Revised syllabus of M.Sc. Information Technology Semester III and IV
(Based on Credit and grading system)

Semester III

Course Code	Course Nomenclature	Lectures	Credits	Practical Course	Hours	Credits	Total Credits
PSIT301	Embedded Systems	60	4	PSIT3P1	60	2	6
PSIT302	Information Security Management	60	4	PSIT3P2	60	2	6
Elective 1		60	4	Elective 1	60	2	6
PSIT303a	Virtualization			PSIT3P3a			
PSIT303b	Artificial Neural Networks			PSIT3P3b			
Elective 2		60	4	Elective 2	60	2	6
PSIT304a	Digital Image Processing			PSIT3P4a			
PSIT304b	Ethical Hacking			PSIT3P4b			

Semester IV

Course Code	Course Nomenclature	Lectures	Credits	Practical Course	Hours	Credits	Total Credits
PSIT401	Artificial Intelligence	60	4				4
PSIT402	IT Infrastructure Management	60	4				4
Elective 1		60	4	Elective 1	60	2	6
PSIT403a	Intelligent Systems			PSIT4P3a			
PSIT403b	Real Time Embedded Systems			PSIT4P3b			
PSIT403c	Computer Forensics			PSIT4P3c			
Elective 2		60	4	Elective 2	60	2	6
PSIT404a	Design of Embedded Control Systems			PSIT4P4a			
PSIT404b	Advanced Image Processing			PSIT4P4b			
PSIT404c	Cloud Management			PSIT4P4c			
PSIT405	Project		2	PSIT4P5		2	4

CLASS: M. Sc. (Information technology)		Semester - IV	
COURSE: Artificial Intelligence (PSIT401)			
Periods per week **1 Period is 60 minutes**	**Lecture**	**4**	
	TW/Tutorial/Practical	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**3**	**60**
	Internal		**40**
	Practical	**--**	**50**
Unit – I	**Introduction:** AI, Components of AI, History of AI, Salient Points, Knowledge and Knowledge Based Systems, AI in Future, Applications. **Logic and Computation:** Classical Concepts, Computational Logic, FOL, Symbol Tableau, Resolution, Unification, Predicate Calculus in Problem Solving, Model Logic, Temporal Logic. **Heuristic Search:** Search-Based Problems, Informed Search, Water Jug Problem, TSP, Branch and Bound Method, TSP Algorithm. **[Reference I]**		**12 Lectures**
Unit- II	**Game Playing:** AND/OR Graph, Minimax Problem, Alpha-Beta Search, Puzzle Solving, AI versus Control Robot. **Knowledge Representation:** Structure of an RBS, Merit, Demerit and Applicability of RBS, Semantic Nets, Frames, Conceptual Graphs, Conceptual Dependency, Scripts. **Automated Reasoning:** Default Logic, Problem for Default Reasoning, Closed World Assumption, Predicate Completion, Circumscription, Default Reasoning, Model Based Reasoning, Case Based Reasoning, Reasoning Models, Multimodels, Multimodal Reasoning. **[Reference I]**		**12 Lectures**
Unit-III	**Probabilistic Reasoning:** Bayes Theorem, Bayesian Network, Dempster and Shafer Theory of Evidence, Confidence Factor, Probabilistic Logic. **Knowledge Acquisition:** Knowledge Acquisition process, Automatic Knowledge Acquisition, Machine Learning, Induction, Analogical Reasoning, Explanation-Based Learning, Inductive Learning, Knowledge Acquisition Tools. **[Reference I]**		**12 Lectures**
Unit-IV	**Planning:** Necessity of planning, Planning Agents, Planning generating schemes, Non-hierarchical planning, Hierarchical planning, Script-based planning, Oppurtunistic planning, Algorithm for planning, planning representation with STRIPS an example. **Constraint Satisfaction Problem:** Constraints and Satisfiabillity, Basic search strategies for solving CSP, Representation of CSP problem, Examples of constraint satisfaction problem. **[Reference II]**		**12 Lectures**
Unit –V	**Knowledge-Based Systems:** Structure of an Expert System, Expert Systems in different Areas, Expert System Shells, Comparison of Expert Systems, Comparative View, Ingredients of Knowledge-Based Systems, Web-based Expert Systems. **[Reference I]** **Prolog:** Prolog programming features, Syntax, Syntax of Rules, LIST, Structure, Some Solutions using TURBO PROLOG. **[Reference II]**		**12 Lectures**

Books / References

Title	Author/s	Edition	Publisher
Artificial Intelligence	R. B. Mishra	**EEE**	**PHI**
Artificial Intelligence & Soft Computing for Beginners	Anandita Das Bhattacharjee		**SPD**
Artificial Intelligence	E.Rich and K.Knight	**2002**	**TMH**
Artificial Intelligence: A Modern Approach	S.Russel, P.Norvig	**2002**	**Pearson Education**

CLASS: M. Sc. (Information technology)			**Semester – IV**
COURSE: IT Infrastructure Management (PSIT402)			
Periods per week **1 Period is 60 minutes**	**Lecture**	**4**	
	TW/Tutorial/Practical	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**3**	**60**
	Internal		**40**
	Practical	**--**	**50**

Unit – I	**Introduction:** The four perspectives (attributes) of IT service management, benefits of IT service management, business and IT alignment, What is ITIL?, What are services?, Service Management as a practice, The concept of Good Practice, Concept of a Service, Concept of Service Management, Functions and Processes, The process model and the characteristics of processes. **The Service Lifecycle:** Mapping the Concepts of ITIL to the Service Lifecycle, How does the Service Lifecycle work? **Service Strategy:** Objectives, Creating Service Value, Service Packages and Service Level Packages, Service Strategy Processes, Service Portfolio Management, Financial Management, Demand Management, Service Strategy Summary, Interfaces with the Service Design Phase, Interfaces with the Service Transition Phase, Interfaces with the Service Operation Phase, Interfaces with the Continual Service Improvement Phase, Service Strategy Service Scenario, Overall Service Strategy, Service Portfolio Management Considerations, Financial Management Considerations	**12 Lectures**
Unit- II	**Service Design:** Objectives, Major Concepts, Five Major Aspects of Service Design, Service Design Packages, Service Design Processes, Service Level Management, Supplier Management, Service Catalogue Management, Capacity Management, Availability Management, IT Service Continuity Management, Information Security Management, Service Design Scenario, Service Level Management Considerations, Capacity Management	**12 Lectures**

	Considerations, Availability Management Considerations, Information Security Management Considerations, Service Catalogue Management Considerations, ITSCM Considerations, Supplier Management Considerations	
Unit-III	**Service Transition:** Objectives, Service Transition Processes, Knowledge Management, Service Asset and Configuration Management, Change Management, Release and Deployment Management, Service Validation and Testing, Service Transition Summary, Service Transition Scenario, Knowledge Management Considerations, Service Asset and Configuration Management Considerations, Change Management Considerations, Release and Deployment Management Considerations, Service Validation and Testing Considerations	**12 Lectures**
Unit-IV	**Service Operation:** Objectives, Major Concepts, Service Operation Functions, The Service Desk, Technical Management, IT Operations Management, Application Management, Service Operation Processes, Event Management, Incident Management, Problem Management, Request Fulfillment, Access Management, Service Operation Summary, Service Operation Scenario, Functions, Processes	**12 Lectures**
Unit –V	**Continual Service Improvement:** Objectives, Major Concepts Continual Service Improvement Processes, Service Level Management, Service Measurement and Reporting , CSI (7 Step) Improvement Process, Continual Service Improvement Summary, Continual Service Improvement Scenario, Service Level Management Service Measurement and Reporting, CSI Process	**12 Lectures**

Books / References

Title	Author/s	Edition	Publisher
ITIL V3 Foundation Complete Certification Kit			
Foundations of IT Service Management - The Unofficial ITIL® v3 Foundations Course	Brady Orand	**2nd Edition**	
ITILv3 Foundation Exam, The Study Guide	Arjen de Jong Axel Kolthof Mike Pieper Ruby Tjassing Annelies van der Veen Tieneke Verheijen		**Van Harren**

CLASS: M. Sc. (Information technology)		Semester – IV	
COURSE: Intelligent Systems (PSIT403a)			
Periods per week **1 Period is 60 minutes**	**Lecture**	**4**	
	TW/Tutorial/Practical	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**3**	**60**
	Internal		**40**
	Practical	**--**	**50**

Unit – I	Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, Structure of Agents Problem Solving by searching: Problem-Solving Agents Example Problems, Searching for Solutions, Uninformed Search Strategies, Informed Search and exploration: Informed (Heuristic) Search Strategies, Heuristic Functions, Local Search Algorithms and Optimization Problems, Local Search in Continuous Spaces, Searching with Nondeterministic Actions, Searching with Partial Observations, Online Search Agents and Unknown Environments	**12 Lectures**
Unit- II	Games: Optimal Decisions in Games, Alpha—Beta Pruning, Imperfect Real-Time Decisions, Stochastic Games, Partially Observable Games, State-of-the-Art Game Programs Constraint Satisfaction, Constraint Propagation: Inference in CSPs, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems Logical Agents: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving, Effective Propositional Model Checking, Agents Based on Propositional Logic First-Order Logic: Representation Revisited, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic, Inference in First-Order Logic, Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution,	**12 Lectures**
Unit-III	Planning: Classical Planning, Algorithms for Planning as State-Space Search, Planning Graphs, Other Classical Planning Approaches, Hierarchical Planning, Planning and Acting in Nondeterministic Domains, Multiagent Planning Uncertain Knowledge and Reasoning: Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use, The Wumpus World Revisited, Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Exact Inference in	**12 Lectures**

	Bayesian Networks, Approximate Inference in Bayesian Networks, Relational and First-Order Probability Models, Approaches to Uncertain Reasoning, Probabilistic reasoning over time: Inference in Temporal Models, Hidden Markov Models, Kalman Filters, Dynamic Bayesian Networks, Keeping Track of Many Objects	
Unit-IV	Simple Decision Making: Combining Beliefs and Desires under Uncertainty, The Basis of Utility Theory, Utility functions, Multiattribute Utility Functions, Decision Networks, Complex Decision Making: Sequential Decision Problems, Value Iteration, Policy Iteration, Partially Observable MDPs, Decisions with Multiple Agents: Game Theory Knowledge in Learning: Review of Forms and types of Learning, Logical Formulation of Learning, Knowledge in Learning, Explanation-Based Learning, Learning Using Relevance Information, Inductive Logic Programming,	**12 Lectures**
Unit –V	Statistical and Reinforced Learning: Statistical Learning, Learning with Complete Data, Learning with Hidden Variables: The EM Algorithm, Reinforcement Learning, Passive Reinforcement Learning, Active Reinforcement Learning, Generalization in Reinforcement Learning, Applications of Reinforcement Learning Natural Language Processing: Language Models, Text Classification, Information Retrieval, Information Extraction. Robotics: Introduction, Robot Hardware, Robotic Perception, Planning to Move, Planning Uncertain Movements, Moving, Robotic Software Architectures, Applications.	**12 Lectures**

Books / References

Title	Author/s	Edition	Publisher
Artificial Intelligence: A Modern Approach	Staurt Russell, Peter Norvig	**3rd Edition**	**Pearson Education**
Artificial Intelligence: Structures and Strategies for Complex Problem Solving	George F. Luger		**Pearson Education**
Artificial Intelligence	Patrick Winston		**Pearson Education**

Practicals (PSIT4P3a):

1.	Write a program using C/C++/Java for implementing the Depth First Search Algorithm. And also write the algorithm for the same.
2.	Write a program using C/C++/Java for implementing the Breadth First Search Algorithm.
3.	Apply domain specific heuristic to generate possible solution for the AI problems using. i. Greedy Best First Search.
4.	Implement the mechanism A^* algorithm.

5.	Implement Recursive Breadth First Search.
6.	Generate succession nodes and check possibility of finding solutions of the specified problems using: i. Steepest Ascent Hill Climbing ii. Simulated Annealing
7.	Optimize the search strategy for the suggested problems using: i. Mini-max algorithm. ii. Alpha Beta Pruning.
8.	Find a solution to map-coloring as a constraint satisfaction problem using: Forward checking.
9.	Show the Implementation of Bayesian Network Classification.
10.	Show the application of Hidden Markov Model.
All Practicals can be done using C++/ R / MATLAB.	

CLASS: M. Sc. (Information technology)		**Semester – IV**	
COURSE: Real-time Embedded Systems (PSIT403b)			
Periods per week **1 Period is 60 minutes**	**Lecture**	**4**	
	TW/Tutorial/Practical	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**3**	**60**
	Internal		**40**
	Practical	**--**	**50**

Unit – I	**Introduction-** What is Real Time System, Application of real time system, A Basic Model of Real time system, Characteristics of Real Time System,Safety and Realibility, Types of Real Time Task, Timing Constraints,Modeling Timing Constraints. **Embedded Operating Systems** Fundamental Components, Example: Simple Little Operating System **Caches** The Memory Hierarchy and Cache Memory, Cache Architecture, Cache Policy	**12 Lectures**
Unit- II	**Exception and Interrupt Handling** Exception Handling, Interrupts, Interrupt Handling Schemes **Firmware** Firmware and Bootloader, Example: Sandstone **Memory Management** Moving from an MPU to an MMU, How Virtual Memory Works, Details of the ARM MMU, Page Tables, The Translation Lookaside Buffer, Domains and Memory Access Permission, The Caches and Write Buffer.	**12 Lectures**

Unit-III	**Real Time Task Scheduling** Types of real time task and their characteristics, Task Scheduling, Clock driven scheduling, Hybrid Schedulers, Event Driven Scheduling, Earliest Deadline first scheduling, Rate Monotic Algorithm. **Handling Resource Sharing and Dependencies** Resource sharing among real time task, Priority Inversion, Prioroty inheritence protpcol, Highest locker protocol,prioroty ceiling protocol,Different types of priority inversion Under PCP,Important features of PCP, Resource sharing Protocol, Handling Task Dependencies.	**12 Lectures**
Unit-IV	**Real Time Communication** Basic Concept, Real Time Communication in Lan, Soft/Hard Real Time communication in a Lan, Bounded Access Protocol for Lans, Performance comparison, Real time communication over Packet Switched networks, QoS framework, Routing,Resource reservation, Rate Control, QoS Model-Integrated services and Differentiated Services.	**12 Lectures**
Unit –V	**Real Time Databases** Concept and Example of real time databases, Real time databases application design issues, Characteristics of temporal data, Concurrency control in real-time databases. Case study on commercial real time databases.	**12 Lectures**

Books / References

Title	Author/s	Edition	Publisher
Real-Time Systems: Theory and Practice.	Rajib Mall	First	Pearson Publication
ARM system developer's guide: designing and optimizing system. (Ch-8,Ch-9,Ch-12, Ch-14)	software/Andrew N. Sloss, Dominic Symes, Chris Wright.	First	Elsevier Publication
Embedded Systems Design	S. Heath	Second Edition	Newnes Publication
Real-Time Systems: Theory and Practice.	Rajib Mall	First	Pearson Publication

Practicals (PSIT4P3b):

1) Schedule a task periodically; after 5 min xyz task has to perform (Hint JITTER).
2) Schedule a task non periodically; no specific time stamp is set for any task.
3) Shared resources management using SEMAPHORE.
4) Shared resources management using MUTEX.
5) Implement scheduling algorithm FIFO.
6) Implement scheduling algorithm ROUND ROBIN.

7) Implement scheduling algorithm RATE MONOTONIC.
8) Implement Inter process communication (IPC) using NAMED PIPES.
9) IPC using simple PIPES.
10) IPC using MAIL BOXES.
11) Using Client Socket & Server Socket (UDP/TCP) maintain data received from client node.
12) Small demonstration of Kernel Level & User Level Communications

CLASS: M. Sc. (Information technology)		**Semester – IV**	
COURSE: Computer Forensics (PSIT403c)			
Periods per week **1 Period is 60 minutes**	**Lecture**	**4**	
	TW/Tutorial/Practical	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**3**	**60**
	Internal		**40**
	Practical	**--**	**50**

Unit – I	Computer Forensics and Investigation Processes, Understanding Computing Investigations, The Investigator's Office and Laboratory, Data Acquisitions.	**12 Lectures**
Unit- II	Processing Crime and Incident Scenes, Working with Windows and DOS Systems, Current Computer Forensics Tools.	**12 Lectures**
Unit-III	Macintosh and Linux Boot Processes and File Systems, Computer Forensics Analysis, Recovering Graphics Files.	**12 Lectures**
Unit-IV	Virtual Machines, Network Forensics, and Live Acquisitions, E-mail Investigations, Cell Phone and Mobile Device Forensics	**12 Lectures**
Unit –V	Report Writing for High-Tech Investigations, Expert Testimony in High-Tech Investigations, Ethics and High-Tech Investigations.	**12 Lectures**

Books / References

Title	Author/s	Edition	Publisher
Guide to Computer Forensics and Investigations	Bell Nelson, Amelia Phillips,Christopher Steuart	4th Edition	Cengage Learning
Computer Forensics A Pocket Guide	Nathan Clarke		I.T G.vernance Publishing

1., Computer Forensics: Computer Crime Scene Investigation	John R. Vacca	2nd Edition,	Charles River Media

Practicals (PSIT4P3c):

1. File System Analysis using The Sleuth Kit
2. Using Windows forensics tools
3. Using Data acquisition tools
4. Using file recovery tools
5. Using Forensic Toolkit (FTK)
6. Forensic Investigation using EnCase
7. Using Steganography tools
8. Using Password Cracking tools
9. Using Log Capturing and Analysis tools
10. Using Traffic capturing and Analysis tools
11. Using Wireless forensics tools
12. Using Web attack detection tools
13. Using Email forensics tools
14. Using Mobile Forensics software tools
15. Writing report using FTK

CLASS: M. Sc. (Information technology)		**Semester – IV**	
COURSE: Design of Embedded Control Systems (PSIT404a)			
Periods per week **1 Period is 60 minutes**	**Lecture**	**4**	
	TW/Tutorial/Practical	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**3**	**60**
	Internal		**40**
	Practical	**--**	**50**

Unit – I	**Introduction to microcontrollers** Microprocessors and microcontrollers, History, Embedded vs external memory devices, 8-bit and 16-bit microcontrollers, RISC and CISC processors, Harvard and Von Neumann architectures, Commercial microcontroller devices. Industrial applications. **Design with Atmel microcontrollers** Architecture overview of Atmel 89C51, Pin description of 89C51, Using flash memory devices Atmel 89CXX, Power saving options.	**12 Lectures**
Unit- II	**PIC Microcontrollers** Overview, PIC16C6X/7X, Reset actions, Oscillators, Memory organization, PIC16C6X/7X instructions, Addressing modes, I/O ports, Interrupts PIC16C61/71, PIC16C61/71 timers, PIC16C 71 ADC, **PIC16F8XX Flash microcontrollers**	**12 Lectures**

	Introduction, pin diagram, status registers, options_reg registers, power control registers, PIC16F8 program memory, PIC16F8 data memory, Data EEPROM, Flash program EEPROM, Interrupts PIC16F877, I/O ports, Timers **More about PIC microcontrollers** Introduction, Capture/compare/PWM modules in PIC16F877, Master synchronous serial port (MSSP) module, USART, ADC	
Unit-III	**ARM Embedded Systems** The RISC Design Philosophy, The ARM Design Philosophy, Embedded System Hardware, Embedded System Software, **ARM Processor Fundamentals** Registers, Current Program Status Register, Pipeline, Exceptions, Interrupts, and the Vector Table, Core Extensions, Architecture Revisions**,** ARM Processor Families	**12 Lectures**
Unit-IV	**Introduction to the ARM Instruction Set** Data Processing Instructions, Branch Instructions, Load-Store Instructions, Software Interrupt Instruction, Program Status Register Instructions, Loading Constants, ARMv5E Extensions, Conditional Execution **Introduction to the Thumb Instruction Set** Thumb Register Usage, ARM-Thumb Interworking, Other Branch Instructions, Data Processing Instructions, Single-Register Load-Store Instructions, Multiple-Register Load-Store Instructions, Stack Instructions, Software Interrupt Instruction.	**12 Lectures**
Unit - V	**Writing and Optimizing ARM Assembly Code** Writing Assembly Code, Profiling and Cycle Counting, Instruction Scheduling, Register Allocation, Conditional Execution, Looping Constructs, Bit Manipulation, Efficient Switches, Handling Unaligned Data	**12 Lectures**

Books / References

Title	Author/s	Edition	Publisher
Microcontrollers theory and applications (UnitI and II)	Ajay Deshmukh	First	Tata McGraw-Hill
ARM system developer's guide: designing and optimizing system. (Unit III to V)	Andrew N. Sloss, Dominic Symes, Chris Wright.	First	Elsevier Publication

Practicals (PSIT4P4a):

1. Interfacing of LED, relay, Push Button
2. Sending and Receive Data Serially to/from PC.
3. Interfacing Wireless Module using ASK and FSK
4. Interfacing PC Keyboard.
5. Interfacing with EEPROM using I2C BUS.
6. Using a Watchdog Timer.
7. Using an External RTC.

8. Design a 4 bit binary counter.
9. DC Motor Control using PWM module.
10. Interfacing of temperature sensor.
11. Interfacing a 7 segment display.
12. Scrolling text message on LED dot matrix display

CLASS: M. Sc. (Information technology)		**Semester – IV**	
COURSE: Advanced Image Processing (PSIT404b)			
Periods per week **1 Period is 60 minutes**	**Lecture**	**4**	
	TW/Tutorial/Practical	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**3**	**60**
	Internal		**40**
	Practical	**--**	**50**

Unit – I	**Enhancement in Frequency domain** Introduction, 2-D Discrete Fourier Transform, Properties of Fourier transform, Basic filtering in the frequency domain,	**12 Lectures**

	Smoothing and Sharpening filters, FFT algorithm. Discrete cosine transform (DCT), KL (PCT) transform, HAAR, Basics of wavelets. **Remote Sensing** Introduction (Passive and Active sensing), Electromagnetic remote sensing process, Physics of radiant energy, Energy source and its characteristics, Atmospheric interactions with electromagnetic radiation, Energy interaction with Earth's surface materials.	
Unit- II	**Microwave Remote Sensing** Introduction, The Radar principle, Factors affecting microwave measurements, Radar wavebands, Side looking airborne (SLAR) systems, Synthetic Aperture Radar (SAR), Polarimetric SAR (PolSAR), Interaction between microwaves and Earth's surface, Interpreting SAR images, Geometric characteristics. **Remotes Sensing Platforms and Sensors** Introduction, Satellite system parameters, Spatial Resolution, Spectral Resolution, Radiometric Resolution, Temporal resolution, Imaging sensor systems (thermal, multispectral and microwave imaging), Earth resources satellites, Meteorological satellites, Satellites carrying microwave sensors, OCEASAT-1, IKONOS, Latest trends in remote sensing platforms and sensors (weather, land observation and marine satellites).	**12 Lectures**
Unit-III	**Image Analysis** Introduction, Visual interpretation, Elements of visual interpretation, Digital processing, Pre-processing, Enhancement, Transformations, Classification, Integration, Classification accuracy assessment. **Applications** Introduction, Agriculture, Forestry, Geology, Hydrology, Sea Ice, Land cover, Mapping, Oceans and Costal.	**12 Lectures**
Unit-IV	**Medical Image Processing** Various modalities of medical imaging, Breast cancer imaging, Mammographic imaging, Ultrasound imaging, Magnetic resonance imaging (MRI), Breast thermograph imaging, Problems with medical images. Image enhancement, Spatial domain methods, Frequency domain methods, Other modalities of medical imaging, Radiography, Positron emission tomography (PET), Computed tomography angiography (CTA), Echocardiogram.	**12 Lectures**
Unit –V	**Feature Extraction and Statistical Measurement** Selection of features, Shape related features, Shape representation, Bounding box, Shape matrix, Moments of region and shape, Co-occurrence matrix, Principle feature analysis (PFA), Fourier descriptors, Snake boundary detection, Snake algorithm, Texture analysis, Texture features, Feature extraction using discrete Fourier transform, wavelet transform, Gabor filters for texture analysis, Breast tissue detection, Analysis of tissue structure.	**12 Lectures**

Books / References

Title	Author/s	Edition	Publisher
Text Book of Remote Sensing and Geographical Information Systems	M. Anji Reddy	**4th Edition**	BS publication
Remote Sensing and Image Interpretation	Lillesand, T.M. and Kiefer, R.W.	6th edition.	John Wiley and Sons Inc.
Medical Image Processing Concepts and Applications	Sinha, G.R., Patel, Bhagwati Charan		PHI
Digital Image Processing	Gonzalez and Woods	3rd Edition	Pearson
Digital Image Processing and Analysis	Bhabatosh Chanda, Dwijesh Dutta Majumder	2nd Edition	PHI

Practicals (PSIT4P4b):

Note:

1. **All the practical can be done in C, C++, Java or Matlab, PolSARPro, Nest, ImageJ, R and ENVI**
2. **Satellite images can be downloaded from**
    a. **http://bhuvan3.nrsc.gov.in/bhuvan/bhuvannew/bhuvan2d.php**
    b. **http://landsat.usgs.gov/Landsat_Search_and_Download.php**
    c. **http://uavsar.jpl.nasa.gov/**
    d. **http://airsar.jpl.nasa.gov/**
3. **Medical images can be downloaded from**
    a. **http://www.barre.nom.fr/medical/samples/**

1	Apply DFT on Image
2	WAP for implementing LPF 1. Ideal LPF on square image 2. Butterworth filter 3. Gaussian filter
3	WAP for implementing HPF 1. Ideal HPF on square image 2. Butterworth filter 3. Gaussian filter
4	1. WAP for high boost filtering on square image 2. WAP for homomorphic filtering on square image
5	Acquire satellite/medical image and apply pre-processing techniques to improve the quality of image (use different low pass filters and compare the results)
6	Apply different image enhancement techniques (to improve contrast, brightness, sharpness) on satellite image
7	Apply different supervised classification techniques to classify the satellite image (minimum distance, maximum likelihood, decision tree, ANN)
8	Apply different clustering algorithms (K-means, ISODATA)
9	Apply compression and decompression algorithm on image (Huffman coding, Arithmetic encoding, LZW encoding)
10	Apply DCT and PCA on image.

CLASS: M. Sc. (Information technology)		Semester – IV	
COURSE: Cloud Management (PSIT404c)			
Periods per week **1 Period is 60 minutes**	**Lecture**	**4**	
	TW/Tutorial/Practical	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**3**	**60**
	Internal		**40**
	Practical	**--**	**50**

Unit – I	Virtualized Data Center Architecture: Cloud infrastructures; public, private, hybrid. Service provider interfaces; Saas, Paas, Iaas. VDC environments; concept, planning and design, business continuity and disaster recovery principles. Managing VDC and cloud environments and infrastructures	**12 Lectures**
Unit- II	Storage Network Design: Architecture of storage, analysis and planning. Storage network design considerations; NAS and FC SANs, hybrid storage networking technologies (iSCSI, FCIP, FCoE), design for storage virtualization in cloud computing, host system design considerations IP-SAN: Introduction, iSCSI—components of iSCSI, iSCSI host connectivity, topologies for iSCSI connectivity, iSCSI discovery, iSCSI names, iSCSI session, iSCSI PDU, ordering and numbering, iSCSI security and error handling, FCIP—FCIP topology, FCIP performance and security, iFCP—iFCP topology, iFCP addressing and routing, iFCP gateway architecture,FCOE architecture.	**12 Lectures**
Unit-III	Cloud Management: System Center 2012 and Cloud OS, Provisioning Infrastructure: Provisioning Infrastructure with Virtual Machine Designing, Planning and Implementing. Managing Hyper-V Environment with VMM 2012. Provisioning self-service with AppController, AppController essentials, Managing Private, Public, Hybrid clouds. AppController cmdlets.	**12 Lectures**
Unit-IV	Managing and maintaining with Configuration Manager 2012, Design, Planning, Implementation, Administration, Distributing Applications, Updates, Deploying Operating Systems, Asset Management and reporting. Backup and recovery with Data Protection Manager. Design, Planning, Implementation and Administration.	**12 Lectures**
Unit –V	Implementing Monitoring: Real-time monitoring with Operations Manager, Proactive monitoring with Advisor, Operations Design,	**12 Lectures**

	Planning, Implementation, Administration, Monitoring, Alerting, Operations and Security reporting. Building private clouds: Standardisation with service manager, Service Manager 2012: Design, Planning, Implementing, Incident Tracking, Automation with orchestrator, System Orchestrator 2012: Design, Planning, Implementing. Windows Azure Pack.	

Books / References

Title	Author/s	Edition	Publisher
Introducing Microsoft System Center 2012, Technical Overview	Mitch Tulloch, Symon Perriman and Symon Perriman		**Microsoft**
Microsft System Center 2012 Unleashed	Chris Amaris, Rand Morimoto, Pete Handley, David E. Ross, Technical Edit by Yardeni		Pearson Education
The.Official.VCP5.Certification.Guide		Aug.2012	VMware.Press
VCAP5-DCD Official Cert Guide			VMware.Press
Automating vSphere with VMware vCenter Orchestrator			
VMware Private Cloud Computing with vCloud Director			
Managing and optimizing VMWare VSphere deployment			
Storage Networks: The Complete Reference	Robert Spalding		
Storage Networking Protocol Fundamentals	James Long		
Storage Networking Fundamentals: An Introduction to Storage Devices, Subsystems, Applications, Management, and Filing Systems	Marc Farley		

Practicals (PSIT4P4c):

1. Managing Hyper –V environment with SCVVM 2012
2. Provisioning Self-service with AppController
3. Managing Private Cloud with AppController
4. Using Data Protection Manager for Backup and Recovery
5. Using Operations Manager for real-time monitoring
6. Using Advisor for proactive monitoring
7. Using Service Manager to standardize

8. Using Orchestrator for automation
9. Implementing Windows Azure Pack
10. Using Configuration Manager 2012 for managing and maintaining