

M.D. UNIVERSITY, ROHTAK

SCHEME OF STUDIES AND EXAMINATION

B.TECH- Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)

SEMESTER 7th and 8th Semester
Scheme effective from 2023-24



COURSE CODE AND DEFINITIONS

COURSE CODE	DEFINITION
L	LECTURE
T	TUTORIAL
P	PRACTICAL
BSC	BASIC SCIENCE COURSE
PCC	PROFESSIONAL CORE COURSES
PEC	PROFESSIONAL ELECTIVE COURSE
ESC	ENGINEERING SCIENCE COURSE
LC	LAB COURSE
MC	MANDATORY COURSE
PT	PRACTICAL TRAINING
S	SEMINAR

**B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security
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7th SEMESTER**

Scheme of Studies/Examination w.e.f. 2023-24

Sr No	Category	Course Code	Course Title	Hours per Week			Total Cont act Hrs. per week	Credit	Examination Schedule				Duratio n of Exams (Hours)
				L	T	P			Internal Assessment	The ory	Prac tical	Total	
1	Professional Core Course	PCC-IOT-401G	ETHICAL HACKING	3	0	0	3	3	25	75		100	3
2	Professional Core Course	PCC-IOT-403G	Cryptocurrency With Ethereum	3	0	0	3	3	25	75		100	3
3	Professional Elective Course	Annexure -1	Annexure -1	3	0	0	3	3	25	75		100	3
4	Open Elective Course	Annexure -2	Annexure -2	3	0	0	3	3	25	75		100	3
5	Professional Core Course	LC-IOT-411G	Cryptocurrency Lab	0	0	2	2	1	25	-	25	50	3
6	Project	PROJ-IOT-423G	Project -II	0	0	6	6	3	50	-	50	100	3
7	Professional Core Course	PT—IOT-CSE-425G	Practical Training II	0	0	0	1	-	-	-	-	-	-
		TOTAL CREDIT		12	0	8	21	16	175	300	75	550	

Note: 1

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.

Excellent: A; Good: B; Satisfactory: C; Not Satisfactory: F.

Note-Students will have to choose any one from Annexure -1 (Professional Elective Course):

Annexure -1 (Professional Elective Course)	
PEC-IOT-431G	FOG COMPUTING
PEC-IOT-433G	INDUSTRIAL IOT
PEC-IOT-435G	EDGE COMPUTING

Note-Students will have to choose any one from Annexure -2 (Open Elective Course):

Annexure -2 (Open Elective Course)	
HSMC-08G	FUNDAMENTALS OF MANAGEMENT
OEC-CE-451-G	DISASTER MANAGEMENT
HSMC-10G	ENGLISH FOR PROFESSIONALS

**B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security
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8THSEMESTER**

Scheme of Studies/Examination w.e.f. 2023-24

Sr No	Category	Course Code	Course Title	Hours per Week			Total Contact Hrs. per week	Credit	Examination Schedule				Duration of Exams (Hours)
				L	T	P			Internal Assessment	Theory	Practical	Total	
1	Professional Core Course	PCC-IOT-402G	Cyber Forensics and Cyber Laws	3	0	0	3	3	25	75	-	100	3
2	Professional Core Course	PCC-CSE-404G (Common with CSE 8 th Sem)	Big Data Analytics	3	0	0	3	3	25	75	-	100	3
3	Open Elective Course	Annexure -III	Annexure -III	3	0	0	3	3	25	75	-	100	3
4	Professional Core Course	LC-IOT-420G	Cyber Forensics Lab	0	0	2	2	1	25	-	25	50	3
5	Professional Core Course	LC-CSE-410G (Common with CSE 8 th Sem)	Big Data Analytics Lab	0	0	2	2	1	25	-	25	50	3
6	Project	PROJ-IOT-422G	Project – III	0	0	8	8	4	50	-	50	100	3
		TOTAL CREDIT		9	0	12	21	15	175	225	100	500	

Note-Students will have to choose any one from Annexure -III (Open Elective Course):

Annexure -III (Open Elective Course)	
OEC-IOT-440G	Quantum Cryptography
OEC-IOT-442G	Social Media Security
OEC-IOT-444G	Quantum Computing

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ETHICAL HACKING

Coursecode	PCC-IOT-401G				
Category	Professional Core Course				
Course title	Ethical Hacking				
Schemeand Credits	L	T	P	Credits	Semester7
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

Course Objectives:

1. The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security.
2. The course includes-Impacts of Hacking; Types of Hackers; Information Security Models;Information Security Program; Business Perspective; Planning a Controlled Attack; Frameworkof Steps (Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Deliverable andIntegration)

UNIT- I

Introduction: Hacking Impacts, The HackerFramework: Planning the test, Sound Operations, Reconnaissance, Enumeration, VulnerabilityAnalysis, Exploitation, Final Analysis, Deliverable, Integration. Information Security Models:

Computer Security, Network Security, Service Security, Application Security, Security Architecture

Information Security Program: The Process of Information Security, Component Parts of Information

Security Program, Risk Analysis and Ethical Hacking.

UNIT - II

The Business Perspective: Business Objectives, Security Policy, Previous Test Results, BusinessChallenges. Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, timing isEverything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming andAttack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics,Intermediates, Law Enforcement.

UNIT - III

Preparing for a Hack: Technical Preparation, Managing the Engagement. Reconnaissance: SocialEngineering, Physical Security, Internet Reconnaissance.

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Enumeration: Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase. Exploitation: Intuitive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of Concern.

UNIT - IV

Deliverable: The Deliverable, The Document, Overall Structure, Aligning Findings, Presentation.

Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy, Conclusion.

TEXT BOOK:

1. James S. Tiller, "The Ethical Hack: A Framework for Business Value Penetration Testing",

Auerbach Publications, CRC Press.

REFERENCE BOOKS:

1. EC-Council, "Ethical Hacking and Countermeasures Attack Phases", Cengage Learning.

2. Michael Simpson, Kent Backman, James Corley, "Hands-On Ethical Hacking and Network

Defense", Cengage Learning.

Course Outcomes:

1. Gain the knowledge of the use and availability of tools to support an ethical hack
2. Gain the knowledge of interpreting the results of a controlled attack
3. Understand the role of politics, inherent and imposed limitations and metrics for planning of atest
4. Comprehend the dangers associated with penetration testing

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Cryptocurrency With Ethereum

Coursecode	PCC-IOT-403G				
Category	Professional Core Course				
Course title	Cryptocurrency With Ethereum				
Schemeand Credits	L	T	P	Credits	Semester7
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

Course Objectives:

1. To introduce the concepts of cryptocurrency.
2. To understand working of Bitcoin and Ethereum
3. To study the security issues and safeguards related to bitcoin trading
4. To study governing cryptocurrency regulations and its impact on economy.

UNIT- I

Cryptocurrency:- History, Distributed Ledger Technology (DLT), cryptocurrency in blockchain, Cryptographic basics for cryptocurrency: overview of Hashing, signature schemes, encryption schemes and elliptic curve cryptography

UNIT- II

Bitcoin:- Creation of coins, Wallet, Genesis Block, Merkel Tree, Bitcoin Scripts, Bitcoin P2P Network, hardness of mining, Transaction in Bitcoin Network, transaction verifiability, anonymity, forks, payments and double spending, Consensus in a Bitcoin network, mathematical analysis of properties of Bitcoin, Bitcoin protocols – Bitcoin Mining strategy and rewards, life of a Bitcoin Miner, Mining Difficulty, Mining Pool.

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UNIT- III

Ethereum:- Ethereum Virtual Machine (EVM), Wallets for Ethereum, Ethereum Programming Language:Solidity, Smart Contracts, The turing completeness of smart contract languages, attacks on smart contracts,Ethereum Construction, DAO, GHOST, Vulnerability, Attacks, Sidechain: another type of blockchain, Namecoin

UNIT- IV

Cryptocurrency Regulation:- Stakeholders, Roots of Bitcoin, Bitcoin scripting vs Ethereum smart contracts, Legal Aspects - Cryptocurrency Exchange, Black Market and Global Economy, Global Acceptability perspective

TEXT/REFERENCES BOOKS/ARTICLES

1. **Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction by Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Princeton University Press (July 19, 2016).**
2. **Mastering Bitcoin: Unlocking Digital Cryptocurrencies by Antonopoulos**
3. **Bitcoin: A Peer-to-Peer Electronic Cash System by Satoshi Nakamoto**
4. **ETHEREUM: A Secure Decentralized Transaction Ledger by Gavin Wood, Yellow paper.2014.**
5. **A survey of attacks on Ethereum smart contracts by Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli**

Course Outcomes:

At the end of the course, students will develop understanding for:

1. Cryptocurrency : Bitcoin and Ethereum
2. Building efficient blockchain models to carry out tasks with the practical approach.
3. Evaluating the use and risks involved with cryptocurrency
4. Smart contracts and their implications.

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Cryptocurrency Lab

Coursecode	LC-IOT-411G				
Category	Professional Core Course				
Course title	Cryptocurrency Lab				
Schemeand Credits	L	T	P	Credits	Semester7
	0	0	2	1	
Class work	25 Marks				
Exam	25Marks				
Total	50Marks				
Durationof Exam	03Hours				

As per Syllabus of Cryptocurrency With Ethereum, Lab may be conducted in any suitable programming language (C++, Python, Java)

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FOG COMPUTING

Coursecode	PEC -IOT-431G				
Category	Professional Elective Course				
Course title	FOG COMPUTING				
Schemeand Credits	L	T	P	Credits	Semester7
	3	0	0	3	
Class work	25 Marks				
Exam	75Marks				
Total	100Marks				
Durationof Exam	03Hours				

Course Objectives:

This course gives an overview of Fog Computing and its architecture, challenges and applications in different contexts.

UNIT – I

Introduction to Fog Computing: Fog Computing, Characteristics, Application Scenarios, Issues and challenges. Fog Computing Architecture: Communication and Network Model, Programming Models, Fog Architecture for smart cities, healthcare and vehicles. Fog Computing Communication Technologies: Introduction, IEEE 802.11, 4G, 5G standards, WPAN, Short-Range Technologies, LPWAN and other medium and Long-Range Technologies.

UNIT - II

Management and Orchestration of Network Slices in 5G, Fog, Edge, and Clouds: Introduction, Background, Network Slicing in 5G, Network Slicing in Software-Defined Clouds, Network Slicing Management in Edge and Fog, Middleware for Fog and Edge Computing, Need for Fog and Edge Computing Middleware, Clusters for Lightweight Edge Clouds, IoT Integration, Security Management for Edge Cloud Architectures. Fog Computing Realization for Big Data Analytics: Introduction to Big Data Analytics, Data Analytics in the Fog, Prototypes and Evaluation.

UNIT - III

Fog computing requirements when applied to IoT: Scalability, Interoperability, Fog-IoT architectural model, Challenges on IoT Stack Model via TCP/IP Architecture, Data Management, filtering, Event Management, Device Management, cloudification, virtualization, security and privacy issues. Integrating IoT, Fog, Cloud Infrastructures: Methodology, Integrated C2F2T Literature by Modeling Technique by Use-Case Scenarios, Integrated C2F2T Literature by Metrics.

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UNIT - IV

Exploiting Fog Computing in Health Monitoring: An Architecture of a Health Monitoring IoT Based System with Fog Computing, Fog Computing Services in Smart E-Health Gateways, Discussion of Connected Components. Fog Computing Model for Evolving Smart Transportation Applications: Introduction, Data-Driven Intelligent Transportation Systems, Fog Computing for Smart Transportation, Applications Case Study: Intelligent Traffic Lights Management (ITLM) System.

Course Outcomes:

1. Become familiar with the concepts of Fog.
2. Understand the architecture and its components and working of components and its performance.
3. Explore Fog on security, multimedia and smart data.
4. Model the fog computing scenario.

TEXT BOOKS:

1. Fog Computing: Theory and Practice by Assad Abbas, Samee U. Khan, Albert Y. Zomaya.
2. Fog and Edge Computing: Principles and Paradigms (Wiley Series on Parallel and Distributed Computing) by Rajkumar Buyya and Satish Narayana Srirama.
3. Amir Vahid Dastjerdi and Rajkumar Buyya, —Fog Computing: Helping the Internet of Things Realize its Potential, University of Melbourne.

REFERENCE BOOKS:

1. Flavio Bonomi, Rodolfo Milito, Jiang Zhu, Sateesh Addepalli, —Fog Computing and Its Role in the Internet of Things, MCC' 12, August 17, 2012, Helsinki, Finland. Copyright 2012 ACM 978-1-4503-1519-7/12/08... \$15.00.
2. Shanhe Yi, Cheng Li, Qun Li, —A Survey of Fog Computing: Concepts, Applications and Issues, Mobidata' 15, ACM 978-1-4503-3524-9/15/06, DOI: 10.1145/2757384.2757397, June 21, 2015, Hangzhou, China.
3. Amir M. Rahmani, Pasi Liljeberg, Preden, Axel Jantsch, —Fog Computing in the Internet of Things - Intelligence at the Edgell, Springer International Publishing, 2018.
4. Ivan Stojmenovic, Sheng Wen, "The Fog Computing Paradigm: Scenarios and Security Issues", Proceedings, Federated Conference on Computer Science and Information Systems, pp. 1–8, 2014.

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INDUSTRIAL IOT

Coursecode	PEC-IOT-433G				
Category	Professional Elective Course				
Course title	INDUSTRIAL IOT				
Schemeand Credits	L	T	P	Credits	Semester7
	3	0	0	3	
Class work	25 Marks				
Exam	75Marks				
Total	100Marks				
Durationof Exam	03Hours				

Course Objectives:

To provide students with a good depth of knowledge of Designing Industrial IOT Systems for various applications.

UNIT - I:

Introduction to Industrial Internet and Use-Cases: Industrial Internet- Key IIoT Technologies Innovation and the IIoT -Key Opportunities and Benefits -The Digital and Human Workforce – Logistics and the Industrial Internet- IOT Innovations in Retail.

UNIT – II:

The Technical and Business Innovators of The Industrial Internet: Cyber Physical Systems(CPS)– IP Mobility – Network Virtualization - SDN (Software Defined Networks)- The Cloud and Fog – Role of Big Data in IIOT - Role of Machine learning and AI in IIOT.

UNIT - III:

IIOT Reference Architecture: Industrial Internet Architecture Framework (IIAF) - Industrial Internet Viewpoints -. Architectural Topology: The Three-Tier Topology- Key System Characteristics- Data Management- Advanced data analytics.

UNIT - IV:

Protocols for Industrial Internet Systems: Legacy Industrial Protocols - Modern Communication Protocols-Proximity Network Communication Protocols- Wireless Communication Technologies Gateways: industrial gateways - CoAP (Constrained Application Protocol) - NFC.

Middleware Software Patterns and IIOT Platforms: Publish/Subscribe Pattern: MQTT, XMPP,

AMQP, DDS- Middleware Architecture- SigFox- LoRaWAN Augmented reality- Real-World Smart Factories Application of IIOT: Case study: Health monitoring, lot smart city, Smart irrigation, Robot surveillance.

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Course Outcomes: Upon completion of this course, the students will be able to:

1. Identify the Key opportunities and benefits in Industrial IoT.
2. Apply virtual network to demonstrate the use of Cloud in Industrial IoT.
3. Analyze industrial IoT Three tier topology and data management system.
4. Summarize Legacy Industrial and Modern Communication Protocols.
5. Describe Middleware Architecture, LoRaWAN- and Augmented reality.

TEXT BOOKS:

1. Gilchrist, Alasdair, "Industry 4.0 The Industrial Internet of Things", Apress, 2017.
2. Zaigham Mahmood, "The Internet of Things in the Industrial Sector: Security and Device connectivity, smart environments and Industry 4.0 (Springer), 2019.

REFERENCE BOOKS

1. Sabina Jeschke, Christian Brecher, Houbing Song, Danda B. Rawat "Industrial Internet of Things: Cyber manufacturing Systems" (Springer), 2017.
2. Industrial IoT Challenges, Design Principles, Applications, and Security by Ismail Butun (editor)
3. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014
4. Michahelles, "Architecting the Internet of Things", ISBN 978-3- 642-19156-5 e-ISBN 978-3-642-19157-2, Springer
5. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013
Cuno Pfister, Getting Started with the Internet of Things, O' Reilly Media, 2011, ISBN: 978-1-4493-9357-1

E-BOOK:

1. <https://www.apress.com/gp/book/9781484220467>

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EDGE COMPUTING

Coursecode	PEC-IOT-435G				
Category	Professional Elective Course				
Course title	EDGE COMPUTING				
Schemeand Credits	L	T	P	Credits	Semester7
	3	0	0	3	
Class work	25 Marks				
Exam	75Marks				
Total	100Marks				
Durationof Exam	03Hours				

Course Objectives:

Knowledge on how edge computing and Internet of Things (IoT) can be used as a way to meet application demands in intelligent IoT systems.

UNIT - I

IoT and Edge Computing Definition and Use Cases: Introduction to Edge Computing Scenario's and Use cases - Edge computing purpose and definition, Edge computing use cases, Edge computing hardware architectures, Edge platforms, Edge vs Fog Computing, Communication Models - Edge, Fog and M2M.

UNIT - II

IoT Architecture and Core IoT Modules-A connected ecosystem, IoT versus machine-to-machine versus, SCADA, The value of a network and Metcalfe's and Beckstrom's laws, IoT and edge architecture, Role of an architect, Understanding Implementations with examples- Example use case and deployment, Case study – Telemedicine palliative care, Requirements, Implementation, Use case retrospective.

UNIT - III

RaspberryPi: Introduction to RaspberryPi, About the RaspberryPi Board: Hardware Layout and Pinouts, Operating Systems on RaspberryPi, Configuring RaspberryPi, Programming RaspberryPi, Connecting Raspberry Pi via SSH, Remote access tools, Interfacing DHT Sensor with Pi, Pi as Webserver, PiCamera, Image & Video Processing using Pi.

UNIT - IV

Implementation of Microcomputer RaspberryPi and device Interfacing, Edge to Cloud Protocols Protocols, MQTT, MQTT publish-subscribe, MQTT architecture details, MQTT state transitions, MQTT packet structure, MQTT data types, MQTT communication formats, MQTT 3.1.1 working example. Edge computing with RaspberryPi, Industrial and Commercial IoT and Edge, Edge computing and solutions.

Course Outcomes:

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1. Understand use of the IoT architecture with its entities and protocols, from the IoT devices.
2. Security and privacy issues related to the area of edge computing and IoT.
3. Understand the RaspberryPi architecture and its components.
4. Work with RaspberryPi components and evaluate its performance.

TEXT BOOKS:

1. IoT and Edge Computing for Architects - Second Edition, by Perry Lea, Publisher: Packt Publishing, 2020, ISBN: 9781839214806.
2. Raspberry Pi Cookbook, 3rd Edition, by Simon Monk, Publisher: O'Reilly Media, Inc., 2019, ISBN: 978149204322.

REFERENCE BOOKS:

1. Fog and Edge Computing: Principles and Paradigms by Rajkumar Buyya, Satish Narayana Srirama, wiley publication, 2019, ISBN: 9781119524984.
2. David Jensen, "Beginning Azure IoT Edge Computing: Extending the Cloud to the IntelligentEdge, MICROSOFT AZURE.

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PROJECT II

Coursecode	PROJ-IOT-423G				
Category	ProfessionalCoreCourse				
Coursetitle	Project-II				
SchemeandCredits	L	T	P	Credits	Semester7
	0	0	6	3	
Classwork	50Marks				
Exam	50Marks				
Total	100Marks				
DurationofExam	03Hrs				

Students will be assigned projects individually or in a group of not more than 3 students depending on the efforts required for completion of project.

The project will have 4 stages:

(*Marks for internal evaluation are given in brackets)

1. Synopsis submission (10 marks),
2. 1st mid-term progress evaluation (10 marks)
3. 2nd mid-term progress evaluation (10 marks)
4. Final submission evaluation (20 marks).

The external examiner will evaluate the project on the basis of idea/quality of project, implementation of the project, project report and viva.

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PRACTICAL TRAINING II

Coursecode	PT-IOT-CSE-425 G				
Category	ProfessionalCoreCourse				
Coursetitle	PRACTICAL TRAINING II				
SchemeandCredits	L	T	P	Credits	Semester7
	0	0	6	3	
Classwork	50Marks				
Exam	50Marks				
Total	100Marks				
DurationofExam	03Hrs				

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FUNDAMENTALS OF MANAGEMENT

Coursecode	HSMC-08G				
Category	Open ElectiveCourse				
Coursetitle	FUNDAMENTALS OF MANAGEMENT				
SchemeandCredits	L	T	P	Credits	Semester7
	3	0	3	3	
Classwork	25Marks				
Exam	75 Marks				
Total	100Marks				
DurationofExam	03Hrs				

Course Objectives:

Students will be able to understand:

1. Evolution of Management and contribution of Management thinkers.
2. The importance of staffing and training
3. The concept of material management and inventory control
4. The components of marketing and advertising, various sources of finance and capital structure.

UNIT 1

Meaning of management, Definitions of Management, Characteristics of management, Management vs. Administration. Management-Art, Science and Profession. Importance of Management.

Development of Management thoughts. Principles of Management. The Management Functions, Inter-relationship of Managerial functions. Nature and Significance of staffing, Personnel management, Functions of personnel management, Manpower planning, Process of manpower planning, Recruitment, Selection; Promotion - Seniority Vs. Merit. Training - objectives and types of training.

UNIT 2

Production Management: Definition, Objectives, Functions and Scope, Production Planning and Control; its significance, stages in production planning and control. Brief introduction to the concepts of material management, inventory control; its importance and various methods.

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UNIT 3

Marketing Management - Definition of marketing, marketing concept, objectives & Functions of marketing. Marketing Research - Meaning; Definition; objectives; Importance; Limitations; Process. Advertising - meaning of advertising, objectives, functions, criticism.

UNIT 4

Introduction of Financial Management, Objectives of Financial Management, Functions and Importance of Financial Management. Brief Introduction to the concept of capital structure and various sources of finance.

Course outcomes:

Students will be able to understand

1. Evolution of Management and contribution of Management thinkers.
2. Importance of staffing and training
3. The concept of material management and inventory control
4. The components of marketing and advertising
5. Various sources of finance and capital structure

Suggested Books:

1. Principles and Practice of Management - R.S. Gupta, B.D.Sharma, N.S.Bhalla.(Kalyani Publishers)
2. Organisation and Management - R.D. Aggarwal (Tata Mc Graw Hill)

Suggested Reference Books:

1. Principles & Practices of Management – L.M. Prasad (Sultan Chand & Sons)
2. Management – Harold, Koontz and Cyrilo Donell (Mc.Graw Hill).
3. Marketing Management – S.A. Sherlikar (Himalaya Publishing House, Bombay).
4. Financial Management - I.M. Pandey (Vikas Publishing House, New Delhi)
5. Management - James A.F. Stoner & R.Edward Freeman, PHI.

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DISASTER MANAGEMENT

Coursecode	OEC-CE-451G				
Category	Open ElectiveCourse				
Coursetitle	DISASTER MANAGEMENT				
SchemeandCredits	L	T	P	Credits	Semester7
	3	0	3	3	
Classwork	25Marks				
Exam	75 Marks				
Total	100Marks				
DurationofExam	03Hrs				

Course objectives:

1. To provide basic conceptual understanding of disasters and its relationships with development.
2. Provide an understanding of the social nature of natural hazards and disasters
3. Increase awareness of hazards and disasters around the world and the unequal social consequences stemming from disaster events.

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 of Disaster, hazard, Global and Indian scenario, role of engineer, importance of study in human life, long term effects of disaster. Geological Mass Movement and land disasters, Atmospheric disasters, Disaster Mitigation

Unit-2

Natural Disaster: Meaning and nature of natural disaster, Flood, Flash flood, drought, cloud burst, Earthquake, Landslides, Avalanches, Volcanic eruptions, Mudflow, Cyclone, Storm, Storm Surge, climate change, global warming, sea level rise, ozone depletion

Man-made Disasters: Chemical, Industrial, Nuclear and Fire Hazards. Role of growing population and subsequent industrialization, urbanization and changing lifestyle of human beings in frequent occurrences of manmade disasters.

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Unit -3

Case Studies: Damage profile analysis- Uttarkashi/Bhuj/Latur earthquakes, Kedarnath landslide, Kerala floods, cyclone Fani and Amphan, Bihar floods, Covid 19, Forest Related disasters, Mining disasters, Atmospheric disasters.

Unit 4

Disaster Management: Importance of public awareness, Preparation and execution of emergency management programme. Scope and responsibilities of National Institute of Disaster Management (NIDM) and National disaster management authority (NDMA) in India. Use of Internet and software for effective disaster management. Applications of GIS, Remote sensing and GPS in this regard.

Course Outcomes:

After completing this course, students should be able:

1. To know natural as well as manmade disaster and their extent and possible effects on the economy.
2. To Plan national importance structures based upon the previous history.
3. To acquaint with government policies, acts and various organizational structures associated with an emergency.
4. To know the simple dos and don'ts in such extreme events and act accordingly.

Reference Books

1. Singhal J.P. Disaster Management, Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, Disaster Science and Management, McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011

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ENGLISH FOR PROFESSIONALS

Coursecode	HSMC-10G				
Category	Open ElectiveCourse				
Coursetitle	FUNDAMENTALS OF MANAGEMENT				
SchemeandCredits	L	T	P	Credits	Semester7
	3	0	3	3	
Classwork	25Marks				
Exam	75 Marks				
Total	100Marks				
DurationofExam	03Hrs				

Course Objectives:

The course aims at developing the desired language (English) skills of students of engineering and technology so that they become proficient in communication to excel in their professional lives. The course aims at developing competence for report writing with a focus on its complex writing techniques and procedures.

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

Communication Process Types and Levels, Scopes and significance, Technical and Tools of Effective communication

UNIT 2

Speaking files and Personality Development Oral Presentation, Body Language, Voice Modulation, Negotiation, Group Discussion, Interview techniques

UNIT 3

Advanced Technical Writing Job Application, CV writing, Business Letters, Memos, Minutes, Notices, Report Writing and structure, Blog writing.

UNIT 4

Communication and Media Recent Developments in Media, Context of Communication

SUGGESTED READING

**B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security
Including Block Chain Technology)
7th SEMESTER**

1. Borowick, Jerome. N. Technical Communication and its Applications. New Delhi: PHI, 2000
2. Guffey, Mary Ellen. Business Communication: Process & Product. USA: South western College Publishing, 2000.
3. Kumar, Sanjay and Pushp Lata. Communication Skills. Delhi: OUP, 2011

**B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security
Including Block Chain Technology)
8th SEMESTER**

CYBER FORENSICS AND CYBER LAWS

Coursecode	PCC-IOT-402G				
Category	Professional Core Course				
Course title	Cyber Forensics and Cyber Laws				
Schemeand Credits	L	T	P	Credits	Semester8
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

Course Objectives:

1. To learn the overview of cybercrime.
2. To learn the issues of cybercrime.
3. To learn the various methods to investigate cybercrime and learn about digital forensics.
4. To understand the laws and acts behind.

UNIT I

Introduction: Overview of Cyber Crime, Nature and Scope of Cyber Crime, Types of Cyber Crime, Social Engineering, Categories of Cyber Crime, Property Cyber Crime. Unauthorized Access to Computers, Computer Intrusions, White collar Crimes, Viruses and Malicious Code, Internet Hacking and Cracking, Virus Attacks, Pornography, Software Piracy, Intellectual Property, Mail Bombs, Exploitation, Stalking and Obscenity in Internet, Digital laws and legislation, Law Enforcement Roles and Responses.

UNIT-II

Introduction to Digital Forensics: Forensic Software and Hardware, Analysis and Advanced Tools, Forensic Technology and Practices, Forensic Ballistics and Photography, Face, Iris and Fingerprint Recognition, Audio Video Analysis, Windows System Forensics, Linux System Forensics, Network Forensics.

UNIT III

Introduction to Cyber Crime Investigation Investigation Tools, eDiscovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP

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Including Block Chain Technology)
8th SEMESTER**

Tracking, Email Recovery, Hands on Case Studies, Encryption and Decryption Methods, Search and Seizure of Computers, Recovering Deleted Evidences, Password Cracking.

UNIT IV

Cyber Laws and Ethics: Digital Evidence Controls - Evidence Handling Procedures - Basics of Indian Evidence ACT IPC and CrPC - Electronic Communication Privacy ACT - Legal Policies. Digital, Indian IT Act

TEXT/REFERENCE BOOKS:

1. Bernadette H Schell, Clemens Martin, Cybercrime, ABC , CLIO Inc, California, 2004.
2. Understanding Forensics in IT , NIIT Ltd, 2005.
3. Nelson Phillips and Enfinger Steuart, Computer Forensics and Investigations, Cengage Learning, New Delhi, 2009.
4. Kevin Mandia, Chris Prosis, Matt Pepe, Incident Response and Computer Forensics, Tata McGraw -Hill, New Delhi, 2006.
5. Robert M Slade, Software Forensics, Tata McGraw - Hill, New Delhi, 2005.

Course Outcomes:

Students should be able:

1. To have various ideas about cybercrime.
2. To have knowledge of the various issues of cybercrime.
3. To investigate and find the cybercrime.
4. To have clear idea of the various laws and acts.

**B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security
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8th SEMESTER**

BIG DATA ANALYTICS

Coursecode	PCC-CSE-404G				
Category	Professional Core Course				
Course title	BIG DATA ANALYTICS				
Schemeand Credits	L	T	P	Credits	Semester8
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

Objectives of the course

1. To Provide an explanation of the architectural components and programming models used for scalable big data analysis.
2. To Identify the frequent data operations required for various types of data and Apply techniques to handle streaming data
3. To describe the connections between data management operations and the big data processing patterns needed to utilize them in large-scale analytical applications
4. To Identify describe and differentiate between relational and non-relational database and how Data Warehouses, Data Marts, Data Lakes, and Data Pipelines work.
5. Explain how the Extract, Transform, and Load process works to make raw data ready for analysis.

Unit: 1

Introduction to Big Data: Big Data: Why and Where, Application and Challenges, Characteristics of Big Data and Dimensions of Scalability, The Six V, Data Science: Getting Value out of Big Data, Steps in the Data science process, Foundations for Big Data Systems and Programming, Distributed file systems

Unit: 2

Data Repositories and Big Data Platforms: RDBMS, NoSQL, Data Marts, Data Lakes, ETL, and Data Pipelines, Foundations of Big Data, Big Data Processing Tools, Modern Data Ecosystem, Key Players, Types of Data, Understanding Different Types of File Formats, Sources of Data Using Service Bindings

Unit: 3

Introduction to Big Data Modeling and Management: Data Storage, Data Quality, Data Operations, Data Ingestion, Scalability and Security Traditional DBMS and Big Data Management Systems, Real Life Applications, Data Model: Structure, Operations, Constraints, Types of Big Data Model

Unit: 4

Big Data Integration and processing: Big Data Processing, Retrieving: Data Query and retrieval, Information Integration, Big Data Processing pipelines, Analytical operations, Aggregation operation, High level Operation, Tools and Systems: Big Data workflow Management

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Suggested books:

Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

Suggested reference books

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
3. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw - Hill/Osborne Media (2013), Oracle press.
4. Anand Rajaraman and Jeffrey David Ulman, "Mining of Massive Datasets", Cambridge University Press, 2012.
5. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.
6. Glen J. Myat, "Making Sense of Data", John Wiley & Sons, 2007
7. Pete Warden, "Big Data Glossary", O'Reilly, 2011.
8. Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
9. ArvindSathi, "BigDataAnalytics: Disruptive Technologies for Changing the Game", MC Press, 2012
10. Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGraw Hill Publications, 2012.

Course Outcomes

1. For a given query Describe the Big Data landscape including examples of real world big data problems including the three key sources of Big Data: people, organizations, and sensor.
2. For a given specification, Recognize different data elements in your own work and in everyday life problems
3. For a given specification select a data model to suit the characteristics of your data
4. For a given problem one will be able to Retrieve data from example database and big data management systems and identify when a big data problem needs data integration
5. For a given problem one will be able to design an approach to leverage data using the steps in the machine learning process and apply them to explore and prepare data for modelling.

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8th SEMESTER**

Big Data Analytics Lab

Coursecode	LC-CSE-410G				
Category	Professional Core Course				
Course title	Big Data Analytics Lab				
Schemeand Credits	L	T	P	Credits	Semester8
	0	0	2	1	
Class work	25 Marks				
Exam	25Marks				
Total	50Marks				
Durationof Exam	03Hours				

As per Syllabus of BIG DATA ANALYTICS A STUDENT CAN PERFORM 10-15 EXPERIMENTS IN R/Python/Java.

**B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security
Including Block Chain Technology)
8th SEMESTER**

QUANTUM CRYPTOGRAPHY

Coursecode	OEC-IOT-440G				
Category	Open Elective Course				
Course title	QUANTUM CRYPTOGRAPHY				
Schemeand Credits	L	T	P	Credits	Semester8
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

Course Objectives: Objective of the course is to build quantum-preparedness for the post quantum era.

UNIT - I

Quantum Information Theory, Unconditional Secure Authentication, Entropy, Quantum Key Distribution, Quantum Channel, Public Channel, QKD Gain, Finite Resources

UNIT - II

Adaptive Cascade Introduction, Error Correction and the Cascade Protocol, Adaptive Initial Block-Size Selection, Fixed Initial Block-Size, Dynamic Initial Block-Size, Examples

UNIT - III

Attack Strategies on QKD Protocols: Introduction, Attack Strategies in an Ideal Environment, Individual Attacks in a Realistic Environment QKD Systems: Introduction, QKD Systems

UNIT - IV

Statistical Analysis of QKD Networks in Real-Life Environment: Statistical Methods, Statistical Analysis QKD Networks Based on Q3P: QKD Networks, PPP, Q3P, Routing, Transport

UNIT - V

Quantum-Cryptographic Networks from a Prototype to the Citizen: The SECOQC Project, How to Bring QKD into the "Real" Life The Ring of Trust Model: Introduction, Model of the Point of Trust, Communication in the Point of Trust Model, Exemplified Communications, A Medical Information System Based on the Ring of Trust

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Including Block Chain Technology)
8th SEMESTER**

Course Outcomes:

1. Basic understanding about Quantum Information and Computation.
2. Understand attack Strategies on QKD Protocols.
3. Analyze and understand statistical analysis of QKD Networks in Real-Life Environment.
4. Apply Quantum-cryptographic networks.

TEXT BOOK:

1. Kollmitzer C., Pivk M. (Eds.), Applied Quantum Cryptography, Lect. Notes Phys. 797 (Springer, Berlin Heidelberg 2010).

REFERENCE BOOKS:

1. Gerald B. Gilbert, Michael Hamrick, and Yaakov S. Weinstein, Quantum Cryptography, World Scientific Publishing.
2. Gilles Van Assche, Quantum Cryptography and Secret-Key Distillation, Cambridge University Press.

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8th SEMESTER**

SOCIAL MEDIA SECURITY

Coursecode	OEC-IOT-442G				
Category	Open Elective Course				
Course title	SOCIAL MEDIA SECURITY				
Schemeand Credits	L	T	P	Credits	Semester8
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

Course Objectives: Give introduction about the social networks, its use, the need of security in socialdata.

UNIT – I

Introduction to Social Media, Understanding Social Media, Different Types and Classifications, TheValue of Social Media, Cutting Edge Versus Bleeding Edge, The Problems That Come With SocialMedia, Is Security Really an Issue? Taking the Good With the Bad.

UNIT - II

Dark side Cybercrime, Social Engineering, Hacked accounts, cyberstalking, cyberbullying, predators,phishing, hackers.

UNIT – III

Being bold versus being overlooked Good social media campaigns, Bad social media campaigns,Sometimes it's better to be overlooked, Social media hoaxes, The human factor, Content management,Promotion of social media.

UNIT - IV

Risks of Social media Introduction Public embarrassment, Once it's out there, it's out there Falseinformation, Information leakage, Retention and archiving, Loss of data and equipment.Policies and Privacy Blocking users controlling app privacy, Location awareness, Security Fakeaccounts passwords, privacy and information sharing.

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Course Outcomes:

1. Learn about browser's risks.
2. Learn about Social Networking, Understand the risks while using social media. Guidelines for social networking.
3. Understand how to secure different web browsers.
4. Understand how an e-mail works, learn threats involved using an email communication, safety measures while using e-mail.

TEXT BOOKS:

1. Interdisciplinary Impact Analysis of Privacy in Social Networks, Recognizing Your Digital Friends, Encryption for Peer-to-Peer Social Networks Crowd sourcing and Ethics, Authors: Altshuler Y, Elovici Y, Cremers A.B, Aharony N, Pentland A. (Eds.).

2. Social media security

<https://www.sciencedirect.com/science/article/pii/B97815974998660000>

REFERENCE BOOKS:

1. Michael Cross, Social Media Security Leveraging Social Networking While Mitigating Risk.
2. Online Social Networks Security, Brij B. Gupta, Somya Ranjan Sahoo, Principles, Algorithm, Applications, and Perspectives, CRC press.

**B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security
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8th SEMESTER**

QUANTUM COMPUTING

Coursecode	OEC-IOT-444G				
Category	Open Elective Course				
Course title	QUANTUM COMPUTING				
Schemeand Credits	L	T	P	Credits	Semester8
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

Course Objectives:

1. To introduce the fundamentals of quantum computing
2. The problem-solving approach using finite dimensional mathematics

UNIT - I

Introduction to Essential Linear Algebra: Some Basic Algebra, Matrix Math, Vectors and Vector Spaces, Set Theory. Complex Numbers: Definition of Complex Numbers, Algebra of Complex Numbers, Complex Numbers Graphically, Vector Representations of Complex Numbers, Pauli Matrices, Transcendental Numbers.

UNIT - II

Basic Physics for Quantum Computing: The Journey to Quantum, Quantum Physics Essentials, Basic Atomic Structure, Hilbert Spaces, Uncertainty, Quantum States, Entanglement. Basic Quantum Theory: Further with Quantum Mechanics, Quantum Decoherence, Quantum Electrodynamics, Quantum Chromodynamics, Feynman Diagram Quantum Entanglement and QKD, Quantum Entanglement, Interpretation, QKE.

UNIT - III

Quantum Architecture: Further with Qubits, Quantum Gates, More with Gates, Quantum Circuits, The D-Wave Quantum Architecture. Quantum Hardware: Qubits, How Many Qubits Are Needed? Addressing Decoherence, Topological Quantum Computing, Quantum Essentials.

UNIT - IV

Quantum Algorithms: What Is an Algorithm? Deutsch's Algorithm, Deutsch-Jozsa Algorithm, Bernstein-Vazirani Algorithm, Simon's Algorithm, Shor's Algorithm, Grover's Algorithm. Current Asymmetric Algorithms: RSA, Diffie-Hellman, Elliptic Curve. The Impact of Quantum Computing on Cryptography: Asymmetric Cryptography, Specific Algorithms, Specific Applications.

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Course Outcomes:

1. Understand basics of quantum computing
2. Understand physical implementation of Qubit
3. Understand Quantum algorithms and their implementation
4. Understand the Impact of Quantum Computing on Cryptography

TEXT BOOKS:

1. Nielsen M. A., Quantum Computation and Quantum Information, Cambridge University Press
2. Dr. Chuck Easttom, Quantum Computing Fundamentals, Pearson

REFERENCE BOOKS:

1. Quantum Computing for Computer Scientists by Noson S. Yanofsky and Mirco A. Mannucci
2. Benenti G., Casati G. and Strini G., Principles of Quantum Computation and Information, Vol. Basic Concepts. Vol. Basic Tools and Special Topics, World Scientific.
3. Pittenger A. O., An Introduction to Quantum Computing Algorithms.