Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical/Oral	Tutorial	Total
CSDO7021	Cyber security Management	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
CSDO7021	Cyber security Management	20	20	20	80	--	--	--	100

Course Objectives:

Sr. No.	Course Objectives
The course aims:	
1	Introduce students to the field of cyber security management and its importance in today's digital age.
2	Help students understand the different types of cyber security threats and vulnerabilities and how they can be mitigated.
3	Teach students how to evaluate cyber security risks and develop risk management strategies.
4	Provide students with an understanding of various cyber security technologies and tools, and how they can be used to secure information systems and networks.
5	Develop students' skills in incident response planning and execution.
6	Educate students on the ethical and legal implications of cyber security management.

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	Describe the fundamental concepts and principles of cyber security management.	L1, L2, L3
2	Analyze different types of cyber security threats and vulnerabilities.	L1, L2, L4
3	Evaluate cyber security risks and identify appropriate countermeasures.	L1, L2, L3
4	Apply best practices for securing information systems and networks.	L1, L2, L3
5	Develop and implement effective incident response plans.	L1, L2. L3
6	Understand the ethical and legal implications of cyber security management.	L1, L2

Prerequisite: Introduction to Cyber Security.

DETAILED SYLLABUS:

Sr. No.	Module	Detailed Content	Hours	CO Mapping
0	Prerequisite	Basic of Ethical Hacking, Networking device and OSI layers	**02**	-
I	Introduction to cyber security	**Concepts:** Defining Cyberspace and Cybersecurity, Architecture of cyberspace, Basic concepts of information security, Types of cyber threats, Security issues and challenges of Cybersecurity, Security policies and standards, Security risk management, Security awareness and training, Risk management frameworks and Security governance **Self-learning Topics:** NIST Cybersecurity Framework, ISO/IEC 27001 standard, SANS Security	**06**	CO1
II	Tools and technologies for Cyber Security	**Concepts:** Access control and authentication mechanisms, Network security, Application security, Incident response and management, Firewalls and Antivirus: Significance of host firewall and Antivirus, Management of host firewall and Antivirus, Intrusion detection/prevention systems, Encryption and decryption techniques, Security testing and assessment, Threat modeling and vulnerability assessment, Cyber Security best practices, Wi-Fi security, Configuration of basic security policy and permissions. **Self-learning Topics:** SANS Institute reading room, MITRE ATT&CK Framework, Cybersecurity and Infrastructure Security Agency (CISA) publications.	**10**	CO2
III	Cyber security risks and vulnerabilities .	**Courses:** Human factors in security breaches, social engineering attacks, Web application security, Cloud security, Mobile device security, Internet of Things (IoT) security, Password policy, Security patch management, Data backup, Downloading and management of third-party software, Threat modeling, Vulnerability scanning, Penetration testing, Risk assessment, Business impact analysis **Self-learning Topics:** Open Web Application Security Project (OWASP) Risk Assessment Methodology, Penetration Testing Execution Standard (PTES), Open-Source Security Testing Methodology Manual (OSSTMM), SANS Risk Management resources	**8**	CO3
IV	Implementation of Security management	**Courses:** Human-computer interaction (HCI) design principles, Usability testing and evaluation, User-centered design methodologies, Privacy and data protection regulations, Security by design and by default, Security architecture and design, Security engineering, Secure coding practices, Security testing, Security operations **Self-learning Topics:** SANS Secure Coding resources, Building Security in Maturity Model (BSIMM), Microsoft Security Development Lifecycle (SDL)	**6**	CO4
V	Cyber security Management Compliance and Governance	Cyber security Plan- cyber security policy, cyber crisis management plan, Security reporting and metrics Business continuity, Risk assessment, Types of security controls and their goals, Cyber Security audit and compliance, National cyber security policy and strategy, Crisis communications, Vendor and third-party management **Self-learning Topics:** Information Security Forum (ISF) publications, Carnegie Mellon's Computer Emergency Response Team (CERT)	**06**	CO5

		resources, Cybersecurity and Infrastructure Security Agency (CISA) training and resources		
VI	Emerging threats in Cyber security	Advanced persistent threats (APTs), Insider threats, Cyber Crime in various industry: Banking and Healthcare, Cybersecurity law and regulation, Cyber security aspects related to new technologies- AI/ML, IoT, Blockchain, **Self-learning Topics:** FireEye Threat Intelligence, resources, SANS Newsletters and Podcasts, DarkReading.com, Cloud Security Alliance research and publications	**03**	CO6

Textbooks:

1. Cybersecurity Management, An Organizational and Strategic Approach, Nir Kshetri, University of Toronto Press, Toronto Buffalo London, 2021.
2. Cyber Security, Incident Management Guide, Centre for Cyber Security Belgium
3. Information Security Management Handbook Sixth Edition VOLUME 2.
4. Handbook Of System, Safety and Security, Cyber Risk and Risk Management, Cyber Security, Threat Analysis, Functional Safety, Software Systems, and Cyber Physical Systems.
5. Strategic Cyber Security Management, Peter Trim and Yang-Im Lee, by Routledge 2023.

References Books:

1. Cybersecurity and Cyberwar: What Everyone Needs to Know by P.W. Singer and Allan Friedman
2. Cybersecurity: The Essential Body of Knowledge by Dan Shoemaker, Wm. Arthur Conklin, Gregory White, Dwayne Williams, and Chuck Cothren
3. Managing Risk and Information Security: Protect to Enable by Malcolm W. Harkins
4. Security Metrics: Replacing Fear, Uncertainty, and Doubt by Andrew Jaquith
5. The CERT Guide to Insider Threats: How to Prevent, Detect, and Respond to Information Technology Crimes (Theft, Sabotage, Fraud) by Dawn M. Cappelli, Andrew P. Moore, and Randall F. Trzeciak

Online References:

1. https://www.nist.gov/cyberframework
2. Cybersecurity and Infrastructure Security Agency (CISA): https://www.cisa.gov/cybersecurity
3. Journal of Cyberpsychology, Behavior, and Social Networking: https://www.liebertpub.com/loi/cyber
4. Cyber Security India: https://www.cybersecurityindia.in/
5. Center for Cyber Safety and Education: https://www.isc2.org/Cybersecurity-Resources

Assessment:

Internal Assessment (IA) for 20 marks:

● IA will consist of Two Compulsory Internal Assessment Tests. Approximately 40% to 50% of syllabus content must be covered in First IA Test and remaining 40% to 50% of syllabus content must be covered in Second IA Test

Question paper format

● Question Paper will comprise of a total of **six questions each carrying 20 marks.** Q.1 will be **compulsory** and should **cover maximum contents of the syllabus.**
● **Remaining questions** will be **mixed in nature** (part (a) and part (b) of each question must be from different modules. For example, if Q.2 has part (a) from Module 3 then part (b) must be from any other Module randomly selected from all the modules)
● A total of **four questions** needs to be answered.

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
CSDO7022	User Interface Design with Security	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
CSDO7022	User Interface Design with Security	20	20	20	80	--	--	--	100

Course Objectives:

Sr. No.	Course Objectives
1	To stress the importance of good interface design.
2	To understand the importance of human psychology as well as social and emotional aspect in designing good interfaces.
3	To learn the techniques of data gathering, establishing requirements, analysis and data interpretation.
4	To learn the techniques for prototyping and evaluating user experiences.
5	To understand interaction design process and bring out the creativity in each student – build innovative applications that are usable, effective and efficient for intended users.
6	To understand the role of security in User interaction design.

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	Identify and criticize bad features of interface designs.	L4
2	Predict good features of interface designs.	L5
3	Illustrate and analyze user needs and formulate user design specifications.	L4
4	Interpret and evaluate the data collected during the process.	L2, L5
5	Evaluate designs based on theoretical frameworks and methodological approaches and will be able to produce/show better techniques to improve the user interaction design interfaces.	L5
6	Evaluate designs based on cyber security aspects.	L5

Prerequisite: Basics of Cyber Security, Software Engineering concepts and any programming Language

DETAILED SYLLABUS:

Sr. No.	Module	Detailed Content	Hours	CO Mapping
0	Prerequisite	Basics of Cyber Security, Software Engineering concepts and any programming Language **Self-learning Topics:** Web design languages	**1**	--
I	Introduction To Interaction Design	Good And Poor Design, Interaction Design, The User Experience, The Process of Interaction Design, interaction Design and The User Experience **Self-learning Topics:** Study of Various interactive day to day application	**5**	CO1
II	Understanding And Conceptualizing Interaction	Understanding The Problem Space and Conceptualizing Design, Conceptual Model, Interface Types, Cognitive Aspects, Social Interaction and The Emerging Social Phenomena, Emotions and The User Experience, Expressive And Frustrating Interfaces, Persuasive Technologies **Self-learning Topics:** Study of Various interactive Interface Types	**5**	CO2
III	Data Processing	Establishing Requirements, Five Key Issues, Techniques for Data Gathering, Data Analysis Interpretation and Presentation, Task Description and Task Analysis **Self-learning Topics:** Any case study of how to gather requirements. (eq.BE Project)	**6**	CO3
IV	Process Of Interaction Design and Design Rules and Industry Standards	Interaction Design Process, Prototyping and Conceptual Design, Interface Metaphors and Analogies, Design Principles, Principles to Support Usability, Standards And Guidelines, Golden Rules and Heuristics, ISO/IEC Standards **Self-learning Topics:** Study of two websites with usability concepts. Study experiments on industry standards and design principles. principles.https://xd.adobe.com/ideas/career-tips/15-rules-every-ux-designer-know/	**7**	CO4
V	Evaluation Techniques and Framework	The Why, what, Where and When of Evaluation, Types Of Evaluation, Case Studies DECIDE Framework, Usability Testing, Conducting Experiments, Field Studies, Heuristic Evaluation and Walkthroughs, Predictive Models. **Self-learning Topics:** Evaluation of any GUI with usability principles.	**7**	CO5
VI	Usability Design and Evaluation for Privacy and Security Solutions and Secure Systems	Usability in the Software and Hardware Life Cycle: Unique Aspects of HCI and Usability in the Privacy and Security Domain, Usability in Requirements, Usability in Design and Development, Usability in Post release, Guidelines and Strategies for Secure Interaction Design, Design Guidelines, Authorization, Communication, Design Strategies, Security by Admonition and Security by Designation, Applying the Strategies to Everyday Security Problems, Fighting Phishing at the User Interface **Self-learning Topics:** Any case study of how to check Cyber Security Guidelines (eg. BE Project)	**8**	CO6

Textbooks:

1. Interaction Design, by J. Preece, Y. Rogers and H. Sharp. ISBN 0-471-49278-7.
2. Security and Usability by Lorrie Faith Cranor, Simson Garfinkel, Publisher(s): O'Reilly Media, Inc. ISBN: 9780596553852 (Chapter 4 , 13 & 14)
3. Jeff Johnson, "Designing with the mind in mind", Morgan Kaufmann Publication.
4. Wilbert O. Galitz, "The Essential Guide to User Interface Design", John Wiley & Sons, Second Edition 2002.
5. Human Computer Interaction, by Alan Dix, Janet Finlay, Gregory D Abowd, Russell Beale
6. Alan Cooper, Robert Reimann, David Cronin, "About Face3: Essentials of Interaction design", Wiley publication.
7. Wilbert O. Galitz, "The Essential Guide to User Interface Design", Wiley publication.

References:

1. Nilakshi Jain, Dhanajay R kalbande UI DESIGN: Key to Captivate User Understanding, STBGEN Learning
2. The UX Book, by Rex Hartson and Pardha S Pyla.
3. Donald A. Norman, "The design of everyday things", Basic books.

Online References:

1. https://onlinecourses.nptel.ac.in/noc21_ar05/preview
2. https://nptel.ac.in/courses/124/107/124107008/
3. https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-ar10/
4. https://nptel.ac.in/courses/107/103/107103083/
5. https://www.youtube.com/watch?v=6C2Ye1makdY&list=PLW-zSkCnZ-gD5TDfs1eL5EnH2mQ0f9g6B
6. https://xd.adobe.com/ideas/process/

Assessment:

Internal Assessment (IA) for 20 marks:

● IA will consist of Two Compulsory Internal Assessment Tests. Approximately 40% to 50% of syllabus content must be covered in First IA Test and remaining 40% to 50% of syllabus content must be covered in Second IA Test

Question paper format

● Question Paper will comprise of a total of **six questions each carrying 20 marks.** Q.1 will be **compulsory** and should **cover maximum contents of the syllabus.**
● **Remaining questions** will be **mixed in nature** (part (a) and part (b) of each question must be from different modules. For example, if Q.2 has part (a) from Module 3 then part (b) must be from any other Module randomly selected from all the modules)
● A total of **four questions** needs to be answered.

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral	Tutorial	Total
CSDO7023	MANET	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
CSDO7023	MANET	20	20	20	80	--	--	--	100

Course Objectives:

Sr. No.	Course Objectives:
The course aims:	
1	To identify and distinguish major issues associated with ad-hoc networks.
2	To analyze the basic concepts for designing a routing protocol for MANETs.
3	To explore and analyze routing protocols of Ad-hoc network.
4	To learn the concepts of Transport layer and Security issues for MANETs.
5	To apply fundamental principles characteristics of QoS and understand the need of Energy Management in wireless ad-hoc network.
6	To learn enhancements and challenges required in securing MANET protocols

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	Understand the fundamentals of Mobile ad-hoc Networks.	L1, L2
2	Understand and be able to use advanced concept of MAC layer protocols more effectively.	L1, L2
3	Analyze different routing technologies for designing a routing protocol.	L1, L2, L3, L4
4	Understand the concepts of Transport layer and security features of Ad-hoc network.	L1, L2
5	Create the awareness of QoS and Energy Management in Ad hoc network.	L6
6	Understand the Security issues in MANET	L2, L3, L4

Prerequisite: Wireless Technology.

Sr. No.	Module	Detailed Content	Hours	CO Mapping
0	Prerequisite	Fundamentals of Wireless Communication, Wireless Metropolitan and Local Area Networks: IEEE 802.16 (WiMax) – Mesh mode, Wireless Network Security: Security in GSM; UMTS Security; Bluetooth Security; WEP.	**02**	--
I	Introduction to Ad-hoc Wireless Networks and IEEE 802.11	IEEE 802.11(Wi-Fi) – Architecture, Wireless Ad hoc Networks: WPAN Device Architecture, Wireless Sensor Network Applications, Advantages and Limitations **Introduction:** Cellular and Ad Hoc Wireless Networks, Applications of Ad Hoc Wireless Networks, **Issues In Ad Hoc Wireless Networks:** Medium Access Scheme, Routing, Multicasting, Transport Layer Protocols, Pricing, Quality of Service Provisioning, Addressing and Service Discovery, Energy Management, Scalability, Deployment Considerations, Ad Hoc Wireless Internet. **Self-learning Topics:** Global Mobile Ad Hoc Network Market	**07**	CO1
II	Medium Access Control Protocols	Issues in Designing a MAC Protocol, Design Goals of MAC Protocols, Classification of MAC protocols, Contention-Based Protocols with Reservation Mechanisms and Scheduling Mechanisms, IEEE 802.11a and Hiper Lan standard. **Self-learning Topics:** MAC Protocols that use Directional Antennas and Other MAC Protocols	**06**	CO2
III	Routing Protocols	**Routing Protocols in Ad-hoc Wireless Networks:** Introduction, Design Issues, Classification of Routing Protocols: Routing information update mechanism, Use of temporal information for routing, Routing topology, Utilization of specific resources, **Multicast Routing in Ad-hoc Wireless Networks**: Introduction, Design Issues, Operation of Multicast Routing Protocols, An Architecture Reference Model for Multicast Routing Protocols **Self-learning Topics:** Table Driven Routing Protocols, Classifications of Multicast Routing Protocols	**08**	CO3
IV	Transport Layer and Security Protocols	**Transport Layer in Ad-hoc Wireless Networks**: Introduction, Design Issues and Goals of a Transport Layer Protocol; Classification of Transport Layer Solutions. **Security in Ad-hoc Wireless Networks:** Issues and Challenges in Security Provisioning, Network Security Attacks classification. **Self-learning Topics:** TCP over Transport Layer Solutions, Key Management and Secure Touting	**07**	CO4
V	Quality of Service and Energy Management	**Quality of Service in Ad-hoc Wireless Networks**: Introduction, Issues and Challenges in Providing QoS in Ad-hoc Wireless Networks, Classification of QoS Solutions **Energy Management in Ad-hoc Wireless Networks**: Introduction, Need for Energy Management in Ad-hoc Wireless Networks, Classification of Energy Management Schemes **Self-learning Topics:** MAC Layer Solutions, Battery Management Schemes	**05**	CO5

VI	Securing MANET	**Introduction:** Threats and Challenges, Trust Management. **Secure Routing:** Secure routing protocol (SRP), Neighbour lookup protocol (NLP), Basic route discovery procedure, priority-based query handling, route maintenance procedure, SRP extension. **Secure Data Forwarding:** Secure message transmission protocol.	**04**	CO6

Text Books:

1. C. S. Ram Murthy, B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols", Prentice Hall of India, 2nd Edition, 2005
2. C. K. Toh, "Adhoc Mobile Wireless Networks", Pearson Education, 2002
3. Wireless Communications & Networks, By William Stallings, Second Edition, Pearson Education

References Books:

1. Shih-Lin Wu Yu-Chee Tseng, "Wireless Ad Hoc Networking: Personal-Area, Local-Area, and the Sensory-Area Networks", Auerbach Publications, 2007
2. Subir Kumar Sarkar, "Adhoc Mobile Wireless Network: Principles, Protocols and Applications" CRC Press
3. Prashant Mohapatra and Sriramamurthy, "Ad Hoc Networks: Technologies and Protocols", Springer International Edition, 2009
4. Mohammad Ilyas," AD HOC Wireless Networks: CRC PRESS

Online References:

1. https://www.cousera.org
2. https://nptel.ac.in

Assessment:

Internal Assessment (IA) for 20 marks:

● IA will consist of Two Compulsory Internal Assessment Tests. Approximately 40% to 50% of syllabus content must be covered in First IA Test and remaining 40% to 50% of syllabus content must be covered in Second IA Test

Question paper format

● Question Paper will comprise of a total of **six questions each carrying 20 marks.** Q.1 will be **compulsory** and should **cover maximum contents of the syllabus.**
● **Remaining questions** will be **mixed in nature** (part (a) and part (b) of each question must be from different modules. For example, if Q.2 has part (a) from Module 3 then part (b) must be from any other Module randomly selected from all the modules)
● A total of **four questions** needs to be answered.

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral	Tutorial	Total
CSDO7024	Information retrieval system	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
CSDO7024	Information retrieval system	20	20	20	80	--	--	--	100

Course Objectives:

Sr. No.	Course Objectives:
The course aims:	
1	To learn the fundamentals of the information retrieval system.
2	To classify various Information retrieval models.
3	To demonstrate the query processing techniques and operations
4	To compare the relevance of query languages for text and multimedia data
5	To evaluate the significance of various indexing and searching techniques for information retrieval
6	To develop an effective user interface for information retrieval.

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	Define and describe the objectives of the basic concepts of the Information retrieval system.	L1, L2
2	Evaluate the taxonomy of different information retrieval models	L5
3	Try to solve and process text and multimedia retrieval queries and their operations.	L3
4	Evaluate text processing techniques and operations in the information retrieval system.	L5
5	Demonstrate and evaluate various indexing and searching techniques.	L3, L5

6	Design the user interface for an information retrieval system.	L6

Prerequisite: Data Structure

DETAILED SYLLABUS:

Sr. No.	Module	Detailed Content	Hours	CO Mapping
0	Prerequisite	Indexing and searching Algorithms	**2**	--
I	Introduction	Motivation, Basic Concepts, The Retrieval Process, Information System: Components, parts and types on information system; Definition and objectives on information retrieval system, Information versus Data Retrieval. Search Engines and browsers **Self-learning Topics**: Search Engines, Search API	**6**	**CO1**
II	IR Models	Modeling: Taxonomy of Information Retrieval Models, Retrieval: Formal Characteristics of IR models, Classic Information Retrieval, Alternative Set Theoretic models, Probabilistic Models, Structured text retrieval Models, models for Browsing. **Self-learning Topics:** Terrier	**6**	**CO2**
III	Query Processing and Operations	Query Languages: Keyword based Querying, Pattern Matching, Structural Queries, Query Protocols; Query Operations: User relevance feedback, Multimedia IR models: Data Modeling. **Self-learning Topics:** Proximity Queries and Wildcard Queries	**6**	**CO3**
IV	Text Processing	Text and Multimedia languages and properties: Metadata, Markup Languages, Multimedia; Text Operations: Document Preprocessing, Document Clustering. **Self-learning Topics:** Digital Library: Greenstone	**6**	**CO4**
V	Indexing and searching	Inverted files, other indices for text, Boolean Queries, Sequential Searching, Pattern Matching, Structural Queries, Compression; Multimedia IR: Indexing and Searching: - A Generic Multimedia indexing approach, Automatic Feature extraction; Searching Web: Challenges, Characterizing the web, Search Engines. Browsing, Meta searches, Searching using Hyperlinks. **Self-learning Topics:** Koha	**7**	**CO5**
VI	User Interface and Visualization	Human Computer interaction, the information access process, starting points, query specifications, context, using relevance judgments, interface support for the search process. **Self-learning Topics:** SeeSoft	**6**	**CO6**

Textbooks:

1. Modern Information Retrieval, Ricardo Baeza-Yates, Berthier Ribeiro- Neto, ACM Press-Addison Wesley.
2. Information Retrieval Systems: Theory and Implementation, Gerald Kowaski, Kluwer Academic Publisher**.**
3. Storage Network Management and Retrieval by Dr. Vaishali Khairnar, Nilima Dongre, Wiley India.

References:

1. Introduction to Information Retrieval by Christopher D. Manning and Prabhakar Raghavan, Cambridge University Press.
2. Information Storage & Retrieval by Robert Korfhage – John Wiley & Sons
3. Introduction to Modern Information Retrieval. G.G. Chowdhury. Neal Schuman.

Online References:

1. https://www.geeksforgeeks.org/what-is-information-retrieval/
2. https://nlp.stanford.edu/IR-book/
3. https://en.wikipedia.org/wiki/Information_retrieval
4. https://people.ischool.berkeley.edu/~hearst/irbook/10/node1.html

Assessment:

Internal Assessment (IA) for 20 marks:

● IA will consist of Two Compulsory Internal Assessment Tests. Approximately 40% to 50% of syllabus content must be covered in First IA Test and remaining 40% to 50% of syllabus content must be covered in Second IA Test

Question paper format

● Question Paper will comprise of a total of **six questions each carrying 20 marks.** Q.1 will be **compulsory** and should **cover maximum contents of the syllabus.**

● **Remaining questions** will be **mixed in nature** (part (a) and part (b) of each question must be from different modules. For example, if Q.2 has part (a) from Module 3 then part (b) must be from any other Module randomly selected from all the modules)

● A total of **four questions** needs to be answered.

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral	Tutorial	Total
ILO7011	**Product Lifecycle Management**	**03**	**--**	**--**	**03**	**--**	**--**	**03**

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
ILO7011	**Product Lifecycle Management**	**20**	**20**	**20**	**80**	**--**	**--**	**--**	**100**

Course Objectives:

Sr. No.	Course Objectives:
The course aims:	
1	To familiarize the students with the need, benefits and components of PLM
2	To acquaint students with Product Data Management & PLM strategies
3	To give insights into new product development program and guidelines for designing and developing a product
4	To familiarize the students with Virtual Product Development

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	Gain knowledge about phases of PLM, PLM strategies and methodology for PLM feasibility study and PDM implementation	L1
2	Illustrate various approaches and techniques for designing and developing products	L3, L4
3	Apply product engineering guidelines / thumb rules in designing products for moulding, machining, sheet metal working etc.	L3
4	Acquire knowledge in applying virtual product development tools for components, machining and manufacturing plant.	L3

Module	Detailed Contents	Hrs
01	**Introduction to Product Lifecycle Management (PLM):** Product Lifecycle Management (PLM), Need for PLM, Product Lifecycle Phases, Opportunities of Globalization, Pre-PLM Environment, PLM Paradigm, Importance & Benefits of PLM, Widespread Impact of PLM, Focus and Application, A PLM Project, Starting the PLM Initiative, PLM Applications **PLM Strategies:** Industrial strategies, Strategy elements, its identification, selection and implementation, Developing PLM Vision and PLM Strategy, Change management for PLM	10
02	**Product Design:** Product Design and Development Process, Engineering Design, Organization and Decomposition in Product Design, Typologies of Design Process Models, Reference Model, Product Design in the Context of the Product Development Process, Relation with the Development Process Planning Phase, Relation with the Post design Planning Phase, Methodological Evolution in Product Design, Concurrent Engineering, Characteristic Features of Concurrent Engineering, Concurrent Engineering and Life Cycle Approach, New Product Development (NPD) and Strategies, Product Configuration and Variant Management, The Design for X System, Objective Properties and Design for X Tools, Choice of Design for X Tools and Their Use in the Design Process	09
03	**Product Data Management (PDM):** Product and Product Data, PDM systems and importance, Components of PDM, Reason for implementing a PDM system, financial justification of PDM, barriers to PDM implementation	05
04	**Virtual Product Development Tools:** For components, machines, and manufacturing plants, 3D CAD systems and realistic rendering techniques, Digital mock-up, Model building, Model analysis, Modeling and simulations in Product Design, Examples/Case studies	05
05	**Integration of Environmental Aspects in Product Design:** Sustainable Development, Design for Environment, Need for Life Cycle Environmental Strategies, Useful Life Extension Strategies, End-of-Life Strategies, Introduction of Environmental Strategies into the Design Process, Life Cycle Environmental Strategies and Considerations for Product Design	05
06	**Life Cycle Assessment and Life Cycle Cost Analysis:** Properties, and Framework of Life Cycle Assessment, Phases of LCA in ISO Standards, Fields of Application and Limitations of Life Cycle Assessment, Cost Analysis and the Life Cycle Approach, General Framework for LCCA, Evolution of Models for Product Life Cycle Cost Analysis	05

Assessment:

Internal:
Assessment consists of two tests out of which; one should be compulsory class test and the other is either a class test or assignment on live problems or course project.

End Semester Theory Examination:
Some guidelines for setting up the question paper. Minimum 80% syllabus should be covered in question papers of end semester examination. **In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.**

1. Question paper will comprise of total six question.
2. All question carry equal marks
3. Questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four question need to be solved.

REFERENCES:

1. John Stark, "Product Lifecycle Management: Paradigm for 21st Century Product Realisation", Springer-Verlag, 2004. ISBN: 1852338105
2. Fabio Giudice, Guido La Rosa, AntoninoRisitano, "Product Design for the environment-A life cycle approach", Taylor & Francis 2006, ISBN: 0849327229
3. SaaksvuoriAntti, Immonen Anselmie, "Product Life Cycle Management", Springer, Dreamtech, ISBN: 3540257314
4. Michael Grieve, "Product Lifecycle Management: Driving the next generation of lean thinking", Tata McGraw Hill, 2006, ISBN: 0070636265

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral	Tutorial	Total
ILO7012	Reliability Engineering	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
ILO7012	Reliability Engineering	20	20	20	80	--	--	--	100

Sr. No.	Course Objectives:
The course aims:	
1	To familiarize the students with various aspects of probability theory
2	To acquaint the students with reliability and its concepts
3	To introduce the students to methods of estimating the system reliability of simple and complex systems
4	To understand the various aspects of Maintainability, Availability and FMEA procedure

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	Understand and apply the concept of Probability to engineering problems	L1, L3
2	Apply various reliability concepts to calculate different reliability parameters	L3
3	Estimate the system reliability of simple and complex systems	L5
4	Carry out a Failure Mode Effect and Criticality Analysis	L4

Module	Detailed Contents	Hrs
01	**Probability theory:** Probability: Standard definitions and concepts; Conditional Probability, Baye's Theorem. **Probability Distributions:** Central tendency and Dispersion; Binomial, Normal, Poisson, Weibull, Exponential, relations between them and their significance. **Measures of Dispersion:** Mean, Median, Mode, Range, Mean Deviation, Standard Deviation, Variance, Skewness and Kurtosis.	08
02	**Reliability Concepts:** Reliability definitions, Importance of Reliability, Quality Assurance and Reliability, Bath Tub Curve. **Failure Data Analysis:** Hazard rate, failure density, Failure Rate, Mean Time to Failure (MTTF), MTBF, Reliability Functions. **Reliability Hazard Models:** Constant Failure Rate, linearly increasing, Time Dependent Failure Rate, Weibull Model. Distribution functions and reliability analysis.	08
03	**System Reliability:** System Configurations: Series, parallel, mixed configuration, k out of n structure, Complex systems.	05
04	**Reliability Improvement:** Redundancy Techniques: Element redundancy, Unit redundancy, Standby redundancies. Markov analysis. System Reliability Analysis – Enumeration method, Cut-set method, Success Path method, Decomposition method.	08
05	**Maintainability and Availability:** System downtime, Design for Maintainability: Maintenance requirements, Design methods: Fault Isolation and self-diagnostics, Parts standardization and Interchangeability, Modularization and Accessibility, Repair Vs Replacement. Availability – qualitative aspects.	05
06	**Failure Mode, Effects and Criticality Analysis:** Failure mode effects analysis, severity/criticality analysis, FMECA examples. Fault tree construction, basic symbols, development of functional reliability block diagram, Fau1t tree analysis and Event tree Analysis	05

Assessment

Internal:
Assessment consists of two tests out of which; one should be compulsory class test and the other is either a class test or assignment on live problems or course project.

End Semester Theory Examination:
Some guidelines for setting up the question paper. Minimum 80% syllabus should be covered in question papers of end semester examination. **In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.**

1. Question paper will comprise of total six question.
2. All question carry equal marks
3. Questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four question need to be solved.

REFERENCES:

1. L.S. Srinath, "Reliability Engineering", Affiliated East-Wast Press (P) Ltd., 1985.
2. Charles E. Ebeling, "Reliability and Maintainability Engineering", Tata McGraw Hill.
3. B.S. Dhillion, C. Singh, "Engineering Reliability", John Wiley & Sons, 1980.
4. P.D.T. Conor, "Practical Reliability Engg.", John Wiley & Sons, 1985.
5. K.C. Kapur, L.R. Lamberson, "Reliability in Engineering Design", John Wiley & Sons.
6. Murray R. Spiegel, "Probability and Statistics", Tata McGraw-Hill Publishing Co. Ltd.

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral	Tutorial	Total
ILO7013	Management Information System	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
ILO7013	Management Information System	20	20	20	80	--	--	--	100

Course Objectives:

Sr. No.	Course Objectives:
The course aims:	
1	The course is blend of Management and Technical field.
2	Discuss the roles played by information technology in today's business and define various technology architectures on which information systems are built
3	Define and analyze typical functional information systems and identify how they meet the needs of the firm to deliver efficiency and competitive advantage
4	Identify the basic steps in systems development

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	Explain how information systems Transform Business	L2, L4, L5
2	Identify the impact information systems have on an organization	L1
3	Describe IT infrastructure and its components and its current trends	L1, L2
4	Understand the principal tools and technologies for accessing information from databases to improve business performance and decision making	L1
5	Identify the types of systems used for enterprise-wide knowledge management and how they provide value for businesses.	L1

Module	Detailed Contents	Hrs
01	Introduction To Information Systems (IS): Computer Based Information Systems, Impact of IT on organizations, Importance of IS to Society. Organizational Strategy, Competitive Advantages and IS.	4
02	Data and Knowledge Management: Database Approach, Big Data, Data warehouse and Data Marts, Knowledge Management. Business intelligence (BI): Managers and Decision Making, BI for Data analysis. and Presenting Results	7
03	Ethical issues and Privacy: Information Security. Threat to IS, and Security Controls	7
04	Social Computing (SC): Web 2.0 and 3.0, SC in business-shopping, Marketing, Operational and Analytic CRM, E-business and E-commerce – B2B B2C. Mobile commerce.	7
05	Computer Networks Wired and Wireless technology, Pervasive computing, Cloud computing model.	6
06	Information System within Organization: Transaction Processing Systems, Functional Area Information System, ERP and ERP support of Business Process. Acquiring Information Systems and Applications: Various System development life cycle models.	8

Assessment:

Internal:
Assessment consists of two tests out of which; one should be compulsory class test and the other is either a class test or assignment on live problems or course project.

End Semester Theory Examination:
Some guidelines for setting up the question paper. Minimum 80% syllabus should be covered in question papers of end semester examination. **In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.**

1. Question paper will comprise of total six question.
2. All question carry equal marks
3. Questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four question need to be solved.

REFERENCES:

1. Kelly Rainer, Brad Prince,Management Information Systems, Wiley
2. K.C. Laudon and J.P. Laudon, Management Information Systems: Managing the Digital Firm, 10th Ed., Prentice Hall, 2007.
3. D. Boddy, A. Boonstra, Managing Information Systems: Strategy and Organization, Prentice Hall, 2008

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral	Tutorial	Total
ILO7014	Design of Experiments	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
ILO7014	Design of Experiments	20	20	20	80	--	--	--	100

Course Objectives:

Sr. No.	Course Objectives:
The course aims:	
1	To understand the issues and principles of Design of Experiments (DOE)
2	To list the guidelines for designing experiments
3	To become familiar with methodologies that can be used in conjunction with experimental designs for robustness and optimization.

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	Plan data collection, to turn data into information and to make decisions that lead to appropriate action.	L6
2	Apply the methods taught to real life situations.	L3
3	Plan, analyze, and interpret the results of experiments.	L4, L6

Module	Detailed Contents	Hrs
01	**Introduction** Strategy of Experimentation, Typical Applications of Experimental Design Guidelines for Designing Experiments, Response Surface Methodology	06

02	**Fitting Regression Models** Linear Regression Models, Estimation of the Parameters in Linear Regression Models Hypothesis Testing in Multiple Regression, Confidence Intervals in Multiple Regression Prediction of new response observation, Regression model diagnostics, Testing for lack of fit	08
03	**Two-Level Factorial Designs** The 2^2 Design, The 2^3 Design, The General2^k Design, A Single Replicate of the 2^k Design The Addition of Center Points to the 2^k Design, Blocking in the 2^k Factorial Design, Split-Plot Designs	07
04	**Two-Level Fractional Factorial Designs** The One-Half Fraction of the 2^k Design, The One-Quarter Fraction of the 2^k Design The General 2^{k-p} Fractional Factorial Design, Resolution III Designs, Resolution IV and V Designs, Fractional Factorial Split-Plot Designs	07
05	**Response Surface Methods and Designs** Introduction to Response Surface Methodology, The Method of Steepest Ascent Analysis of a Second-Order Response Surface, Experimental Designs for Fitting Response Surfaces	07
06	**Taguchi Approach** Crossed Array Designs and Signal-to-Noise Ratios, Analysis Methods, Robust design examples	04

Assessment:

Internal:
Assessment consists of two tests out of which; one should be compulsory class test and the other is either a class test or assignment on live problems or course project.

End Semester Theory Examination:
Some guidelines for setting up the question paper. Minimum 80% syllabus should be covered in question papers of end semester examination. **In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.**

1. Question paper will comprise of total six question
2. All question carry equal marks
3. Questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four question need to be solved.

REFERENCES:

1. Raymond H. Mayers, Douglas C. Montgomery, Christine M. Anderson-Cook, Response Surface Methodology: Process and Product Optimization using Designed Experiment, 3rd edition,John Wiley & Sons, New York, 2001
2. D.C. Montgomery, Design and Analysis of Experiments, 5th edition, John Wiley &Sons, New York, 2001
3. George E P Box, J Stuart Hunter, William G Hunter, Statics for Experimenters: Design, Innovation and Discovery, 2nd Ed. Wiley
4. W J Dimond, Peactical Experiment Designs for Engineers and Scintists, John Wiley and Sons Inc. ISBN: 0-471-39054-2
5. Design and Analysis of Experiments (Springer text in Statistics), Springer by A.M. Dean,and D. T.Voss.

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral	Tutorial	Total
ILO7015	Operation Research	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
ILO7015	Operation Research	20	20	20	80	--	--	--	100

Course Objectives:

Sr. No.	Course Objectives:
The course aims:	
1	Formulate a real-world problem as a mathematical programming model.
2	Understand the mathematical tools that are needed to solve optimization problems
3	Use mathematical software to solve the proposed models.

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	Understand the theoretical workings of the simplex method, the relationship between a linear program and its dual, including strong duality and complementary slackness.	L1
2	Perform sensitivity analysis to determine the direction and magnitude of change of a model's optimal solution as the data change.	L5
3	Solve specialized linear programming problems like the transportation and assignment problems, solve network models like the shortest path, minimum spanning tree, and maximum flow problems.	L3
4	Understand the applications of integer programming and a queuing model and compute important performance measures.	L1, L2

Module	Detailed Contents	Hrs
01	**Introduction to Operations Research**: Introduction, , Structure of the Mathematical Model, Limitations of Operations Research **Linear Programming**: Introduction, Linear Programming Problem, Requirements of LPP, Mathematical Formulation of LPP, Graphical method, Simplex Method Penalty Cost Method or Big M-method, Two Phase Method, Revised simplex method, **Duality**, Primal – Dual construction, Symmetric and Asymmetric Dual, Weak Duality Theorem, Complimentary Slackness Theorem, Main Duality Theorem, Dual Simplex Method, Sensitivity Analysis **Transportation Problem**: Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions – Northwest corner rule, least cost method and Vogel's approximation method. Optimality test: the stepping stone method and MODI method. **Assignment Problem**: Introduction, Mathematical Formulation of the Problem, Hungarian Method Algorithm, Processing of n Jobs Through Two Machines and m Machines, Graphical Method of Two Jobs m Machines Problem Routing Problem, Travelling Salesman Problem **Integer Programming Problem**: Introduction, Types of Integer Programming Problems, Gomory's cutting plane Algorithm, Branch and Bound Technique. Introduction to Decomposition algorithms.	14
02	**Queuing models**: queuing systems and structures, single server and multi-server models, Poisson input, exponential service, constant rate service, finite and infinite population	05
03	**Simulation**: Introduction, Methodology of Simulation, Basic Concepts, Simulation Procedure, Application of Simulation Monte-Carlo Method: Introduction, Monte-Carlo Simulation, Applications of Simulation, Advantages of Simulation, Limitations of Simulation	05
04	**Dynamic programming**. Characteristics of dynamic programming. Dynamic programming approach for Priority Management employment smoothening, capital budgeting, Stagecoach/Shortest Path, cargo loading and Reliability problems.	05
05	**Game Theory**. Competitive games, rectangular game, saddle point, minimax (maximin) method of optimal strategies, value of the game. Solution of games with saddle points, dominance principle. Rectangular games without saddle point – mixed strategy for 2 X 2 games.	05
06	**Inventory Models**: Classical EOQ Models, EOQ Model with Price Breaks, EOQ with Shortage, Probabilistic EOQ Model,	05

Assessment:

Internal:
Assessment consists of two tests out of which; one should be compulsory class test and the other is either a class test or assignment on live problems or course project.

End Semester Theory Examination:
Some guidelines for setting up the question paper. Minimum 80% syllabus should be covered in question papers of end semester examination. **In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.**

1. Question paper will comprise of total six question.
2. All question carry equal marks
3. Questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four question need to be solved.

REFERENCES:

1. Taha, H.A. "Operations Research - An Introduction", Prentice Hall, (7th Edition), 2002.
2. Ravindran, A, Phillips, D. T and Solberg, J. J. "Operations Research: Principles and Practice", John Willey and Sons, 2nd Edition, 2009.
3. Hiller, F. S. and Liebermann, G. J. "Introduction to Operations Research", Tata McGraw Hill, 2002.
4. Operations Research, S. D. Sharma, KedarNath Ram Nath-Meerut.
5. Operations Research, KantiSwarup, P. K. Gupta and Man Mohan, Sultan Chand & Sons.

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral	Tutorial	Total
ILO7016	Cyber Security and Laws	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
ILO7016	Cyber Security and Laws	20	20	20	80	--	--	--	100

Course Objectives:

Sr. No.	Course Objectives:
The course aims:	
1	To understand and identify different types of cybercrime and cyber law
2	To recognized Indian IT Act 2008 and its latest amendments
3	To learn various types of security standards compliances

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	Understand the concept of cybercrime and its effect on the outside world.	L1
2	Interpret and apply IT law in various legal issues.	L5, L3
3	Distinguish different aspects of cyber law.	L2, L4
4	Apply Information Security Standards compliance during software design and development.	L3, L6

Module	Detailed Contents	Hrs
01	**Introduction to Cybercrime:** Cybercrime definition and origins of the world, Cybercrime and information security, Classifications of cybercrime, Cybercrime and the Indian ITA 2000, A global Perspective on cybercrimes.	4
02	**Cyber offenses & Cybercrime:** How criminal plan the attacks, Social Engg, Cyber stalking, Cybercafé and Cybercrimes, Bot nets, Attack vector, Cloud computing, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Devices-Related Security Issues, Organizational Security Policies and Measures in Mobile Computing Era, Laptops	9
03	**Tools and Methods Used in Cyber line.** Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing, Identity Theft (ID Theft)	6
04	**The Concept of Cyberspace** E-Commerce, The Contract Aspects in Cyber Law, The Security Aspect of Cyber Law, The Intellectual Property Aspect in Cyber Law, The Evidence Aspect in Cyber Law, The Criminal Aspect in Cyber Law, Global Trends in Cyber Law, Legal Framework for Electronic Data Interchange Law Relating to Electronic Banking, The Need for an Indian Cyber Law	8
05	**Indian IT Act.** Cyber Crime and Criminal Justice: Penalties, Adjudication and Appeals Under the IT Act, 2000, IT Act. 2008 and its Amendments	6
06	**Information Security Standard compliances** SOX, GLBA, HIPAA, ISO, FISMA, NERC, PCI.	6

Assessment:

Internal:
Assessment consists of two tests out of which; one should be compulsory class test and the other is either a class test or assignment on live problems or course project.

End Semester Theory Examination:
Some guidelines for setting up the question paper. Minimum 80% syllabus should be covered in question papers of end semester examination.

In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

1. Question paper will comprise of total six question.
2. All question carry equal marks
3. Questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four question need to be solved.

Textbooks:

1. "Cyber Security & Cyber Laws" by Nilakshi Jain & Ramesh Menon.

REFERENCES:

1. Nina Godbole, Sunit Belapure, *Cyber Security*, Wiley India, New Delhi
2. The Indian Cyber Law by Suresh T. Vishwanathan; Bharat Law House New Delhi
3. The Information technology Act, 2000; Bare Act- Professional Book Publishers, New Delhi.
4. Cyber Law & Cyber Crimes By Advocate Prashant Mali; Snow White Publications, Mumbai
5. Nina Godbole, *Information Systems Security,* Wiley India, New Delhi
6. Kennetch J. Knapp, *Cyber Security &Global Information Assurance* Information Science Publishing.
7. William Stallings*, Cryptography and Network Security,* Pearson Publication
8. Websites for more information is available on : The Information Technology ACT, 2008- TIFR : https://www.tifrh.res.in
9. Website for more information , A Compliance Primer for IT professional : https://www.sans.org/reading-room/whitepapers/compliance/compliance-primer-professionals- 33538

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral	Tutorial	Total
ILO7017	Disaster Management and Mitigation Measures	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
ILO7017	Disaster Management and Mitigation Measures	20	20	20	80	--	--	--	100

Course Objectives:

Sr. No.	Course Objectives:
The course aims:	
1	To understand physics and various types of disaster occurring around the world
2	To identify extent and damaging capacity of a disaster
3	To study and understand the means of losses and methods to overcome /minimize it.
4	To understand role of individual and various organization during and after disaster
5	To understand application of GIS in the field of disaster management
6	To understand the emergency government response structures before, during and after disaster

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	Get to know natural as well as manmade disaster and their extent and possible effects on the economy	L1
2	Plan of national importance structures based upon the previous history.	L6
3	Get acquainted with government policies, acts and various organizational structure associated with an emergency.	L1
4	Get to know the simple do's and don'ts in such extreme events and act accordingly.	L1

Module	Detailed Contents	Hrs
01	**Introduction** Definition of Disaster, hazard, global and Indian scenario, general perspective, importance of study in human life, Direct and indirect effects of disasters, long term effects of disasters. Introduction to global warming and climate change.	03
02	**Natural Disaster and Manmade disasters:** 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. Manmade 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.	09
03	**Disaster Management, Policy and Administration** Disaster management: meaning, concept, importance, objective of disaster management policy, disaster risks in India, Paradigm shift in disaster management. Policy and administration: Importance and principles of disaster management policies, command and co-ordination of in disaster management, rescue operations-how to start with and how to proceed in due course of time, study of flowchart showing the entire process.	06
04	**Institutional Framework for Disaster Management in India:** 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. Methods and measures to avoid disasters, Management of casualties, set up of emergency facilities, importance of effective communication amongst different agencies in such situations. Use of Internet and softwares for effective disaster management. Applications of GIS, Remote sensing and GPS in this regard.	06
05	**Financing Relief Measures:** Ways to raise finance for relief expenditure, role of government agencies and NGO's in this process, Legal aspects related to finance raising as well as overall management of disasters. Various NGO's and the works they have carried out in the past on the occurrence of various disasters, Ways to approach these teams. International relief aid agencies and their role in extreme events.	09
06	**Preventive and Mitigation Measures:** Pre-disaster, during disaster and post-disaster measures in some events in general Structural mapping: Risk mapping, assessment and analysis, sea walls and embankments, Bio shield, shelters, early warning and communication Non-Structural Mitigation: Community based disaster preparedness, risk transfer and risk financing, capacity development and training, awareness and education, contingency plans. Do's and don'ts in case of disasters and effective implementation of relief aids.	06

Assessment:

Internal:
Assessment consists of two tests out of which; one should be compulsory class test and the other is either a class test or assignment on live problems or course project.

End Semester Theory Examination:
Some guidelines for setting up the question paper. Minimum 80% syllabus should be covered in question papers of end semester examination. **In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.**

1. Question paper will comprise of total six question
2. All question carry equal marks
3. Questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four question need to be solved.

REFERENCES:

1. 'Disaster Management' by Harsh K.Gupta, Universities Press Publications.
2. 'Disaster Management: An Appraisal of Institutional Mechanisms in India' by O.S.Dagur, published by Centre for land warfare studies, New Delhi, 2011.
3. 'Introduction to International Disaster Management' by Damon Copolla, Butterworth Heinemann Elseveir Publications.
4. 'Disaster Management Handbook' by Jack Pinkowski, CRC Press Taylor and Francis group.
5. 'Disaster management & rehabilitation' by Rajdeep Dasgupta, Mittal Publications, New Delhi.
6. 'Natural Hazards and Disaster Management, Vulnerability and Mitigation – R B Singh, Rawat Publications
7. Concepts and Techniques of GIS –C.P.Lo Albert, K.W. Yonng – Prentice Hall (India) Publications. (Learners are expected to refer reports published at national and International level and updated information available on authentic web sites)

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral	Tutorial	Total
ILO7018	Energy Audit and Management	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
ILO7018	Energy Audit and Management	20	20	20	80	--	--	--	100

Course Objectives:

Sr. No.	Course Objectives:
The course aims:	
1	To understand the importance of energy security for sustainable development and the fundamentals of energy conservation
2	To introduce performance evaluation criteria of various electrical and thermal installations to facilitate energy management.
3	To relate the data collected during performance evaluation of systems for identification of energy saving opportunities.

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	To identify and describe present state of energy security and its importance	L1, L2, L4
2	To identify and describe the basic principles and methodologies adopted in energy audit of a utility.	L1, L2, L4
3	To describe the energy performance evaluation of some common electrical installations and identify the energy saving opportunities.	L1, L2, L4
4	To describe the energy performance evaluation of some common thermal installations and identify the energy saving opportunities.	L1, L2, L4
5	To analyze the data collected during performance evaluation and recommend energy saving measures	L4

Module	Detailed Contents	Hrs
01	**Energy Scenario:** Present Energy Scenario, Energy Pricing, Energy Sector Reforms, Energy Security, Energy Conservation and its Importance, Energy Conservation Act- 2001 and its Features. Basics of Energy and its various forms, Material and Energy balance	04
02	**Energy Audit Principles:** Definition, Energy audit- need, Types of energy audit, Energy management (audit) approach-understanding energy costs, Bench marking, Energy performance, Matching energy use to requirement, maximizing system efficiencies, Optimizing the input energy requirements, Fuel and energy substitution. Elements of monitoring& targeting; Energy audit Instruments; Data and information-analysis. Financial analysis techniques: Simple payback period, NPV, Return on investment (ROI), Internal rate of return (IRR)	08
03	**Energy Management and Energy Conservation in Electrical System:** Electricity billing, Electrical load management and maximum demand Control; Power factor improvement, Energy efficient equipment and appliances, star ratings. **Energy efficiency measures in lighting system, Lighting control:** Occupancy sensors, daylight integration, and use of intelligent controllers. Energy conservation opportunities in: water pumps, industrial drives, induction motors, motor retrofitting, soft starters, variable speed drives.	10
04	**Energy Management and Energy Conservation in Thermal Systems:** Review of different thermal loads; Energy conservation opportunities in: Steam distribution system, Assessment of steam distribution losses, Steam leakages, Steam trapping, Condensate and flash steam recovery system. General fuel economy measures in Boilers and furnaces, Waste heat recovery, use of insulation- types and application. HVAC system: Coefficient of performance, Capacity, factors affecting Refrigeration and Air Conditioning system performance and savings opportunities.	10
05	**Energy Performance Assessment:** On site Performance evaluation techniques, Case studies based on: Motors and variable speed drive, pumps, HVAC system calculations; Lighting System: Installed Load Efficacy Ratio (ILER) method, Financial Analysis.	04
06	**Energy conservation in Buildings:** Energy Conservation Building Codes (ECBC): Green Building, LEED rating, Application of Non-Conventional and Renewable Energy Sources	03

Assessment:

Internal:
Assessment consists of two tests out of which; one should be compulsory class test and the other is either a class test or assignment on live problems or course project.

End Semester Theory Examination:
Some guidelines for setting up the question paper. Minimum 80% syllabus should be covered in question papers of end semester examination. **In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.**

1. Question paper will comprise of total six question
2. All question carry equal marks
3. Questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four question need to be solved.

REFERENCES:

1. Handbook of Electrical Installation Practice, Geofry Stokes, Blackwell Science
2. Designing with light: Lighting Handbook, By Anil Valia, Lighting System
3. Energy Management Handbook, By W.C. Turner, John Wiley and Sons
4. Handbook on Energy Audits and Management, edited by A. K. Tyagi, Tata Energy Research Institute (TERI).
5. Energy Management Principles, C.B.Smith, Pergamon Press
6. Energy Conservation Guidebook, Dale R. Patrick, S. Fardo, Ray E. Richardson, Fairmont Press
7. Handbook of Energy Audits, Albert Thumann, W. J. Younger, T. Niehus, CRC Press
8. www.energymanagertraining.com
9. www.bee-india.nic.in.

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral	Tutorial	Total
ILO7019	Development Engineering	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
ILO7019	Development Engineering	20	20	20	80	--	--	--	100

Course Objectives:

Sr. No.	Course Objectives:
The course aims:	
1	To familiarise the characteristics of rural Society and the Scope, Nature and Constraints of rural Development
2	To provide an exposure to implications of 73rdCAA on Planning, Development and Governance of Rural Areas
3	An exploration of human values, which go into making a 'good' human being, a 'good' professional, a 'good' society and a 'good life' in the context of work life and the personal life of modern Indian professionals
4	To familiarise the Nature and Type of Human Values relevant to Planning Institutions

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	Demonstrate understanding of knowledge for Rural Development.	L3
2	Prepare solutions for Management Issues.	L3
3	Take up Initiatives and design Strategies to complete the task	L6
4	Develop acumen for higher education and research.	L6
5	Demonstrate the art of working in group of different nature	L3
6	Develop confidence to take up rural project activities independently.	L6

Module	Contents	Hrs
1	Introduction to Rural Development Meaning, nature and scope of development; Nature of rural society in India; Hierarchy of settlements; Social, economic and ecological constraints for rural development Roots of Rural Development in India Rural reconstruction and Sarvodaya program before independence; Impact of voluntary effort and Sarvodaya Movement on rural development; Constitutional direction, directive principles; Panchayati Raj - beginning of planning and community development; National extension services.	**08**
2	Post-Independence rural Development Balwant Rai Mehta Committee - three tier system of rural local Government; Need and scope for people's participation and Panchayati Raj; Ashok Mehta Committee - linkage between Panchayati Raj, participation and rural development.	**06**
3	Rural Development Initiatives in Five Year Plans Five Year Plans and Rural Development; Planning process at National, State, Regional and District levels; Planning, development, implementing and monitoring organizations and agencies; Urban and rural interface - integrated approach and local plans; Development initiatives and their convergence; Special component plan and sub-plan for the weaker section; Micro-eco zones; Data base for local planning; Need for decentralized planning; Sustainable rural development	**07**
4	Post 73rd Amendment Scenario 73rd Constitution Amendment Act, including - XI schedule, devolution of powers, functions and finance; Panchayati Raj institutions - organizational linkages; Recent changes in rural local planning; Gram Sabha - revitalized Panchayati Raj; Institutionalization; resource mapping, resource mobilization including social mobilization; Information Technology and rural planning; Need for further amendments.	**04**
5	Values and Science and Technology Material development and its values; the challenge of science and technology; Values in planning profession, research and education Types of Values Psychological values — integrated personality; mental health; Societal values — the modern search for a good society; justice, democracy, rule of law, values in the Indian constitution; Aesthetic values — perception and enjoyment of beauty; Moral and ethical values; nature of moral judgment; Spiritual values; different concepts; secular spirituality; Relative and absolute values; Human values— humanism and human values; human rights; human values as freedom, creativity, love and wisdom	**10**
6	Ethics Canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility. Work ethics; Professional ethics; Ethics in planning profession, research and education	**04**

Assessment:

Internal Assessment for 20 marks:
Consisting of **Two Compulsory Class Tests**
First test based on approximately 40% of contents and second test based on remaining contents (approximately 40% but excluding contents covered in Test I)

End Semester Examination:
The weightage of each module in end semester examination will be proportional to number of respective lecture hours mentioned in the curriculum.

1. Question paper will comprise of total six question.
2. All question carry equal marks
3. Questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four question need to be solved.

Reference

1. ITPI, Village Planning and Rural Development, ITPI, New Delhi
2. Thooyavan, K.R. Human Settlements: A 2005 MA Publication, Chennai
3. GoI, Constitution (73rdGoI, New Delhi Amendment) Act, GoI, New Delhi
4. Planning Commission, Five Year Plans, Planning Commission
5. Planning Commission, Manual of Integrated District Planning, 2006, Planning Commission New Delhi
6. Planning Guide to Beginners
7. Weaver, R.C., The Urban Complex, Doubleday
8. Farmer, W.P. et al, Ethics in Planning, American Planning Association, Washington.
9. How, E., Normative Ethics in Planning, Journal of Planning Literature, Vol.5, No.2, pp. 123-150
10. Watson, V. Conflicting Rationalities: -- Implications for Planning Theory and Ethics, Planning Theory and Practice, Vol. 4, No.4, pp.395 – 407