

M.D. UNIVERSITY, ROHTAK

(NAAC Accredited 'A+' Grade)

SCHEME OF STUDIES AND EXAMINATION

B.Tech (Computer Science & Information Technology)

Common with

B.Tech (Information Technology)

SEMESTER 7th AND 8th

Scheme effective from 2021-22

COURSE CODE AND DEFINITIONS:

Course Code	Definitions
L	Lecture
T	Tutorial
P	Practical
BSC	Basic Science Courses
ESC	Engineering Science Courses
HSMC	Humanities and Social Sciences including Management courses
PCC	Professional Core Courses
LC	Laboratory Courses
MC	Mandatory Courses
PT	Practical Training
S	Seminar
TH	Theory
Pr	Practical

General Notes:

1. Mandatory courses are non credit courses in which students will be required passing marks in internal assessments.
2. Students will be allowed to use non programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.
3. Students will be permitted to opt for any elective course run by the department. However, the department shall offer those electives for which they have expertise. The choice of the students for any elective shall not be binding for the department to offer, if the department does not have expertise. To run the elective course a minimum of $1/3^{\text{rd}}$ students of the class should opt for it.

**B.Tech (Computer Science and Information Technology)
common with B.Tech (Information Technology)
Scheme of Studies/Examination
Semester 7**

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Contact Hrs. per week	Credit	Examination Schedule (Marks)				Duration of Exam (Hours)
				L	T	P			Internal Assessment	Theory	Practical	Total	
1	Professional Core Course	PCC-IT-401G	Neural Networks	3	0	0	3	3	25	75		100	3
2	Professional Elective Course	Refer to Annexure IV	Elective-IV	3	0	0	3	3	25	75		100	3
3	Professional Elective Course	Refer to Annexure V	Elective-V	3	0	0	3	3	25	75		100	3
4	Open Elective Course	Refer to Annexure OEC-I	Open Elective-I	3	0	0	3	3	25	75		100	3
5	Professional Core Course	LC-IT-419 G	Neural Networks Lab	0	0	2	2	1	25	-	25	50	3
6	Project	PROJ-IT-422G	Project-II	0	0	6	6	3	50	-	50	100	3
7	Professional Core Course	PT-IT-423G	Practical Training-II	0	0	0	1	-	-	-	-	-	-
		TOTAL CREDIT						16	175	300	75	550	

NOTE:

1. Practical Training II: The evaluation of Practical Training-II will be based on seminar, viva-voce, report submitted by the students. According to performance, the students are awarded grades A, B, C, F. A student who is awarded 'F' grade is required to repeat Practical Training.

2. Choose one subject from each Elective -IV, Elective -V and open Elective -I. List of elective subjects is attached as annexures.

**B.Tech (Computer Science and Information Technology)
common with B.Tech (Information Technology)
Scheme of Studies/Examination
Semester 8**

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Contact Hrs. per week	Credit	Examination Schedule (Marks)				Duration of Exam (Hours)
				L	T	P			Internal Assessment	Theory	Practical	Total	
1	Professional Core Course	PCC-IT-402G	R Programming	3	0	0	3	3	25	75		100	3
2	Professional Core Course	PCC-IT-403G	Big Data Analysis	3	0	0	3	3	25	75		100	3
3	Open Elective Course	Refer to Annexure OEC-II	Open Elective-II	3	0	0	3	3	25	75		100	3
4	Professional Core Course	LC-IT-420G	R Programming Lab	3	0	0	3	3	25	75		100	3
5	Professional Core Course	LC-IT-4212G	Big Data Analysis Lab	0	0	2	2	1	25		25	50	3
6	Project	PROJ-IT-424G	Project-III	0	0	8	4	4	50		50	100	3
TOTAL CREDIT								17	175	300	75	550	

NOTE:

Choose one subject from open Elective – II. List of elective subjects is attached as annexures.

Annexure IV

1. PEC-IT-404G: High Speed Networks
2. PEC-IT-405G: Advanced Computer Architecture
3. PEC-IT-406G: Soft Computing
4. PEC-IT-407G: Software Project Management

Annexure V

1. PEC-IT-408G: Cloud Computing
2. PEC-IT-409G: Analytical Instrumentation
3. PEC-IT-410G: Cyber Security Threats

Annexure OEC-I

1. OEC-IT-411G: Robotics
2. OEC-IT-414G: Disaster Management
3. HSMC-418G: Human Resource Management
4. OEC-IT-415G: Game Theory in Engineering Application

Annexure OEC-II

1. PEC-CS-412G: Cyber Law & Ethics
2. OEC-ECE-413G: Wireless Communication & Adhoc Network
3. OEC-CS-416G: Renewable Energy System
4. OEC-CS- 417G: Knowledge Management
5. OEC-CS-418G: Managing Innovation & Entrepreneurship

PCC-IT-401 G

Neural Networks

L T P

3 - -

Class Work: 25Marks

Exam: 75Marks

Total: 100Marks

Duration of Exam: 03 Hrs.

NOTE: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The student have to attempt five questions in total, First being compulsory and selecting one from each unit.

UNIT-1: Overview of biological neurons: Structure of biological neurons relevant to ANNs. Fundamental concepts of Artificial Neural Networks: Models of ANNs; Feedforward & feedback networks; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule, Winner-take all learning rule, etc.

UNIT-2: Single layer Perception Classifier: Classification model, Features & Decision regions; training & classification using discrete perceptron, algorithm, single layer continuous perceptron networks for linearlyseperable classifications. Multi-layer Feed forward Networks: linearly non-seperable pattern classification, Delta learning rule for multi-perceptron layer, Generalized delta learning rule, Error back-propagation training, learning factors, Examples.

UNIT-3: Single layer feed back Networks: Basic Concepts, Hopfield networks, Training & Examples. Associative memories: Linear Association, Basic Concepts of recurrent Auto associative memory: retrieval algorithm, storage algorithm; By directional associative memory, Architecture, Association encoding & decoding, Stability.

UNIT-4: Self organizing networks: UN supervised learning of clusters, winner-take-all learning, recall mode, Initialisation of weights, seperability limitations

Text Books: 1. Introduction to artificial Neural systems by Jacek M. Zurada, 1994, Jaico Publ. House.
Reference Books:

2. "Neural Networks :A Comprehensive formulation", Simon Haykin, 1998, AW
3. "Neural Networks", Kosko, 1992, PHI.
4. "Neural Network Fundamentals" – N.K. Bose , P. Liang, 2002, T.M.H
5. Neural Network , T.N.Shankar, University Science Press
6. Neuro Fuzzy Systems, Lamba, V.K., University Science Press

PEC-IT-404 G

High Speed Networks

L T P

3 - -

Class Work: 25Marks

Exam: 75Marks

Total: 100Marks

Duration of Exam: 03 Hrs.

NOTE: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The student have to attempt five questions in total, First being compulsory and selecting one from each unit.

UNIT-1: Gigabit Ethernet Æ Overview of fast Ethernet, Gigabit Ethernet – overview, specifications, layered protocol architecture, network design using Gigabit Ethernet, applications, 10GB Ethernet – overview, layered protocol architecture, applications. Wireless Networks Æ Existing and emerging standards, Wireless LAN(802.11), Broadband Wireless(802.16), Bluetooth(802.15) their layered protocol architecture and security. Mobile Networks – GSM, CDMA and GPRS

UNIT-2: Fibre Channel Æ Fibre channel physical characteristics – topologies & ports, layered protocol architecture, class of service, technology comparison, SAN overview and architecture. Frame Relay Æ Protocol architecture, frame format, routing, congestion control.

UNIT-3: ISDN & B-ISDN Æ ISDN - Channels, interfaces, addressing, protocol architecture, services and B-ISDN ATM Æ Virtual circuits, cell switching, reference model, traffic management.

UNIT-4: Internet Layer Æ IPV4 and IPV6, IP addressing, ARP, IP routing(OSPF & BGP), internet multicasting, mobile IP. Transport Layer Æ UDP/TCP protocols & architecture, TCP connection management, wireless TCP. Application Layer Æ DNS, FTP, Voice over IP, audio & video compression.

Reference & Text Books: 1. James P.G. Sterbenz and Joseph D. Touch, High-Speed Networking: A Systematic Approach to High-Bandwidth Low Latency Communication, Wiley, 2001
2. William-Stallings, High-Speed Networks TCP/IP and ATM Design Principles, Prentice Hall; 1st edition, 1998.

PEC-IT-405 G

ADVANCED COMPUTER ARCHITECTURE

L T P

3 - -

Class Work: 25Marks

Exam: 75Marks

Total: 100Marks

Duration of Exam: 03 Hrs.

NOTE: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The student have to attempt five questions in total, First being compulsory and selecting one from each unit.

UNIT-1: Architecture And Machines: Some definition and terms, interpretation and microprogramming. The instruction set, Basic data types, Instructions, Addressing and Memory. Virtual to real mapping. Basic Instruction Timing. Time, Area And Instruction Sets: Time, cost-area, technology state of the Art, The Economics of a processor project: A study, Instruction sets, Professor Evaluation Matrix

UNIT-2: Cache Memory Notion: Basic Notion, Cache Organization, Cache Data, adjusting the data for cache organization, write policies, strategies for line replacement at miss time, Cache Environment, other types of Cache. Split I and D-Caches, on chip caches, Two level Caches, write assembly Cache, Cache references per instruction, technology dependent Cache considerations, virtual to real translation, overlapping the Tcycle in V-R Translation, studies. Design summary.

UNIT-3: Memory System Design: The physical memory, models of simple processor memory interaction, processor memory modeling using queuing theory, open, closed and mixed-queue models, waiting time, performance, and buffer size, review and selection of queuing models, processors with cache.

UNIT-4: Concurrent Processors: Vector Processors, Vector Memory, Multiple Issue Machines, Comparing vector and Multiple Issue processors. Shared Memory Multiprocessors: Basic issues, partitioning, synchronization and coherency, Type of shared Memory multiprocessors, Memory Coherence in shared Memory Multiprocessors.

Text Book: Advance computer architecture by Hwang & Briggs, 1993, TMH. Reference Books: Pipelined and Parallel processor design by Michael J. Fiyinn – 1995, Narosa.

PEC-IT-406 G

SOFT COMPUTING

L T P

3 - -

Class Work: 25Marks

Exam: 75Marks

Total: 100Marks

Duration of Exam: 03 Hrs.

NOTE: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The student have to attempt five questions in total, First being compulsory and selecting one from each unit.

UNIT-1: INTRODUCTION TO SOFT COMPUTING Evolution of Computing: Soft Computing Constituents, From Conventional AI to Computational Intelligence: Machine Learning Basics

UNIT-2: FUZZY LOGIC: Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions: Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making.

UNIT-3: : NEURAL NETWORKS: Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks : Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance architectures, Advances in Neural networks

UNIT-4: GENETIC ALGORITHMS: Introduction to Genetic Algorithms (GA), Applications of GA in Machine Learning : Machine Learning Approach to Knowledge Acquisition.

UNIT-5: Matlab: Study of neural network toolbox and fuzzy logic toolbox, Simple implementation of Artificial Neural Network and Fuzzy Logic

TEXT/REFERENCES: 1. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic: Theory and Applications", PHI

2. Satish Kumar, "Neural Networks: A classroom approach" Tata McGraw Hill.

3. Haykin S., "Neural Networks-A Comprehensive Foundations", PHI

4. Anderson J.A., "An Introduction to Neural Networks", PHI

5. M.Ganesh, "Introduction to Fuzzy sets and Fuzzy Logic" PHI.

6. N P Padhy and S P Simon, " Soft Computing with MATLAB Programming", Oxford University Press

PEC-IT-407 G

L T P

3 - -

Software Project Management

Class Work: 25Marks

Exam: 75Marks

Total: 100Marks

Duration of Exam: 03 Hrs.

NOTE: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The student have to attempt five questions in total, First being compulsory and selecting one from each unit.

UNIT1

Introduction to Software Project Management (SPM): Definition of a Software Project (SP), SP Vs. other types of projects activities covered by SPM, categorizing SPs, project as a system, management control, requirement specification, information and control in organization.

Stepwise Project planning: Introduction, selecting a project, identifying project scope and objectives, identifying project infrastructure, analyzing project characteristics, identifying project products and activities, estimate efforts each activity, identifying activity risk, allocate resources, review/ publicize plan.

UNIT2

Project Evaluation & Estimation: Cost benefit analysis, cash flow forecasting, cost benefit evaluation techniques, risk evaluation. Selection of an appropriate project report; Choosing technologies, choice of process model, structured methods, rapid application development, waterfall, V-process model, spiral models, Prototyping, delivery. Albrecht function point analysis.

Activity planning & Risk Management: Objectives of activity planning, project schedule, projects and activities, sequencing and scheduling activities, network planning model, representation of lagged activities, adding the time dimension, backward and forward pass, identifying critical path, activity throat, shortening project, precedence networks.

Risk Management: Introduction, the nature of risk, managing risk, risk identification, risk analysis, reducing the risks, evaluating risks to the schedule, calculating the z values.

UNIT3

Resource allocation & monitoring the control: Introduction, the nature of resources, identifying resource requirements, scheduling resources creating critical paths, counting the cost, being specific, publishing the resource schedule, cost schedules, the scheduling sequence.

Monitoring the control: Introduction, creating the frame work, collecting the data, visualizing progress, cost monitoring, earned value, prioritizing monitoring, getting the project back to target, change control.

Managing contracts and people: Introduction, types of contracts, stages in contract, placement, typical terms of a contract, contract management, acceptance, Managing people and organizing terms: Introduction, understanding behaviour, organizational behaviour: a background, selecting the right person for the job, instruction in the best methods, motivation, working in groups, becoming a team, decision making, leadership, organizational structures.

UNIT4

Software quality: Introduction, the place of software quality in project planning, the importance of software quality, defining software quality, ISO 9126, Practical software quality measures, product versus process quality management, external standards, techniques to help enhance software quality.

Text Book:

1. Software Project Management (2nd Edition), by Bob Hughes and Mike Cotterell, 1999, TMH

Reference Books:

1. Software Engineering – A Practitioner’s approach, Roger S. Pressman (5th edi), 2001, MGH
2. Software Project Management, Walker Royce, 1998, Addison Wesley.
3. Project Management 2/c. Maylor
4. Managing Global software Projects, Ramesh, 2001, TMH.

CLOUD COMPUTING

L T P
3 - -

Class Work: 25Marks
Exam: 75Marks
Total: 100Marks
Duration of Exam: 03 Hrs.

NOTE: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The student have to attempt five questions in total, First being compulsory and selecting one from each unit.

UNIT-1: INTRODUCTION TO CLOUD COMPUTING: Online Social Networks and Applications, Cloud introduction and overview, Different clouds, Risks, Novel applications of cloud computing

UNIT-2: CLOUD COMPUTING ARCHITECTURE: Requirements, Introduction Cloud computing architecture, On Demand Computing Virtualization at the infrastructure level, Security in Cloud computing environments, CPU Virtualization, A discussion on Hypervisors Storage Virtualization Cloud Computing Defined, The SPI Framework for Cloud Computing, The Traditional Software Model, The Cloud Services Delivery Model Cloud Deployment Models Key Drivers to Adopting the Cloud, The Impact of Cloud Computing on Users, Governance in the Cloud, Barriers to Cloud Computing Adoption in the Enterprise .

UNIT-3: SECURITY ISSUES IN CLOUD COMPUTING Infrastructure Security, Infrastructure Security: The Network Level, The Host Level, The Application Level, Data Security and Storage, Aspects of Data Security, Data Security Mitigation Provider Data and Its Security Identity and Access Management Trust Boundaries and IAM, IAM Challenges, Relevant IAM Standards and Protocols for Cloud Services, IAM Practices in the Cloud, Cloud Authorization Management

UNIT-4: SECURITY MANAGEMENT IN THE CLOUD Security Management Standards, Security Management in the Cloud, Availability Management: SaaS, PaaS, IaaS Privacy Issues Privacy Issues, Data Life Cycle, Key Privacy Concerns in the Cloud, Protecting Privacy, Changes to Privacy Risk Management and Compliance in Relation to Cloud Computing, Legal and Regulatory Implications, U.S. Laws and Regulations, International Laws and Regulations

UNIT-5: AUDIT AND COMPLIANCE Internal Policy Compliance, Governance, Risk, and Compliance (GRC), Regulatory/External Compliance, Cloud Security Alliance, Auditing the Cloud for Compliance, Security-as-a-Cloud.

UNIT-6: DATA INTENSIVE COMPUTING Map-Reduce Programming Characterizing Data-Intensive Computations, Technologies for DataIntensive Computing, Storage Systems, Programming Platforms, MapReduce Programming, MapReduce Programming Model, Example Application

TEXT/REFERENCES 1. "Cloud Computing Explained: Implementation Handbook for Enterprises", John Rhoton, Publication Date: November 2, 2009
2. "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance (Theory in Practice)", Tim Mather, ISBN-10: 0596802765, O'Reilly Media, September 2009

ANALYTICAL INSTRUMENTATION

PEC-IT-409 G

L T P

3 - -

Class Work: 25Marks

Exam: 75Marks

Total: 100Marks

Duration of Exam: 03 Hrs.

UNIT - I

Basic Components of a Spectrophotometer, different types of excitation sources, single and double monochromator components and mounting; materials for lens, prism, sample holder, filters etc for various wavelengths, optical sensors for different wavelength ranges. UV-VIS Spectrophotometers (Optical & Electronic Instrumentation) double wavelength spectrophotometer.

UNIT- II

Fluorescence & Phosphorescence Spectrometry (Basic principle, optical & electronic Instrumentation) Atomic Absorption & Emission Spectroscopy (Sample preparation, photometer instrumentation). Laser Raman Spectrometer Instrumentation & application.

UNIT - III

Basic consideration, Instrumentation, Qualitative & Quantitative elemental data analysis, limitations and applications of i) X-Ray Fluorescence, ii) Neutron activation, iii) Auger Electron and iv) ESCA techniques.

UNIT – IV

Basic principle of NMR phenomenon, NMR spectrometer Instrumentation and application Electron spin resonance (ESR) Spectroscopy basic principle, spectrometer instrumentation and applications. Basic principle of chromatography - Gas & Liquid column chromatograph instrumentation and applications; water pollution monitoring instrumentation.

Reference Books:

1. Instrumental Methods Of Analysis By Williard, Merrit, Dean
2. Handbook Of Analytical Instrumentation By R.S. Khandpur
3. Instrumental Methods For Chemical Analysis By E.W.Ewing
4. Introduction To Instrumental Analysis By Robert D. Braun
5. Essentials of Instrumental analysis by Skoog, Holler & Nieman, Thomson Publ.

CYBER SECURITY THREATS

PEC-IT-410 G

L T P
3 - -

Class Work: 25Marks
Exam: 75Marks
Total: 100Marks
Duration of Exam: 03 Hrs.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT 1

Introduction: Security threats - Sources of security threats- Motives - Target Assets and vulnerabilities – Consequences of threats- E-mail threats - Web-threats - Intruders and Hackers, Insider threats, Cyber crimes. Network Threats: Active/ Passive – Interference – Interception – Impersonation – Worms – Virus – Spam’s – Ad ware - Spy ware – Trojans and covert channels – Backdoors – Bots – IP, Spoofing - ARP spoofing - Session Hijacking - Sabotage- Internal treats Environmental threats - Threats to Server security.

UNIT 2

Security Threat Management: Risk Assessment - Forensic Analysis - Security threat correlation – Threat awareness - Vulnerability sources and assessment- Vulnerability assessment tools – Threat identification - Threat Analysis - Threat Modeling - Model for Information Security Planning.

UNIT 3

Security Elements: Authorization and Authentication - types, policies and techniques – Security certification - Security monitoring and Auditing - Security Requirements Specifications – Security Policies and Procedures, Firewalls, IDS, Log Files, Honey Pots

UNIT 4

Access control, Trusted Computing and multilevel security - Security models, Trusted Systems, Software security issues, Physical and infrastructure security, Human factors – Security awareness, training , Email and Internet use policies.

Reference Books:

1. Swiderski, Frank and Sydex, "Threat Modeling", Microsoft Press, 2004.
2. William Stallings and Lawrie Brown, "Computer Security: Principles and Practice", Prentice Hall, 2008.
3. Joseph M Kizza, "Computer Network Security", Springer Verlag, 2005
4. Thomas Calabres and Tom Calabrese, "Information Security Intelligence: Cryptographic Principles & Application", Thomson Delmar Learning, 2004.

ROBOTICS

PEC-IT-411 G

L T P

3 - -

Class Work: 25Marks

Exam: 75Marks

Total: 100Marks

Duration of Exam: 03 Hrs.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT-I

Introduction to Robotics, terminology and definitions, Classification: Cylindrical, Spherical, Revolute, Rectangular; Components of Robotic Systems: Actuators, Sensors, Controllers, Manipulators. Position and Orientation Description & frames, Rotation, Homogeneous transform, Translations, Transformation matrix.

UNIT-II

Forward Kinematics: Denavit-Hartenberg (D-H) representation, Link parameters, Link frame assignment, Example of Manipulation Kinematics. Inverse Kinematics: Solvability, Solution Approaches and examples; Velocities of link motion, Jacobian transformation.

UNIT-III

Manipulator Dynamics: Euler-Lagrange Equation, KE and PE Expressions, Equations of motion, Newton-Euler transformation, some examples; Independent Joint control: Actuator Dynamics, set point tracking, Trajectory Interpolation

UNIT-IV

Robot Hardware: Robot End Effectors, Grippers, grippers selection & Design; Vision: Introduction, visual sensing, Machine vision & its applications and other optical methods and Robot Applications.

Reference Books:

1. Robot and Controls By Mittal and Nagarath, TMH
2. Introduction to Robotics: Mechanics and control By J.J.Craig, Addison Wesley Pub. Co.
3. Robot Dynamics and Control, By W.Sponge & M.Vidyasagar, John Wiley and Sons, New York, 1989.
4. Robotics: Control, Sensing, Vision and Intelligence By K.S.Fu, R.C.Gonzalez and C.S.G.Lee, McGraw Hill, 1987.

Disaster Management

OEC-IT-414 G

L T P
3 - -

Class Work: 25Marks
Exam: 75Marks
Total: 100Marks
Duration of Exam: 03 Hrs.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT 1: Introduction- Concepts and definitions: disaster, hazard, vulnerability, risk, capacity, impact, prevention, mitigation).

UNIT 2: Disasters - Disasters classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills etc); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility.

UNIT 3: Disaster Impacts - Disaster impacts (environmental, physical, social, ecological, economical, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters.

UNIT 4: Disaster Risk Reduction (DRR)- Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and nonstructural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post-disaster environmental response (water, sanitation, food safety, waste management, disease control); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

UNIT 5: Disasters, Environment and Development - Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land-use changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods.

Text/Reference Books: 1. <http://ndma.gov.in/> (Home page of National Disaster Management Authority).
2. <http://www.ndmindia.nic.in/> (National Disaster management in India, Ministry of Home Affairs).
3. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
4. Singh B.K., 2008, Handbook of Disaster Management: techniques & Guidelines, Rajat Publication.
5. Ghosh G.K., 2006, Disaster Management ,APH Publishing Corporation.

HUMAN RESOURCE MANAGEMENT

HSMC-418 G

L T P
3 - -

Class Work: 25Marks
Exam: 75Marks
Total: 100Marks
Duration of Exam: 03 Hrs.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT 1: HUMAN RESOURCE MANAGEMENT Human Resource Management: concept, evolution and scope; Strategic objectives of HR management; Roles, responsibilities and competencies of HR manager; Challenges to HR professionals; Human Resource Planning & Forecasting: significance and process; Human Resource Information System.

UNIT 2 : HR SOURCING AND RECRUITMENT HR Sourcing and Recruitment; Selection: process, Placement; Induction and Socialization. Job Analysis: job Description and job Specification; Job Design: approaches and methods; Job Evaluation-concept & methods; Performance Management System: appraisal and counselling.

UNIT 3: TRAINING Training process, training need analysis (TNA); training methods and techniques; Designing Training programs; Training evaluation; Career planning and Development; Potential Appraisal and Succession planning; Employee Compensation: basic concepts & determinants; New trends in compensation management.

UNIT 4: INDUSTRIAL RELATIONS AND GRIEVANCE HANDLING Industrial Relations and Grievance Handling; Employee welfare; Dispute Resolution; International Human Resource Management; Contemporary Issues in HRM: knowledge Management, HR Audit & Accounting, HR in virtual organizations, ethics & corporate social responsibility.

TEXT/REFERENCE BOOKS 1. K. Aswathapa, "Human resource Management: Text and cases", 6 th edition, Tata McGraw Hill, New Delhi.

2. Uday Kumar Haldar & Juthika Sarkar, "Human resource Management", New Delhi, Oxford University Press.

3. De Cenzo, Da & Robbins S.P., "Fundamentals of Human Resource Management", 9 th edition, New York, John Wiley & Sons.

4. Gary Dessler, "Human Resource Management", 11 th edition New Delhi: Pearson Prentice Hall.

5. Tanuja Agarwala, "Strategic Human resource Management", Oxford University Press.

Game theory with Engineering Applications

OEC-IT-415 G

L T P

3 - -

Class Work: 25Marks

Exam: 75Marks

Total: 100Marks

Duration of Exam: 03 Hrs.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT 1: Introduction-What is Game Theory? Definition of Games. Actions, Strategies, Preferences, Payoffs. Examples. Strategic form games and examples: Prisoner's Dilemma, Bach or Stravinsky, Matching Pennies. Notion of Nash Equilibrium. Examples of Nash Equilibrium. Best Response Functions. Dominated Actions. Symmetric Games and Symmetric Equilibria. Case Studies of Nash Equilibrium in popular games.

UNIT 2: Mixed Strategy Nash Equilibrium- Randomization of Actions, Mixed strategy Nash equilibrium, Dominated actions, Pure strategy equilibria in the presence of randomization, Illustrations: (1) expert diagnosis (2) reporting a crime. Finding all mixed strategy Nash equilibria of some representative games.

UNIT 3: Extensive games with Perfect Information- Extensive games, Strategies and outcomes, Nash equilibrium, Subgame perfect equilibrium, finding subgame perfect equilibria using backward induction. Allowing for simultaneous moves in extensive games with perfect information. Example of committee decision making. Two Player Zerosum Games: Maxminimization and Nash Equilibrium. Strictly competitive games. Nash equilibrium in strictly competitive games. Minimax theorem. Solution via linear programming. Examples.

UNIT 4: Bayesian and Repeated Games- Motivational Examples. Definition of a Bayesian Game and Bayesian Nash Equilibrium and examples. Auctions: Independent private values, Nash equilibrium of first price auction and second price auction, common valuations, revenue equivalence of auctions. Idea of repeated games. Finitely repeated prisoner's dilemma, infinitely repeated prisoner's dilemma, strategies in a repeated prisoner's dilemma, Nash equilibria and equilibria payoffs in infinitely repeated prisoner's dilemma, sub-game perfect equilibria and equilibria payoffs in infinitely repeated prisoner's dilemma.

UNIT 5: Coalitional Games- Coalitional games. The Core. Illustrations: (1) Ownership and distribution of wealth (2) exchanging homogeneous items (3) exchanging heterogeneous items (4) voting (5) matching. Shapley value and examples.

Text Books: 1. Martin Osborne. An Introduction to Game Theory. Oxford University Press, 2003.

2. Philip D. Straffin, Jr. Game Theory and Strategy. The Mathematical Association of America, January 1993.

Reference Books: 1. Ken Binmore, Fun and Games : A Text On Game Theory, D. C. Heath & Company, 1992.
2. Y. Narahari. Essentials of Game Theory and Mechanism Design. IISc Press, 2011

LC-IT-419 G

Neural Network Using Matlab.

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Class Work: 25

Exam: 50

Total: 75

Duration of Exam: 3 Hrs.

To study some basic neuron models and learning algorithms by using Matlab's neural network toolbox. The following demonstrations

- Simple neuron and transfer functions
- Neuron with vector input
- Decision boundaries
- Perceptron learning rule
- Classification with a 2-input perceptron (note - there's an error in the text here: it says there are 5 input vectors, but really there are only 4) Linearly non-separable vectors

Try to understand the following things:

1. How the weights and bias values affect the output of a neuron.
2. How the choice of activation function (or transfer function) affects the output of a neuron. Experiment with the following functions: identity (purelin), binary threshold (hardlim, hardlims) and sigmoid (logsig, tansig).
3. How the weights and bias values are able to represent a decision boundary in the feature space.
4. How this decision boundary changes during training with the perceptron learning rule.
5. How the perceptron learning rule works for linearly separable problems.
6. How the perceptron learning rule works for non-linearly separable problems.

R PROGRAMMING

PCC-IT-402 G

L T P
3 - -

Class Work: 25Marks

Exam: 75Marks

Total: 100Marks

Duration of Exam: 03 Hrs.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT 1: Introduction: Introducing to R – R Data Structures – Help functions in R – Vectors – Scalars – Declarations – recycling – Common Vector operations – Using all and any – Vectorized operations – NA and NULL values – Filtering – Vectorised if-then else – Vector Equality – Vector Element names

UNIT 2: Matrices, Arrays And Lists: Creating matrices – Matrix operations – Applying Functions to Matrix Rows and Columns – Adding and deleting rows and columns – Vector/Matrix Distinction – Avoiding Dimension Reduction – Higher Dimensional arrays – lists – Creating lists – General list operations – Accessing list components and values – applying functions to lists – recursive lists

UNIT 3: Data Frames: Creating Data Frames – Matrix-like operations in frames – Merging Data Frames – Applying functions to Data frames – Factors and Tables – factors and levels – Common functions used with factors – Working with tables - Other factors and table related functions - Control statements – Arithmetic and Boolean operators and values – Default values for arguments - Returning Boolean values – functions are objects – Environment and Scope issues – Writing Upstairs - Recursion – Replacement functions – Tools for composing function code – Math and Simulations in R

UNIT 4: OOP: S3 Classes – S4 Classes – Managing your objects – Input/Output – accessing keyboard and monitor – reading and writing files – accessing the internet – String Manipulation – Graphics – Creating Graphs – Customizing Graphs – Saving graphs to files – Creating three-dimensional plots

UNIT 5: Interfacing: Interfacing R to other languages – Parallel R – Basic Statistics – Linear Model – Generalized Linear models – Non-linear models – Time Series and Auto-correlation – Clustering

Text Books:

Name :

The Art of R Programming: A Tour of Statistical Software Design

Author:

Norman Matloff

Publication:

No Starch Press, 2011

Name :

R for Everyone: Advanced Analytics and Graphics

Author:

Jared P. Lander

Publication:

Addison-Wesley Data & Analytics Series, 2013.

Reference Books:

Name:

Beginning R – The Statistical Programming Language

Author:

Mark Gardener

Publication:

Wiley, 2013

Name:

Introductory R: A Beginner's Guide to Data Visualisation, Statistical Analysis and Programming in R

Author:

Robert Knell

Publication:

Amazon Digital South Asia Services Inc, 2013

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3 - -

Class Work: 25Marks

Exam: 75Marks

Total: 100Marks

Duration of Exam: 03 Hrs.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT-1: INTRODUCTION Computers and its Impact in Society, Overview of Computer and Web Technology, Need for Cyber Law, Cyber Jurisprudence at International and Indian Level.

UNIT-2: CYBER LAW-INTERNATIONAL PERSPECTIVES UN & International Telecommunication Union (ITU) Initiatives Council of Europe-Budapest Convention on Cyber crime, Asia-Pacific Economic Cooperation(APEC), Organization for Economic Co-operation and Development(OECD),World Bank, Common wealth of Nations

UNIT-3: CONSTITUTIONAL & HUMAN RIGHT ISSUES IN CYBERSPACE Freedom of Speech and Expression in Cyberspace, Right to Access Cyberspace–Access to Internet, Right to Privacy, Right to Data Protection

UNIT-4: CYBER CRIMES & LEGAL FRAMEWORK Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber Pornography, Identity Theft & Fraud, Cyber terrorism, Cyber Defamation, Different offences under IT Act, 2000

UNIT-5: CYBER TORTS Cyber Defamation, Different Types of Civil Wrongs under the IT Act, 2000

UNIT-6: INTELLECTUAL PROPERTY ISSUES IN CYBERSPACE Interface with Copyright Law, Interface with Patent Law, Trademarks & Domain Names Related issue

UNIT-7: E-COMMERCECONCEPT E-commerce Salient Features, Online approaches like B2B, B2C & C2C Online contracts, Click Wrap Contracts, Applicability of Indian Contract Act, 1872

UNIT-8: DISPUTERE SOLUTION IN CYBERSPACE Concept of Jurisdiction, Indian Context of Jurisdiction and IT Act, 2000, International Law and Jurisdictional Issues in Cyberspace, Dispute Resolutions, Information warfare policy and ethical Issues.

References: Chris Reed• & John Angel, Computer Law, OUP, New York,(2007). Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co, New Delhi,(2012)• Verma S, K, Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute, New Delhi,(2004) Jonthan Rosenoer, Cyber Law, Springer, New York,(1997).• Sudhir Naib, The Information Technology Act, 2005: A Handbook, OUP, NewYork,• (2011) S. R. Bhansali, InformationTechnologyAct, 2000, University Book HousePvt.Ltd., Jaipur• (2003). Vasu Deva, Cyber Crimes and Law Enforcement, Common wealth Publishers, New• Delhi, (2003)

WIRELESS COMMUNICATIONS AND AD-HOC NETWORKS

PEC-ECE-401 G

L T P
3 - -

Class Work: 25Marks

Exam: 75Marks

Total: 100Marks

Duration of Exam: 03 Hrs.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT 1: INTRODUCTION TO WIRELESS COMMUNICATION SYSTEM Evolution of mobile radio communications, Generation of wireless communication, examples of wireless communication systems, paging systems, Cordless telephone systems, comparison of various wireless systems.

UNIT 2: MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION & CELLULAR SYSTEM Introduction to Multiple Access, ALOHA, SDMA, FDMA, TDMA, CDMA, spread Spectrum multiple Access Basic cellular Systems, Operation of Cellular systems packet ratio, capacity of a cellular systems. Second generation cellular networks: GSM, third generation wireless networks: CDMA. Channel Assignment Strategies, Hand Off Strategies (MAHO, MCHO, NCHO), Cell splitting, Cell sectoring, Zone concepts, Frequency Reuse, Interference and system capacity, tracking and grade off service.

UNIT 3: INTRODUCTION TO MOBILE ADHOC NETWORK Introduction: Wireless Networks, Infrastructure and Infrastructure less Wireless Networks, Ad hoc Wireless Networks, Heterogeneity in Mobile Devices, Types of Ad hoc Mobile Communications, Challenges Facing Ad hoc Mobile Networks, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks , classifications of Routing Protocols.

UNIT 4: ROUTING PROTOCOLS IN MOBILE ADHOC NETWORKS Table-Driven Ad hoc Routing Protocols: Destination Sequenced Distance Vector (DSDV), Wireless Routing Protocol (WRP), Cluster Switch Gateway Routing (CSGR) On-Demand Ad hoc Routing Protocols: Ad hoc On-Demand Distance Vector Routing (AODV) , Dynamic Source Routing (DSR) , Temporally Ordered Routing Algorithm (TORA) , Signal Stability Routing (SSR) , Location-Aided Routing (LAR) Hybrid Routing Protocol: Zone Routing Protocol (ZRP).

UNIT 5: QUALITY OF SERVICE IN MOBILE ADHOC NETWORK QoS in Ad-hoc Networks: Introduction to QoS, Issues and Challenges in Providing QoS in Ad hoc Wireless Networks , classifications of QoS Solutions , Network Layer Solutions (Ticket Based QoS Routing, Predictive Location Based QoS Routing, QAODV) , QoS Frameworks for Ad hoc Wireless Networks (IntServ, DiffServ, FQMM, INSIGNIA, INORA)

REFERENCES 1. Jochen Schiller, " Mobile Communication" , Pearson Education, 2000 2. Theodore S. Rappaport , "Wireless Communications : Principles and Practice", Prentice Hall India 1996. 3. Siva Ram Murthy and B. S. Manoj, "Ad Hoc Wireless Networks Architectures and Protocols", Prentice Hall, PTR, 2004. 4. C. K. Toh, "Ad Hoc Mobile Wireless Networks Protocols and Systems", Prentice Hall, PTR, 2001. 5. Charles E. Perkins, "Ad Hoc Networking", Addison Wesley, 2000

RENEWABLE ENERGY SYSTEM

OEC-CS-416 G

L T P
3 - -

Class Work: 25Marks

Exam: 75Marks

Total: 100Marks

Duration of Exam: 03 Hrs.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT 1: Introduction, Distributed vs Central Station Generation Sources of Energy such as Microturbines, Internal Combustion Engines.

UNIT 2: Introduction to Solar Energy, Wind Energy, Combined Heat and Power, Hydro Energy, Tidal Energy, Wave Energy, Geothermal Energy, Biomass and Fuel Cells.

UNIT 3: Power Electronic Interface with the Grid

UNIT 4: Impact of Distributed Generation on the Power System, Power Quality Disturbances

UNIT 5: Transmission System Operation, Protection of Distributed Generators, Economics of Distributed Generation

TEXT/ REFERENCES BOOKS : 1. Ranjan Rakesh, Kothari D.P, Singal K.C, "Renewable Energy Sources and Emerging Technologies", 2nd Ed. Prentice Hall of India ,2011

2. Math H.Bollen, Fainan Hassan, "Integration of Distributed Generation in the Power System", July 2011, Wiley –IEEE Press

3. Loi Lei Lai, Tze Fun Chan, "Distributed Generation: Induction and Permanent Magnet Generators", October 2007, Wiley-IEEE Press.

4. Roger A.Messenger, Jerry Ventre, "Photovoltaic System Engineering", 3rd Ed, 2010

5. James F.Manwell, Jon G.McGowan, Anthony L Rogers, "Wind energy explained: Theory Design and Application", John Wiley and Sons 2nd Ed, 2010

Knowledge Management

OEC-CS-417 G

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Class Work: 25Marks

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT 1: Introduction: Definition, evolution, need, drivers, scope, approaches in Organizations, strategies in organizations, components and functions, understanding knowledge; Learning organization: five components of learning organization, knowledge sources, and documentation.

UNIT 2: Essentials of Knowledge Management; knowledge creation process, knowledge management techniques, systems and tools.

UNIT 3: Organizational knowledge management; architecture and implementation strategies, building the knowledge corporation and implementing knowledge management in organization.

UNIT 4: Knowledge management system life cycle, managing knowledge workers, knowledge audit, and knowledge management practices in organizations, few case studies.

UNIT 5: Futuristic KM: Knowledge Engineering, Theory of Computation, Data Structure.

Text Books: 1. Knowledge Management – a resource book – A Thothathri Raman, Excel, 2004.

2. Knowledge Management- Elias M. Awad Hasan M. Ghazri, Pearson Education

Reference Books: 1. The KM Toolkit – Orchestrating IT, Strategy & Knowledge Platforms, Amrit Tiwana, Pearson, PHI, II Edn.

2. The Fifth Discipline Field Book – Strategies & Tools For Building A learning Organization – Peter Senge et al. Nicholas Brealey 1994

3. Knowledge Management – Sudhir Warier, Vikas publications

4. Leading with Knowledge, Madanmohan Rao, Tata Mc-Graw Hill.

Managing Innovation and Entrepreneurship

OEC-CS-418 G

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3 - -

Class Work: 25Marks

Exam: 75Marks

Total: 100Marks

Duration of Exam: 03 Hrs.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT 1: Introduction to Entrepreneurship: Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies. Entrepreneurial growth and development.

UNIT 2: Creativity and Innovation: Creativity and Innovation: Concepts Shifting Composition of the Economy Purposeful Innovation & the 7 Sources of Innovative Opportunity The Innovation Process. Innovative Strategies : Strategies that aim at introducing an innovation. Innovation & entrepreneurship: Can they work together? Planning - incompatible with Innovation & entrepreneurship.

UNIT 3: Entrepreneurial Motivation: Need for continuous learning & relearning Acquiring Technological Innovation Entrepreneurial motivation (nAch story) Achievement Motivation in Real life.. Case Study.

UNIT 4: International Entrepreneurship: Concepts and Nature of International Entrepreneurship. The changing International environment. Ethics and International Entrepreneurship. Strategic Issues in International Entrepreneurship.

UNIT 5: Problem Identification and Problem Solving: Problem Identification. Problem solving. Innovation and Diversification.

Text/Reference Books: 1. Martin, M.J., 1994, "Managing Innovation and Entrepreneurship in Technology based Firm", John Wiley.

2. Ettl, J.E., 2000, "Managing Technology Innovation", John Wiley & Sons.

3. Drucker, P. F. (2000), "The Discipline of Innovation," Harvard Business Review, May, (originally published 1985, May-June, 63(3), 67-72.1

4. Christensen, C. M. and Raynor, M. E. (2003), The Innovator's Solution: Creating and Sustaining Successful Growth, Boston, MA: Harvard Business School Press.

5. Drucker, P. F. (1985), Innovation and Entrepreneurship, New York: Harper.

6. Harvard Business Review on Innovation (Collection of articles), Harvard Business School Press (2001).

7. Harvard Business Review on Entrepreneurship (Collection of articles), Harvard Business School Press (1999)

8. Rogers, E.M. (2003), Diffusion of Innovations, 5th ed., New York: Simon and Schuster.

LIST OF EXPERIMENTS IN R PROGRAMMING

1. Study of basic Syntaxes in R
2. Implementation of vector data objects operations
3. Implementation of matrix, array and factors and perform va in R

4. Implementation and use of data frames in R
5. Create Sample (Dummy) Data in R and perform data manipulation with R
6. Study and implementation of various control structures in R
7. Data Manipulation with dplyr package
8. Data Manipulation with data.table package
9. Study and implementation of Data Visualization with ggplot2
10. Study and implementation data transpose operations in R.