYLLABUS

UNIT I Introduction to Business Intelligence: Introduction to digital data and its types – structured, semi-structured and unstructured, Introduction to OLTP and OLAP (MOLAP, ROLAP, HOLAP), BI Definitions & Concepts, BI Framework, Data Warehousing concepts and its role in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities, Business Applications of BI, BI best practices.

UNIT II Basics of Data Integration (Extraction Transformation Loading): Concepts of data integration, needs and advantages of using data integration, introduction to common data integration approaches, Meta data – types and sources, Introduction to data quality, data profiling concepts and applications, introduction to ETL using Pentaho data Integration (formerly Kettle).

UNIT III Introduction to Multi-Dimensional Data Modeling: Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using Microsoft Excel.

UNIT IV Basics of Enterprise Reporting: A typical enterprise, Malcolm Baldrige - quality performance framework, balanced scorecard, enterprise dashboard, balanced scorecard vs. enterprise dashboard, enterprise reporting using MS Access / MS Excel, best practices in the design of enterprise dashboards.

UNIT V Tools used for OLAP Design and BI Models: Overview of tools and techniques that are in use to design BI and OLAP model, common BI and OLAP models, popular OLAP cube formats, design tools for BI and OLAP modeling, tools for OLAP cube building and data population.

UNIT VI Case study: Overview and use of products from Pentaho and other open software .

TEXT BOOKS:

1. Business Intelligence by David Loshin.
2. Business intelligence for the enterprise by Mike Biere.
3. Business intelligence roadmap by Larissa Terpeluk Moss, Shaku Atre.
4. An introduction to Building the Data Warehouse, IBM.
5. Business Intelligence For Dummies, Swain Scheps.
6. Successful Business Intelligence: Secrets to making Killer BI Applications by Cindi Howson Information dashboard design by Stephen Few.

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CT431	PE5: BUSINESS INTELLIGENCE AND ITS APPLICATIONS	L=0	T=0	P=2	Credits=1
Evaluation Scheme	Continuous Evaluation	ESE		Total	ESE Duration
	40	60		100	

Practical List:

Sr. No.	PracticalName
1	Design a conceptual multidimensional model for the given data.
2	Implement the algorithm to extract the data from various sources.
3	Implement the algorithm to clean the data according to business requirement.
4	Transform the data into final 'ready to load' form.
5	Implement the algorithm to load the data in the multidimensional format.
6	Solve the given business queries from the multidimensional model (Phase I).
7	Solve the given business queries from the multidimensional model (Phase II).
8	Design the report for output of Phase I.
9	Design the report for output of Phase II.
Beyond Syllabus Practical List:	
1.	Download and install any one free open source tool for reporting
2.	Take the reports from the system for the given data.

SEMESTER: VIII								
CT432	PE5:Software Project Management				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1 To learn basic concepts project, contract and to get an overview of various activities under project planning. 2 To understand techniques for cost benefit analysis and risk evaluation. 3 To understand project scheduling and various network planning models. 4 To understand Risk Management, Risk Planning and control. 5 To understand various activities like visualizing progress, earned value analysis etc. under monitoring and controlling of a project. 6 To understand the role of continuing training and learning, to improve group working and to select appropriate leadership styles.	1 To understand basic concepts about project, project management and project planning. 2 To assess given requirements and perform cost benefit analysis. 3 To create a project schedule using some network planning model for given requirements. 4 To identify and create a risk management plan for given requirements. 5 To perform earned value analysis for given requirements and current completion state of project. 6 To form teams for any given exercise, work as a team and understand leadership qualities.

PO, PSO MAPPING :- a,b,c,d,e,f,g,h,i,j,k,l,m

SYLLABUS

UNIT I Introduction to Software Project Management:
Project Definition, Contract Management, Activities Covered By Software Project Management, Overview of Project Planning, Stepwise Project Planning.

UNIT II Project Evaluation
Strategic Assessment, Technical Assessment, Cost Benefit Analysis, Cash Flow Forecasting, Cost Benefit Evaluation Techniques, Risk Evaluation.

UNIT III Activity Planning
Objectives, Project Schedule, Sequencing and Scheduling Activities, Network Planning Models, Forward Pass, Backward Pass, Activity Float, Shortening Project Duration, Activity on Arrow Networks.

UNIT IV Risk Management:
Risk Management, Nature Of Risk, Types Of Risk, Managing Risk, Hazard Identification, Hazard Analysis, Risk Planning And Control.

UNIT V Monitoring and Control
Creating Framework , Collecting The Data , Visualizing Progress, Cost Monitoring, Earned Value, Prioritizing Monitoring, Getting Project Back To Target, Change Control, Managing Contracts, Introduction, Types Of Contract, Stages In Contract Placement, Typical Terms of A Contract, Contract Management, Acceptance.

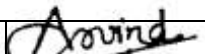
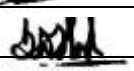
UNIT VI Managing People and Organizing Teams:
Introduction, Understanding Behavior, Organizational Behaviour: A Background, Selecting The Right Person For The Job, Instruction In The Best Methods , Motivation, The Oldman – Hackman Job Characteristics Model, Working In Groups – Becoming A Team, Decision Making, Leadership, Organizational Structures, Stress, Health And Safety.

TEXT BOOKS:

1. Bob Hughes, Mikecotterell, “Software Project Management”, Third Edition, Tata McGraw Hill.

REFERENCE BOOKS:

1. Ramesh, Gopalaswamy, «Managing Global Projects, Tata McGraw Hill.
2. Royce, “Software Project Management”, Pearson Education.
3. Jalote, “Software Project Manangement in Practive”, Pearson Education.

Chairperson		Date of Release	May 2013	Applicable for AY 2013-14 Onwards
Dean (Acad. Matters)		Version	1.00	

CT433	PE5: SOFTWARE PROJECT MANAGEMENT LAB.	L=0	T=0	P=2	Credits=1
Evaluation Scheme	Continuous Evaluation	ESE		Total	ESE Duration
	40	60		100	

Practical List:

Sr.No.	PracticalName
1	Introduction to Software Project Management fundamentals.
2	To analyze requirements for a given case study .
3	To create a WBS for the given case study.
4	To perform risk management for the case study – 1.
5	To perform risk management for the case study – 2.
6	Overview of Planning tool.
7	To create Project Schedule for the case study -1.
8	To create Project Schedule for the case study -2.
9	To perform cost benefit analysis for case study.
10	To study contract management and contract document.
Beyond Syllabus Practical List:	
1.	To study and calculate Software Project Metrics.
2.	To study implementation of change control.

SEMESTER: VIII								
CT434	PE5: SPEECH PROCESSING				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		

OBJECTIVES	OUTCOMES
1. To acquaint with fundamentals of Speech signals, classification of signals, applications of speech processing . 2. To understand Time domain methods for performing speech processing and Mathematical foundations of signal processing and pattern recognition. 3. To familiarize students with Frequency domain methods for performing speech processing. 4. To know methods of speech recognition, various issues in speech recognition. 5. To become aware about Issues in speaker recognition and speech synthesis of different speakers. 6. To understand various techniques for Speech Enhancement and compare them.	After the course is delivered the students would be able to demonstrate the ability to : 1. Classify the speech signals. 2. Use time domain methods for performing speech processing and Pattern recognition. 3. Use Frequency domain methods for performing speech processing and compare it with time domain methods. 4. Select suitable speech recognition method considering various issues. 5. Analyze issues in speaker recognition and speech synthesis. 6. Differentiate various speech enhancement techniques.
PO, PSO MAPPING :- a,b,c,e,h,k,l,	

SYLLABUS

UNIT I Speech production and Perception:
Anatomy and physiology of speech production, Articulatory, Linguistic, acoustic and perceptual descriptions. Classification of speech, sounds, nature of speech signal, models of speech production, purpose of speech processing, Digital processing of speech signals, Significance, short time analysis, Introduction to pitch detection.

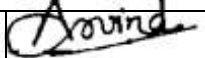
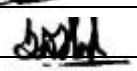
UNIT II Time Domain Methods for Speech Processing:
Time domain parameters of speech, methods for extracting the parameters, Zero crossings, Auto correlation function, pitch estimation , Overlapping function theory of speech, Detection of overlapping tones, Methods to calculate ACF, Software tools to calculate ACF.

UNIT III Frequency domain methods for speech processing:
Short time Fourier analysis, filter bank analysis, spectrographic analysis, Format extraction, pitch extraction, Analysis - synthesis systems, Pitch classification methods, DFT to calculate pitch function, Modules of speech synthesis system, Mathematical formulation of speech synthesis modules.

UNIT IV Speech Recognition:
Issues in Speech recognition, Spectrum distance measures for speech recognition, auditory measures for speech recognition, Dynamic programming based speech recognition algorithms, HMM models for speech recognition, Neural network approach, SVM and its implementation, Approximation functions for speech recognition.

UNIT V Speaker Recognition:
Issues in speaker recognition and speech synthesis of different speakers, Text to speech conversion, Letter to sound rules, Dictionaries, prosody, Intonation, Calculating acoustic parameters, synthesized speech output performance and characteristics of text to speech, application of text to speech technology products, Voice processing hardware and software architectures, Confusion resolving in speech recognition, Confusion/ambiguity resolving in TTS Design.

UNIT VI Speech Enhancement:
Noise suppression with pattern matching, adaptive echo cancellation for speech signals, Noise calculation using ACF.

Chairperson		Date of Release	May 2013	Applicable for AY 2013-14 Onwards
Dean (Acad. Matters)		Version	1.00	

CT434	PE5: SPEECH PROCESSING				L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration		
	15	15	10	60	100	3Hrs		
OBJECTIVES				OUTCOMES				

TEXT BOOKS:

1. L.R. Rabiner and R. E. Schafer : Digital processing of speech signals, Prentice Hall,1978

REFERENCE BOOKS:

1. Furui S.Sondhi, M, “Advances in Speech Signal Processing”, Dekker.
2. Syrdal A. Benett, R. Greenspan, S ,“Applied Speech Technology”, CRC Press.
3. Test Schner W, “Voice Processing”, Artech House.
4. Claudio Becchetti and Lucio Prina Ricotti, “Speech Recognition”, Wiley.
5. Speech and Language Processing by Jurafsky, Dan and Martin, James, Second Edition, Prentice Hall,2008

CT435	PE5: SPEECH PROCESSING LAB	L=0	T=0	P=2	Credits=1
Evaluation Scheme	Continuous Evaluation	ESE		Total	ESE Duration
	40	60		100	

Practical List:

Sr. No.	PracticalName
1	Introduction to Matlab.
2	Study of Matlab functions for Speech Processing.
3	Implementation of Basic functionalities for speech processing using Matlab. (Read speech file, play/plot the file).
4	Write speech array into speech file, record using Matlab.
5	Perform Fourier analysis of a speech file using Matlab.
6	Implementation of Homomorphic methods using Matlab.
7	Implementation of linear predictive methods using Matlab.
8	Pitch determination and excitation identification using Matlab.
9	Implementation of Hidden Markov model for speech recognition using Matlab.
10	Implementation of Compression techniques for audio file using Matlab.
Beyond Syllabus Practical List:	
1.	Study of IBM tool for Speech Processing.
2.	Study of Text to Speech System.