

Nagindas Khandwala College



**Revised Syllabus
And
Question Paper Pattern
Of Course
Of
Master of Science Information Technology
(MSc IT) Programme**

**(Department Of IT)
Part II
*Semester IV***

Under Autonomy

(To be implemented from Academic Year- 2017-2018)

Masters In Information Technology (MSc IT) Program
Under Choice Based Credit, Grading and Semester System
Course Structure

MSC IT

(To be implemented from Academic Year- 2017-2018)

MSC IT – SEMESTER IV							
Course Code	Course	Hrs. of Instruction/Week	Exam Duration (Hours)	Maximum Marks			Credits
				CIE	SEE	Total	
1741PITAI	Core -11 : Artificial Intelligence	4	2 hrs 30 minutes	40	60	100	4
1742PITIM	Core -12: IT Infrastructure Management	4	2 hrs 30 minutes	40	60	100	4
1743PITIS 1743PITES 1743PITCF	DSE 3: Intelligent Systems; Real Time Embedded Systems; Computer Forensics	4	2 hrs 30 minutes	40	60	100	4
1744PITIP 1744PITES 1744PITCM	DSE 4: Advanced Image Processing; Design of Embedded Control Systems; Cloud Management	4	2 hrs 30 minutes	40	60	100	4
1745PITIS 1745PITES	Intelligent Systems Practical; Real Time Embedded Systems	4	2 hrs	-	50	50	2

1745PITCF	Practical; Computer Forensics Practical						
1746PITIP	Advanced Image Processing Practical;	4	2 hrs				
1746PITES	Design of Embedded Control Systems Practical;			-	50	50	2
1746PITCM	Cloud Management Practical						
1747PITPR	Project	8	2 hrs	-	100	100	4
		32				600	24

Course Code :	Course	Hrs. of Instruc tion/ week	Exam Duratio n (Hours)	Maximum Marks			Credits
				CIE	SEE	Total	
1741PITAI	Artificial Intelligence	3	2 ½ hrs	25	75	100	4

Sr. No.	Modules / Units
1	UNIT 1
	<p>Introduction: AI, Components of AI, History of AI, Salient Points, Knowledge and Knowledge Based Systems, AI in Future, Applications.</p> <p>Logic and Computation: Classical Concepts, Computational Logic, FOL, Symbol Tableau, Resolution, Unification, Predicate Calculus in Problem Solving, Model Logic, Temporal Logic.</p> <p>Heuristic Search: Search-Based Problems, Informed Search, Water Jug Problem, TSP, Branch and Bound Method, TSP Algorithm. [Reference I]</p>
2	UNIT 2
	<p>Game Playing: AND/OR Graph, Minimax Problem, Alpha-Beta Search, Puzzle Solving, AI versus Control Robot.</p> <p>Knowledge Representation: Structure of an RBS, Merit, Demerit and Applicability of RBS, Semantic Nets, Frames, Conceptual Graphs, Conceptual Dependency, Scripts.</p> <p>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]</p>

3	UNIT 3
	<p>Probabilistic Reasoning: Bayes Theorem, Bayesian Network, Dempster and Shafer Theory of Evidence, Confidence Factor, Probabilistic Logic.</p> <p>Knowledge Acquisition: Knowledge Acquisition process, Automatic Knowledge Acquisition, Machine Learning, Induction, Analogical Reasoning, Explanation-Based Learning, Inductive Learning, Knowledge Acquisition Tools.</p> <p>[Reference I].</p>
4	UNIT 4
	<p>Planning: Necessity of planning, Planning Agents, Planning generating schemes, Non-hierarchical planning, Hierarchical planning, Script-based planning, Opportunistic planning, Algorithm for planning, planning representation with STRIPS an example.</p> <p>Constraint Satisfaction Problem: Constraints and Satisfiability, Basic search strategies for solving CSP, Representation of CSP problem, Examples of constraint satisfaction problem.</p> <p>[Reference II]</p>
5	UNIT 5
	<p>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]</p> <p>Prolog: Prolog programming features, Syntax, Syntax of Rules, LIST, Structure, Some Solutions using TURBO PROLOG. [Reference II]</p>

Reference Books
Artificial Intelligence
<p>Text Books:</p> <ol style="list-style-type: none"> 1. Artificial Intelligence R. B. Mishra EEE PHI 2. Artificial Intelligence & Soft Computing for Beginners Anandita Das Bhattacharjee SPD 3. Artificial Intelligence E.Rich and K.Knight 2002 TMH 4. Artificial Intelligence: A Modern Approach S.Russel, P.Norvig 2002 Pearson Education

Course Code:	Course	Hrs. of Instruction/week	Exam Duration (Hours)	Maximum Marks			Credits
				CIE	SEE	Total	
1742PITIM	IT Infrastructure Management	3	2 ½ hrs	25	75	100	4

Sr. No.	Modules / Units
1	UNIT 1
	<p>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.</p> <p>The Service Lifecycle: Mapping the Concepts of ITIL to the Service Lifecycle, How does the Service Lifecycle work?</p> <p>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</p>
2	UNIT 2
	<p>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 Considerations, Availability Management Considerations, Information Security Management Considerations, Service Catalogue Management Considerations, ITSCM Considerations, Supplier Management Considerations</p>
3	UNIT 3
	<p>Service Transition: Objectives, Service Transition Processes, Knowledge Management, Service Asset and Configuration Management,</p>

	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
4	UNIT 4
	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
5	UNIT 5
	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

Reference Books
Information Security Management
<p>Text book:</p> <ol style="list-style-type: none"> 1. ITIL V3 Foundation Complete Certification Kit. 2. Foundations of IT Service Management - The Unofficial ITIL® v3 Foundations Course Brady Orand 2nd Edition 3. ITILv3 Foundation Exam, The Study Guide Arjen de JongAxel Kolthof Mike Pieper Ruby Tjassing Annelies van der Veen Tienieke Verheijen Van Harren

Course Code	Course	Hrs. of Instruction/Week	Exam Duration (Hours)	Maximum Marks			Credits
				CIE	SEE	Total	
1743PITIS	Elective 1 Intelligent Systems	3	2 1/2 Hours	25	75	100	4

Sr. No.	Modules / Units
1	UNIT 1
	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
2	UNIT 2
	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,
3	UNIT 3
	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 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
4	UNIT 4
	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,
5	UNIT 5
	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.

Reference Books
ELECTIVE 1:- Intelligent Systems
<p>Reference books:</p> <ol style="list-style-type: none"> 1. Artificial Intelligence: A Modern Approach Stuart Russell, Peter Norvig 3rd Edition Pearson Education 2. Artificial Intelligence: Structures and Strategies for Complex Problem Solving George F.Luger Pearson Education 3. Artificial Intelligence Patrick Winston Pearson Education

Practical (1745PITIS)

At least Eight practicals covering the entire syllabus must be taken.

1. Write a program for implementing the Depth First Search (DFS) Algorithm. And also write the algorithm for the same.
2. Write a program for implementing BFS algorithm.
3. Apply domain specific heuristic to generate possible solution for the AI problems using Greedy Best First Search.
4. Implement the mechanism of A* algorithm.
5. Implement recursive BFS.
6. Generate succession nodes and check possibility of finding solutions of the specified problems using:
 - a) Steepest Ascent Hill Climbing
 - b) Simulated Annealing
7. Optimize the search strategy for the suggested problems using:
 - a) Mini-Max algorithm
 - b) 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

Course Code	Course	Hrs. of Instruction/Week	Exam Duration (Hours)	Maximum Marks			Credits
				CIE	SEE	Total	
1743PITES	Elective 1 Real time Embedded System	3	2 1/2 Hours	25	75	100	4

Sr. No.	Modules / Units
1	UNIT 1
	<p>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 Reliability, Types of Real Time Task, Timing Constraints, Modeling Timing Constraints.</p> <p>Embedded Operating Systems Fundamental Components, Example: Simple Little Operating System</p>

	<p>Caches The Memory Hierarchy and Cache Memory, Cache Architecture, Cache Policy</p>
2	UNIT 2
	<p>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.</p>
3	UNIT 3
	<p>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 Monotonic Algorithm.</p> <p>Handling Resource Sharing and Dependencies Resource sharing among real time task, Priority Inversion, Priority inheritance protocol, Highest locker protocol, priority ceiling protocol, Different types of priority inversion Under PCP, Important features of PCP, Resource sharing Protocol, Handling Task Dependencies.</p>
4	UNIT 4
	<p>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.</p>
5	UNIT 5
	<p>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</p>

Reference Books

ELECTIVE 1:- Real Time Embedded Systems

Reference books:

1. Real-Time Systems: Theory and Practice. Rajib Mall First Pearson Publication.
2. 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
3. Embedded Systems Design S. Heath Second Edition Newnes Publication
4. Real-Time Systems: Theory and Practice. Rajib Mall First Pearson Publication

Practical (1745PITES)

- 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

Course Code:	Course	Hrs. of Instruction/ week	Exam Duration (Hours)	Maximum Marks			Credits
				CIE	SEE	Total	
1743PITCF	Elective 1: Computer Forensics	3	2 ½ hrs	25	75	100	4

Sr. No.	Modules / Units
1	UNIT 1
	Computer Forensics and Investigation Processes, Understanding Computing Investigations, The Investigator's Office and Laboratory, Data Acquisitions
2	UNIT 2
	Processing Crime and Incident Scenes, Working with Windows and DOS Systems, Current Computer Forensics Tools.
3	UNIT 3
	Macintosh and Linux Boot Processes and File Systems, Computer Forensics Analysis, Recovering Graphics Files
4	UNIT 4
	Virtual Machines, Network Forensics, and Live Acquisitions, E-mail Investigations, Cell Phone and Mobile Device Forensics
5	UNIT 5
	Report Writing for High-Tech Investigations, Expert Testimony in High-Tech Investigations, Ethics and High-Tech Investigations

Reference Books
ELECTIVE 1:- Computer Forensics
Reference books:
<ol style="list-style-type: none"> 1. Guide to Computer Forensics and Investigations Bell Nelson, Amelia Phillips, Christopher Steuart 4th Edition Cengage Learning 2. Computer Forensics A Pocket Guide Nathan Clarke I.T G.vernance Publishing 3. Computer Forensics: Computer Crime Scene Investigation John R. Vacca 2nd Edition, Charles River Media

Practical (1745PITCF)

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

Course Code:	Course	Hrs. of Instruction/ week	Exam Duration (Hours)	Maximum Marks			Credits
				CIE	SEE	Total	
1744PITES	Elective 2: Design of Embedded Control System	3	2 ½ hrs	25	75	100	4

Sr. No.	Modules / Units
1	<p>UNIT 1</p> <p>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.</p> <p>Design with Atmel microcontrollers Architecture overview of Atmel 89C51, Pin description of 89C51, Using flash memory devices Atmel 89CXX, Power saving options.</p>
2	UNIT 2

	<p>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,</p> <p>PIC16F8XX Flash microcontrollers 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</p> <p>More about PIC microcontrollers Introduction, Capture/compare/PWM modules in PIC16F877, Master synchronous serial port (MSSP) module, USART, ADC</p>
3	UNIT 3
	<p>ARM Embedded Systems The RISC Design Philosophy, The ARM Design Philosophy, Embedded System Hardware, Embedded System Software,</p> <p>ARM Processor Fundamentals Registers, Current Program Status Register, Pipeline, Exceptions, Interrupts, and the Vector Table, Core Extensions, Architecture Revisions, ARM Processor Families</p>
4	UNIT 4
	<p>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</p> <p>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</p>
5	UNIT 5
	<p>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</p>

Reference Books	
Elective 2: Design of Embedded Control System	
Reference books:	
1. Microcontrollers theory and applications (UnitI and II) Ajay Deshmukh First Tata	

McGraw- Hill

2. ARM system developer's guide: designing and optimizing system. (Unit III to V)
Andrew N. Sloss, Dominic Symes, Chris Wright. First Elsevier Publication

Practical (1746PITES)

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

Course Code:	Course	Hrs. of Instruction/ week	Exam Duration (Hours)	Maximum Marks			Credits
				CIE	SEE	Total	
1744PITIP	Elective 2: Advanced Image Processing	3	2 ½ hrs	25	75	100	4

Sr. No.	Modules / Units
1	UNIT 1
	<p>Enhancement in Frequency domain Introduction, 2-D Discrete Fourier Transform, Properties of Fourier transform, Basic filtering in the frequency domain, Smoothing and Sharpening filters, FFT algorithm. Discrete cosine transform (DCT), KL (PCT) transform, HAAR, Basics of wavelets.</p> <p>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.</p>

2	UNIT 2
	<p>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.</p> <p>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).</p>
3	UNIT 3
	<p>Image Analysis Introduction, Visual interpretation, Elements of visual interpretation, Digital processing, Pre-processing, Enhancement, Transformations, Classification, Integration, Classification accuracy assessment.</p> <p>Applications Introduction, Agriculture, Forestry, Geology, Hydrology, Sea Ice, Land cover, Mapping, Oceans and Coastal.</p>
4	UNIT 4
	<p>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.</p>
5	UNIT 5
	<p>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.</p>

Reference Books

Elective 2: Advanced Image Processing

Reference books:

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

Practical (1746PITIP)

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
 - a. Ideal LPF on square image
 - b. Butterworth filter
 - c. Gaussian filter
3. WAP for implementing HPF
 - a. Ideal HPF on square image
 - b. Butterworth filter
 - c. Gaussian filter
4.
 - a. WAP for high boost filtering on square image
 - b. 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.

Course Code:	Course	Hrs. of Instruction/ week	Exam Duration (Hours)	Maximum Marks			Credits
				CIE	SEE	Total	
1744PITCM	Elective 2: Cloud Management	3	2 ½ hrs	25	75	100	4

Sr. No.	Modules / Units
1	UNIT 1
	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.
2	UNIT 2
	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.
3	UNIT 3
	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.
4	UNIT 4
	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.
5	UNIT 5
	Implementing Monitoring: Real-time monitoring with Operations Manager, Proactive monitoring with Advisor, Operations Design, 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.

Reference Books
Elective 2: Cloud Management
<p>Reference books:</p> <ol style="list-style-type: none"> 1. Introducing Microsoft System Center 2012, Technical Overview Mitch Tulloch, Symon Perriman and Symon Perriman Microsoft 2. Microsoft System Center 2012 Unleashed Chris Amaris, Rand Morimoto, Pete Handley, David E. Ross, Technical Edit by Yardeni Pearson Education 3. The Official VCP5 Certification Guide Aug. 2012, VMware Press 4. VCAP5-DCD Official Cert Guide, VMware Press 5. Automating vSphere with VMware vCenter Orchestrator 6. VMware Private Cloud Computing with vCloud Director 7. Managing and optimizing VMware vSphere deployment 8. Storage Networks: The Complete Reference, Robert Spalding 9. Storage Networking Protocol Fundamentals, James Long 10. Storage Networking Fundamentals: An Introduction to Storage Devices, Subsystems, Applications, Management, and Filing Systems, Marc Farley

Practical (1744PITCM)
<ol style="list-style-type: none"> 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

Evaluation Scheme

I. Internal Exam-40 Marks

(i) Test– 30 Marks - Duration 60 mins

It will be conducted either as a written test or using any open source learning management system such as Moodle (Modular object-oriented dynamic learning environment) Or a test based on an equivalent online course on the contents of the concerned course(subject) offered by or build using MOOC (Massive Open Online Course) platform.

(ii) 10 Marks – Presentation and active participation in routine class instructional deliveries

Overall conduct as a responsible student, manners, skill in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.

II. External Examination- 60 Marks

(i) Duration - 2.5 Hours.

(ii) Theory question paper pattern:-

All questions are compulsory.		
Question	Based on	Marks
Q.1	Unit I	12
Q.2	Unit II	12
Q.3	Unit III	12
Q.4	Unit IV	12
Q.5	Unit V	12

- All questions shall be compulsory with internal choice within the questions.
- Each Question may be sub-divided into sub questions as a, b, c, d & e, etc & the allocation of Marks depends on the weightage of the topic.

III. Practical Examination – 50 marks (Duration: 2 Hours)

- Each practical course carries 50 Marks : 40 marks + 05 marks (journal)+ 05 marks(viva)
- Minimum 75% practical from each core/allied course are required to be completed and written in the journal.

(Certified Journal is compulsory for appearing at the time of Practical Exam)

Guidelines for Project:

- The project topic may be undertaken in any area of Core Courses.
- Each of the students has to undertake a Project individually under the supervision of a teacher-guide.
- The student shall decide the topic in consultation with the teacher-guide concerned.
- College will allot P G Teacher for guidance to the students based on her / his specialization.
- There shall be double valuation of project by the teacher- guide concerned and an external examiner appointed by the College with equal weightage.
- The teacher-guide along with the external examiner appointed by the College for the valuation of project shall conduct viva voce examination with equal weightage.
- The project report shall be prepared as per the broad guidelines given below:
 - a. Project Report shall be typed in Times New Roman with one and half line spacing in 12 Font Size and 1.5 spacing.
 - b. The size of the Project Report shall be with a minimum of 50 pages.
 - c. Project Report shall be printed on both sides of the paper.
 - d. The Project Report shall be bounded.
- Minimum of Grade E in the project component is needed for passing
- In case of failing in the project work, the same project can be revised for ATKT examination.
- Absence of student for viva voce: If any student fails to appear for the viva voce on the date and time fixed by the department, such student shall appear for the viva voce only along with students of the next batch.