Shri Vile Parle Kelavani Mandal's

Dwarkadas J. Sanghvi College of Engineering

(Autonomous College Affiliated to the University of Mumbai)

Scheme and detailed syllabus

Final Year B.Tech

in

Computer Science and Engineering

(IoT and Cyber Security with Block Chain Technology)

(Semester VIII)

Prepared by:- Board of Studies in Computer Science and Engineering (IoT and Cyber Security with Block Chain Technology)

With effect from the Academic Year: 2024-2025

Scheme for Final Year B. Tech. in Computer Science and Engineering (IoT and Cyber Security with Block Chain Technology) Semester VIII (Autonomous) (Academic Year-2024-2025)

Sr No	Course Code	Course	Teaching Scheme(hr)			Continuous Assessment (A)					Semester End Assessment (B)					Aggregate (A+B)	Credits Earned
			Theory	Practical	Credits	TT1	TT2	AVG.	T/W	Total CA (A)	Theory	Oral	Pract	Oral & Pract	Total SEA(B)		
1	DJ19ICC801	Social Network Analysis	3	--	3	25	25	25	--	25	75	--	--	--	75	100	4
	DJ19ICL801	Social Network Analysis Laboratory	--	2	1	--	--	--	25	25	--	25	--		25	50	
2	DJ19ICC802	Ethical Hacking and Digital Forensics	3	--	3	25	25	25	--	25	75	--	--	--	75	100	4
	DJ19ICL802	Ethical Hacking and Digital Forensics Laboratory	--	2	1	--	--	--	25	25	--	25	--	--	25	50	
3@ Any 1 Core Elective	DJ19ICEC8011	Computer Vision	3	--	3	25	25	25	--	25	75	--	--	--	75	100	4
	DJ19ICEL8011	Computer Vision Laboratory	--	2	1	--	--	--	25	25	--	25	--	--	25	50	
	DJ19ICEC8012	Industrial Internet of Everything	3	--	3	25	25	25	--	25	75	--	--	--	75	100	4
	DJ19ICEL8012	Industrial Internet of Everything Laboratory	--	2	1	--	--	--	25	25	--	25	--	--	25	50	
	DJ19ICEC8013	Software Testing and Quality Assurance	3	--	3	25	25	25	--	25	75	--	--	--	75	100	4
	DJ19ICEL8013	Software Testing and Quality Assurance Laboratory	--	2	1	--	--	--	25	25	--	25	--	--	25	50	
4#	DJ19ILO8021	Project Management	3	--	3	25	25	25	--	25	75	--	--	--	75	100	3
	DJ19ILO8022	Entrepreneurship Development and Management	3	--	3	25	25	25	--	25	75	--	--	--	75	100	
	DJ19ILO8023	Corporate Social Responsibility	3	--	3	25	25	25	--	25	75	--	--	--	75	100	
	DJ19ILO8024	Human Resource Management	3	--	3	25	25	25	--	25	75	--	--	--	75	100	
	DJ19ILO8025	Corporate Finance Management	3	--	3	25	25	25	--	25	75	--	--	--	75	100	
	DJ19ILO8026	Logistics and Supply Chain Management	3	--	3	25	25	25	--	25	75	--	--	--	75	100	
	DJ19ILO8027	IPR and Patenting	3	--	3	25	25	25	--	25	75	--	--	--	75	100	
	DJ19ILO8028	Digital Marketing Management	3	--	3	25	25	25	--	25	75	--	--	--	75	100	
	DJ19ILO8029	Environmental Management	3	--	3	25	25	25	--	25	75	--	--	--	75	100	
	DJ19ILO8030	Labour and Corporate Law	3	--	3	25	25	25	--	25	75	--	--	--	75	100	
5	DJ19ICP803	Project Stage II	--	10	5	--	--	--	100	100	--	--	--	100	100	200	5
		Total	12	16	20	100	100	100	175	275	300	75	--	100	475	750	20

@Any 1 elective course, # any 1 institute professional elective

21/01/25

Program: B.Tech. in Computer Science and Engineering (IoT and Cyber Security with Block Chain Technology)	Final Year	Semester: VIII
Course : Social Network Analysis	Course Code: DJ19ICC801	
Course: Social Network Analysis Laboratory	Course Code: DJ19ICL801	

Teaching Scheme (Hours / week)				Evaluation Scheme						
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)			Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average	
				75			25	25	25	100
				Laboratory Examination			Term work		Total Term work	50
3	2	-	4	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal		
				25	–	-	15	10	25	

Pre-requisite:

1. Computer Networks
2. Machine Learning

Course Objectives: The objective of the course is

1. To aware the learners with the concept of social media analytics and understand its significance.
2. To enable the learners to develop skills required for analyzing the effectiveness of social media.
3. To familiarize the learners with different tools of social media analytics
4. To equip students with the skills to analyze and interpret social networks using quantitative and qualitative methods

Course Outcomes: On completion of this course, learner will be able to

1. Understand the fundamental concepts, tools, and techniques for analyzing social networks.
2. Illustrate large-scale network data and mechanisms used for network growth models.
3. Apply link analysis techniques to real-world applications
4. Explore the concepts behind community detection in social networks
5. Engage in research projects that explore novel approaches to link prediction, encouraging innovation and critical thinking in the application of SNA techniques.
6. Implement appropriate anomaly detection method on a networks.

Detailed Syllabus		
Unit	**Description**	**Duration**
1	**Networks and Society** Introduction, Use of social networks, defining a network, types of network (link-centric, node and link centric, local view, temporal view, generalization, real-world network), levels of social network analysis, graph visualization tools (web-based and standalone), applications. **Network Measures:** Network basics, node centrality, assortativity, transitivity and reciprocity, similarity, degeneracy.	06
2	**Network Growth Models** Properties of real world networks, Random Network Model: Degree Distribution of Random Network, Binomial to Poisson Distribution, Evolution of a Random Network, Average Path Length, Clustering Coefficient, Random Network vs. Real-world Network, Ring Lattice Network Model, Watts- Strogatz Model: Network Formation, Preferential Attachment Model: Network Formation, Degree Dynamics, Limitations of BA Model.	08
3	**Link Analysis** Application of link analysis, Signed networks: Balance Theory of Undirected Signed Networks, Status Theory of Signed Networks, Triad Balance vs Status, Strong and Weak Ties: Strength of a Tie, Triadic Closure, Dunbar Number, Local Bridges and Importance of Weak Ties, PageRank, Personalised PageRank, DivRank, SimRank, PathSim.	06
4	**Community Detection** Application of community detection, types of communities, community detection methods, Disjoint Community Detection: Node-centric community detection, modularity and community detection, Overlapping Community Detection: Clique Dynamics, Local Community Detection.	08
5	**Link Prediction** Link prediction using Graph Neural Networks (GNNs), Dynamic Network analysis using Graph Convolutional Networks (GCNs) and GraphSAGE, Graph Attention Networks (GATs), Autoencoders for Link Prediction- Graph Autoencoders (GAE),Applications of link prediction	05
6	**Anomaly Detection in Networks** Anomaly in Static Networks: Plain and attributed networks, relational learning, Anomaly in Dynamic Networks: Preliminaries, feature and decomposition-based approaches. Recurrent Neural Networks (RNNs) for Temporal Anomaly Detection and Time-Series Anomaly Detection	06
Total		39

List of Laboratory Experiments:	
Sr. No.	**Suggested Experiments**
1	To create and analyze a graph using Social Network and Gephi Tool.
2	To build a network and network measures using NetworkX: Degree & Degree Distance, Clustering
3	To build a network and network measures using NetworkX Node Centrality measure
4	To perform data collection-Select the social media platforms of your choice (Twitter, Facebook, LinkedIn, YouTube, Web blogs etc) ,connect to and capture social media data for business (scraping, crawling, parsing).
5	To develop Structure based social media analytics model for any business. (e.g. Structure Based Models -community detection, influence analysis)
6	To Implement random scale-free network growth model on network science. (Barabasi-Albert).
7	To Implement clustering network growth model on network science (Watts Strogatz Network).
8	To implement link analysis of random walk page rank algorithm.
9	To perform and evaluate link prediction using Graph Neural Network(GNN)
10	To perform and evaluate link prediction using Graph Convolutional Network(GCN)
11	To perform and evaluate link prediction using Graph Attention network (GAT
12	To study and implement Graph Representation learning.:DeepWalk
13	To study and implement f Graph Embedding using Node2Vec
14	To implement a Recurrent Neural Network (RNN) to detect temporal anomalies in sequential data, such as time-series data, and evaluate its performance in identifying anomalies based on historical trends.
15	To use Recurrent Neural Network (RNN) auto encoder for time-series anomaly detection.

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text Books:

1. Tanmoy Chakraborty, "Social Network Analysis", First Edition, Wiley, 2021.
2. Stephen P Borgatti, Martin G. Everett, Jeffrey C. Johnson, "Analyzing Social Networks", Sage Publications Ltd, 2nd Edition, 2018.

Reference Books:

1. Xiaoming Fu, Jar-Der Luo, Margarete Boos, 'Social Network Analysis Interdisciplinary Approaches and Case Studies', 1st Edition, CRC Press, 2020.
2. Dr. Krishna Raj P.M., Mr. Ankith Mohan, Dr. Srinivasa K.G, "Practical Social Network Analysis with Python (Computer Communications and Networks)", First Edition, Springer, 2019.
3. John Scott, "Social Network Analysis", Fourth Edition, SAGE Publications Ltd, 2017.
4. Song Yang, Franziska Barbara Keller, Lu Zheng, "Social Network Analysis: Methods and Examples", First Edition, SAGE Publications, 2016.

Web Resources:

1. Coursera - Social Network Analysis https://www.coursera.org/learn/social-network-analysis
2. Gephi- https://gephi.org/
3. NetworkX: https://networkx.org/
4. Social Network Analysis: https://researchmethod.net/social-network-analysis/

Online Courses: NPTEL

1. Social Network Analysis by Prof. Tanmoy Chakraborty, IIIT Delhi
https://onlinecourses.nptel.ac.in/noc22_cs117/preview
2. Social Networks by Prof. Sudarshan Iyengar (IIT Ropar) and Prof. Yayati Gupta (Mahindra University)
https://onlinecourses.nptel.ac.in/noc24_cs56/preview
3. Social Networks by Prof. Sudarshan Iyengar (IIT Ropar), Prof. Poonam Saini (Punjab Engineering College)
https://onlinecourses.nptel.ac.in/noc21_cs74/preview

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Laboratory:

Oral examination will be based on the entire syllabus including, the practical performed during laboratory sessions.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 03 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading

Laboratory: (Term work)

Term work shall consist of minimum 8 experiments.

The distribution of marks for term work shall be as follows:

i. Laboratory work (Performance of Experiments): 15 Marks

ii. Journal documentation (Write-up and/or Assignments): 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work, and upon fulfilling minimum passing criteria in the term work.

Prepared by	Checked by	Head of the Department	Vice Principal	Principal

Program: B.Tech. in Computer Science and Engineering (IoT and Cyber Security with Block Chain Technology)									Final Year	Semester: VIII
Course : Ethical Hacking and Digital Forensics									Course Code: DJ19ICC802	
Course: Ethical Hacking and Digital Forensics Laboratory									Course Code: DJ19ICL802	
Teaching Scheme (Hours / week)				Evaluation Scheme						
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)			Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average	
				75			25	25	25	100
				Laboratory Examination			Term work		Total Term work	
3	2	-	4	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal		50
				25	–	-	15	10	25	

Prerequisite:

1. Security in Computing
2. Computer Networks
3. Vulnerability Assessment and Penetration Testing

Course Objectives: The objective of the course is

1. To understand ethical hacking and different phases of an attack.
2. To recognize the System Hacking strategies in Ethical manner.
3. To create awareness of Network Hacking and its issues.
4. To work with different tools and techniques associated with Cyber Forensics.

Course Outcomes: On completion of this course, learner will be able to

1. Define the concept of ethical hacking and explore different phases of it.
2. Apply the System Hacking strategies in Ethical manner.
3. Analyze and mitigate Network Hacking issues.
4. Understand the fundamental of Cyber Forensics
5. Examine the tools and techniques used for acquiring digital evidence.
6. Assess and authenticate digital evidence data.

Detailed Syllabus

Unit	Description	Duration
1	**Introduction to Ethical Hacking** Introduction- Ethical Hacking Terminology, Types of hacking technologies, Phases of ethical hacking, Hacking Impacts, The Hacker Framework: Planning the test, Sound Operations, System Hacking, Malware Threats, Sniffing, Email Tracking.	4

2	**Enumeration and vulnerability analysis** Enumeration Concepts - NetBIOS Enumeration - SNMP, LDAP, NTP, SMTP and DNS Enumeration - Vulnerability Assessment Concepts - Desktop and Server OS Vulnerabilities - Windows OS Vulnerabilities - Tools for Identifying Vulnerabilities in Windows - Linux OS Vulnerabilities - Vulnerabilities of Embedded Oss.	7
3	**Network hacking** Dial-up, PBX, Voicemail and VPN hacking, Preparing to dial up, War-Dialing, Brute Force Scripting, PBX hacking, Voice mail hacking, VPN hacking, Network Devices: Discovery Autonomous System Lookup, Public Newsgroups, Service Detection, Network Vulnerability, Detecting Layer 2 Media.	7
4	**Introduction to Cyber forensics** Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Role of ECD and ICT in Cybercrime - Classification of Cyber Crime. The Present and future of Cybercrime, Cyber Forensics, Steps in Forensic Investigation, Forensic Examination Process, Types of CF techniques: Forensic duplication and investigation, Forensics Technology and Systems, Understanding Computer Investigation, Data Acquisition.	7
5	**Evidence Collection and Forensics Tools** Processing Crime and Incident Scenes – Digital Evidence, Sources of Evidence, Working with File Systems: Registry, Artifacts, Current Computer Forensics Tools, Software/ Hardware Tools :Forensic Suite, Acquisition and Seizure of Evidence from Computers and Mobile Devices, Chain of Custody- Forensic Tools	7
6	**Analysis and Validation** Validating Forensics Data , Data Hiding Techniques, Performing Remote Acquisition, Network Forensics, Email Investigations, Cell Phone and Mobile Devices Forensics , Analysis of Digital Evidence ,Admissibility of Evidence ,Cyber Laws in India , Case Studies	7
	Total	**39**

	List of Laboratory Experiments:
Sr. No	**Suggested Experiments**
1	To study and implement session hijacking / man in the middle (MiTM) attack in a controlled virtual environment. Recommended Tools: Ettercap / Bettercap
2	To perform static data acquisition from Windows OS Recommended Tool: FTK Imager
3	To acquire live data from Windows OS Recommended Tool: FTK Imager, TCP Dump

4	Windows Recycle Bin Forensics
5	To perform analysis of Forensic Duplicates Recommended Tool: Autopsy, bulk Extractor
6	Data Carving using open source tools • Foremost • Scalpel • Jpegcarver
7	USB Device Forensics using • USBDeview • USB Detection
8	Restore the Evidence Image using EnCase Forensics Imager.
9	Generate a Timeline Report Using Autopsy
10	File inclusion attack simulation using dvwa, lamp stack in Debian .
11	To setup a NETAPI exploit and a persistent backdoor using Metasploit.
12	Case Study on Chain of Custody and Evidence Integrity Validation using Hash Values Recommended Tool: Hashdeep, md5sum

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text Books:

1. EC-Council,"Ethical Hacking and Countermeasures Attack Phases",Cengage Learning,2021.
2. Niranjan Reddy, "Practical Cyber Forensics: An incident- Based Approach to Forensic Investigations ", Academic Press,2019.
3. Casey Eoghan, "Digital evidence and computer crime: Forensic science, computers and the internet", Academic Press,2014.
4. Stuart McClure, Joel Scambray and Goerge Kurtz, "Hacking Exposed 7: Network Security Secrets & Solutions", Tata Mc Graw Hill Publishers, 2010.
5. Bensmith, and Brian Komer, Microsoft Windows Security Resource Kit, Prentice Hall of India, 2010.

Reference Books:

1. Kevin Smith, "Hacking How to Hack - The ultimate Hacking Guide", Hacking Intelligence, 2018
2. Kevin Beaver, "Hacking for dummies" Wiley publication,2018.
3. Jennifer Bayuk, "CyberForensics - Understanding Information Security Investigation",Springer,2010.
4. Eoghan Casey ,"Handbook of Digital Forensics and Investigation" ,Academic Press,2010

Web Resources:

1. https://freevideolectures.com/course/4070/nptel-ethical-hacking
2. https://owasp.org/www-project-top-ten/
3. https://www.computersecuritystudent.com/
4. http://www.opentechinfo.com/learn-use-kali-linux/
5. https://pentesterlab.com
6. https://www.exploit-db.com/google-hacking-database Evaluation Scheme

Online Courses: NPTEL

1. Ethical Hacking, Prof. Indranil Sengupta, IIT Kharagpur
   https://onlinecourses.nptel.ac.in/noc24_cs94/preview

Evaluation Scheme:

Semester End Examination (A):

Theory:

Question paper will be based on the entire syllabus summing up to 75 marks.

Total duration allotted for writing the paper is 3 hrs.

Laboratory:

Oral examination will be based on the entire syllabus including, the practical performed during laboratory sessions.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 03 Modules) and the other can either be a term test or an assignment on live problems or a course project.
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Prepared by	Checked by	Head of the Department	Vice Principal	Principal

Program: B.Tech. in Computer Science and Engineering (IoT and Cyber Security with Block Chain Technology)									Final Year		Semester: VIII
Course : Computer Vision									Course Code: DJ19ICEC8011		
Course: Computer Vision Laboratory									Course Code: DJ19ICEL8011		
Teaching Scheme (Hours / week)				Evaluation Scheme							
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)				Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average		
				75			25	25	25		100
				Laboratory Examination			Term work			Total Term work	
3	2	-	4	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal			50
				25	–	-	15	10		25	

Prerequisite:

1. Statistics for Engineers, linear algebra, and complex arithmetic
2. Programming C++/Python

Course Objectives: The objective of the course is

1. Locating and identifying specific objects within an image or video
2. Dividing an image into different segments or regions, each corresponding to different objects or areas
3. Understanding and analyzing movement or actions in a sequence of images
4. Gain proficiency in morphological operations and image restoration techniques to analyze and enhance image features effectively.

Course Outcomes: On completion of this course, learner will be able to

1. Apply various point processing techniques to enhance images and improve visual quality.
2. Understand spatial and frequency domain filtering for image smoothing and sharpening using Image Transforms.
3. Design feature detection techniques for edges, corners, and textures of the image.
4. Select Techniques for dividing images into meaningful parts using Morphological operation
5. Apply advanced image segmentation techniques, including thresholding, region-based segmentation, and boundary identification, to analyze and interpret digital images.
6. Understand the principles of motion analysis in computer vision

Detailed Syllabus		
Unit	**Description**	**Duration**
1	**Fundamental Steps in Digital Image Processing** Components of an Image Processing System, Image Sampling and Quantization, Some Basic Relationships Between Pixels	2
2	**Image Enhancement (point processing)** Image Negative, Thresholding, Gray- level slicing with and without background, power law and log transform, Contrast Stretching, Histogram equalization and Histogram Specification **Image Enhancement in Spatial Domain (Neighbourhood processing):** Low Pass and High Pass filtering for image enhancement, Basics of Spatial Filtering, Generating Spatial Filter Masks–Smoothing and Sharpening Spatial Filtering Image Transforms: 1-D DFT, 2-D Discrete Fourier Transform and Its Inverse, Some Properties of 2D DFT, Walsh -Hadamard, Discrete Cosine Transform, Haar Transform, Slant Transform **Image Enhancement in Frequency Domain:** The Basics of Filtering in the Frequency Domain, Smoothing and Sharpening frequency domain filters	11
3	**Morphology:** Erosion and Dilation, Opening and Closing, The Hit or-Miss Transformation. Restoration: Noise models – Mean Filters – Order Statistics – Adaptive filters –wiener filter. **Corner and Interest Point detection:** The Harris Interest Point Operator: Corner Signals and shifts for various geometric configuration, Performance with crossing point and Junctions	9
4	**Point, Line, and Edge Detection** Detection of Isolated Points, Line detection, edge models, basic and advance edge detection, Edge linking and boundary detection, Canny's edge detection algorithm	7
5	**Thresholding** Foundation, Role of illumination, Basic Global thresholding, Otsu's method Region Based segmentation: Region Growing, Region Splitting and merging, Relationships between pixels, Hough transform **Region Identification:** Chain code, simple geometric border representation Fourier Transform of boundaries, Boundary description using segment sequences	6
6	**Motion:** Optical Flow, Interpretation of Optical Fields, Using focus of expansion to avoid collision, Time to adjacency analysis, Basic difficulties with optical flow models, Stero from Motion.	4
	Total	39

List of Laboratory Experiments:	
Sr. No.	**Suggested Experiments**
1	Perform Geometric, Arithmetic and Logical operations on images
2	Implement Spatial Domain Image Enhancement using different Point Processing techniques
3	Implement Spatial Domain Image Enhancement using different Neighbourhood Processing techniques

4	Image contrast improvement using Histogram equalization
5	Image contrast improvement using Histogram Stretching.
6	Implement frequency domain Image Enhancement techniques
7	Apply operations like erosion, dilation
8	Apply operations opening, and closing to modify image shapes
9	Implement morphological operations on Image
10	Image Edge detection using basic and advanced techniques
11	Application of Harr transform in image processing
12	Perform Steganography operation
13	Apply Image Transform on the Image
14	Horn-Schunck Optical Flow
15	Implement Lucas-Kanade Optical Flow

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text Books:

1. Rafel C. Gonzalez and Richard E. Woods, "Digital Image Processing", Pearson Education Asia, 4th Edition, 2018.
2. Sanjit Mitra, "Digital Signal Processing: A Computer Based Approach", Tata McGraw Hill, 4th Edition, 2013

Reference Books:

1. S. Salivahanan, A. Vallavaraj, C. Gnanapriya, "Digital Signal Processing", Tata McGraw Hill Publication 4th Edition, 2019.
2. Arcangelo Distante, Cosimo Distante "Handbook of Image Processing and Computer Vision", Springer International Publishing, 2020
3. E. R. Davies, "Computer and Machine Vision: Theory, Algorithms", Academic Press, 4th Edition, 2012.
4. S. Jayaraman, E. Esakkirajan and T. Veerkumar, "Digital Image Processing", Tata McGraw Hill Education Private Ltd, 1st Edition, 2017.
5. Anil K. Jain, "Fundamentals and Digital Image Processing", Pearson Education, 1st Edition, 2015.

Web Resources:

1. Image Enhancement https://medium.com/@gokcenazakyol/what-is-image-enhancement-image-processing-3-32a813087e0a
2. https://www.pace.edu.in/img/course/Module_2-img.pdf
3. https://iipvapi.com/spatial-domain-and-frequency-domain-for-image-enhancement
4. https://www.ibm.com/topics/image-segmentation
5. https://www.cs.auckland.ac.nz/courses/compsci773s1c/lectures/ImageProcessing-html/topic4.htm

Online Courses: NPTEL

1. Digital Image Processing, By Prof. Prabir Kumar Biswas, IIT Kharagpur https://onlinecourses.nptel.ac.in/noc22_ee116/preview
2. Computer Vision And Image Processing - Fundamentals And Applications, Fundamentals And Applications, By Prof. M. K. Bhuyan, IIT Guwahati https://onlinecourses.nptel.ac.in/noc24_ee38/preview

Evaluation Scheme:

Semester End Examination (A):

Theory:

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Laboratory:

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The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work, and upon fulfilling minimum passing criteria in the term work.

Prepared by **Checked by** **Head of the Department** **Vice Principal** **Principal**

Program: B.Tech. in Computer Science and Engineering (IoT and Cyber Security with Block Chain Technology)									Final Year		Semester: VIII
Course : Industrial Internet of Everything									Course Code: DJ19ICEC8012		
Course: Industrial Internet of Everything Laboratory									Course Code: DJ19ICEL8012		
Teaching Scheme (Hours / week)				Evaluation Scheme							
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)				Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average		
				75			25	25	25		100
				Laboratory Examination			Term work			Total Term work	50
3	2	-	4	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal			
				25	–	-	15	10		25	

Prerequisite:

1. Introduction to Internet of Things
2. IoT Architecture and Protocol

Course Objectives: The objectives of the course are

1. To understand the key skills of Industrial IoT and Applications.
2. To analyse the suitable Industrial Internet Architecture Framework with modern communicational protocols.
3. To explore IP, Non-IP IOT protocols and Business models used in IIoT deployments.
4. To Implement IIoT Data Analytics and Applications of IIoT in robotics.

Course Outcomes: On completion of this course, learner will be able to

1. Present key skills used in the IIoT manufacturing and Embedded systems applications.
2. Design suitable network architecture with Industrial Ethernet and Gateways.
3. Introduced operating systems, Networking and wireless communication protocols used in IIoT deployments.
4. Comprehend different protocols and Business models for Industrial Internet of Everything.
5. Deployment of IIoT Data Analytics by using Machine Learning algorithms.
6. Implement cloud-enabled robotics Applications of IIoT in robotics.

Detailed Syllabus		
Unit	Description	Duration
1	**Introduction of IIoT:** Market Size and Potential Definition IoT v IIoT, Next Generation Sensors, Sensor's calibration and validate sensor measurements, placement of IoT devices, Industrial Internet, Impact of Industrial Internet, Industrial Sensing, low-cost communication	07

	system design, Top application areas include manufacturing, oil & gas, Embedded systems in the Automotive and Transportation market segment.	
2	**Industrial Internet Architecture Framework** Functional Viewpoint, Operational Domain, Information Domain, Application Domain, Business Domain, Implementation View point, Architectural Topology, Three Tier Topology, Data Management, Field Bus Technologies, Modern Communication Protocols, Industrial Ethernet, Industrial Gateways.	**07**
3	**IIoT Methodology** Industrial Processes-Features of IIoT for Industrial processes, Top operating systems used in IIoT deployments, Networking and wireless communication protocols used in IIoT deployments. Smart Remote Monitoring Unit, components of monitoring system, control and management, Wireless Sensor Network (WSN).	**06**
4	**Protocols and Architecture of IIoT** WPAN, NFC, WebSockets, Wireless HART Protocol, IP and Non-IP Protocols, Z-Wave, NB-IoT, Business Models of IIoT, Categorization of reference architecture in IIoT, introduction to Interoperable Industrial Internet of Things (IIRA), IIRA-Framework.	**06**
5	**IIoT Data Analytics** Categorization of analytics- IIoT and Industry 4.0 context, Usefulness of IIoT analytics, implementation of industrial IoT Data flow, Deployment of analytics, big data and how to prepare data for machine learning algorithms, Machine Learning algorithms-supervised learning & Un-supervised learning algorithms, Applications of ML in Industries, Healthcare Applications in industries.	**07**
6	**Internet of Robotic Things (IoRT)** Introduction to stationary and mobile robots, Brief introduction to localization, mapping, planning, and control of robotic systems; Introduction to cloud-enabled robotics; Applications of IIoT in robotics; Architectures for IoRT, Examples and case studies: Open issues and challenges.	**06**
	Total	**39**

List of Laboratory Experiments	
Sr. No.	**Suggested Experiments**
1	To implement an Autonomous Inventory Management System Using IIoT.
2	To Design a Smart Warehouse System using Industrial IoT and RFID.
3	To Perform Monitoring and Controlling Industrial Equipment using IIoT Sensors.
4	To design Smart Factory Automation with IIoT-Based Wireless Sensor Networks.
5	To analyse cybersecurity risk assessment for safeguarding industrial IoT (IIoT) environments.
6	To develop an Edge Computing Solution for Industrial IoT Applications.
7	To perform Predictive Analytics for Industrial Energy Management using IoT Data.
8	To perform IIoT-Based Environmental Monitoring in Manufacturing Plants.
9	To deploy sensors to monitor machine health parameters (vibration, temperature, pressure).

10	To analyse Industrial IoT Device Calibration and Data Transmission using MQTT.
11	To analyse Fault Detection in Industrial Systems Using IoT and AI Techniques.
12	To analyse Remote Condition Monitoring of Power Grids using IIoT Solutions.
13	To perform a system to monitor the location and condition of products in real-time application using Technologies like Wi-Fi (Indoors: 30–50 meters), Bluetooth (10 meters) and LoRaWAN (Urban areas: 3–5 kilometers).
14	To perform Industrial Robotics Control through IoT-Based Network using protocols like MQTT or HTTP.
15	Mini Project (Students with group of 3/4 will develop application based on Industrial Internet of Thing along with Report).

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text Books:

1. Michael Peppler and Peter Domsch "Hands-On Industrial Internet of Things: Create a powerful Industrial IoT infrastructure using Industry 4.0", Packt Press, ISBN: 1789537223, 2018.
2. K. V. S. Murthy and V. S. Kumar "Industrial Internet of Things: Design, Implementation, and Applications", 1st Edition, CRC Press, ISBN: ISBN 9780367608675, 2024.
3. Shrey Sharma, "Mastering IoT for Industrial Environments", 1st Edition Packt Publishing, ISBN: 9788197081972, 2024
4. Shriram K Vasudevan, Abhishek S. Natarajan, RMD Sundaram, "Internet of Things", Wiley Publishing, ISBN: 9789388991018, 2020.

Reference Books:

1. Alasdair Gilchrist "Industry 4.0: The Industrial Internet of Things", Apress, 2020, ISBN: 9781484220467.
2. Sudip Misra, Chandana Roy, Anadarup Mukherjee "Introduction to Industrial Internet of Things and Industry 4.0", CRC Press,2021, ISBN: 9780367897581.
3. Giacomo Veneri, Antonio Capasso "Hands on Industrial Internet of Things", Packt Press, 2021, ISBN NO: 978-1789537222.
4. Yashavant Kanetkar, Shrirang Korde, "IoT Experiments", BPB Publications, ISBN: 9789386551832, 2020.

Web Resources:

1. Introduction of IIoT: https://www.trendmicro.com/vinfo/in/security/definition/industrial-internet-of-things-iiot
2. IIoT Architecture : https://www.spiceworks.com/tech/iot/articles/what-is-iiot/
3. https://www.coretigo.com/what-is-the-industrial-internet-of-things-iiot-and-what-are-its-benefits/
4. https://azure.microsoft.com/en-us/solutions/iot/iot-technology-protocols
5. https://www.techtarget.com/iotagenda/definition/Industrial-Internet-of-Things-IIoT

Online Courses: NPTEL

1. Introduction to Industry 4.0 and Industrial Internet of Things, By Prof. Sudip Misra, IIT Kharagpur. https://nptel.ac.in/courses/106105195
2. ACM India Summer School on IoT and Embedded Systems, By prof. Debabrata Das, IIT Madras. https://archive.nptel.ac.in/courses/128/106/128106020/
3. Internet of Things (IoT) and Embedded Systems: By Prof. Sudip Misra, IIT Kharagpur. https://onlinecourses.nptel.ac.in/noc22_cs53/preview
4. Advanced Sensors and Transducers by Prof. Ankur Gupta, IIT Delhi. https://onlinecourses.nptel.ac.in/noc23_ee105/preview
5. Internet of Things (IoT) for Smart Cities, By Sudip Misra, IIT Kharagpur. https://onlinecourses.nptel.ac.in/noc23_cs82/preview

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Laboratory:

Oral examination will be based on the entire syllabus including, the practical performed during laboratory sessions.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 03 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading

Laboratory: (Term work)

Term work shall consist of minimum 8 experiments.

The distribution of marks for term work shall be as follows:

i. Laboratory work (Performance of Experiments): 15 Marks

ii. Mini Project (Implementation and Report): 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work, and upon fulfilling minimum passing criteria in the term work.

Prepared by **Checked by** **Head of the Department** **Vice Principal** **Principal**

Program: B.Tech. in Computer Science and Engineering(IoT and Cyber Security with Block Chain Technology)	Final Year	Semester: VIII
Course : Software Testing and Quality Assurance	Course Code: DJ19ICEC8013	
Course: Software Testing and Quality Assurance Laboratory	Course Code: DJ19ICEL8013	

Teaching Scheme (Hours / week)				Evaluation Scheme						
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)			Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average	
				75			25	25	25	100
				Laboratory Examination			Term work			
3	2	-	4	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal	Total Term work	50
				25	_	-	15	10	25	

Prerequisite:

Secure Software Engineering

Course Objectives: The objectives of the course are

1. Practices that support the production of quality software
2. Software testing techniques and quality models
3. Life-cycle models for requirements, defects, test cases, and test results
4. Process models for units, integration, system, and acceptance testing

Course Outcomes: On successful completion of this course learner will be able to

1. Use various Software testing techniques to produce quality software.
2. Design process models for units, integration, system, and acceptance testing
3. Construct and Analyze Control Flow Graphs and Data Flow Graph.
4. Apply System Testing and Functional Testing Techniques
5. Design and develop automated test case.
6. Identify various Quality Models

Detailed Syllabus		
Unit	Description	Duration
1	**Introduction** Software Quality, Role of testing, verification and validation, objectives and issues of testing, testing activities and levels, Sources of Information for Test Case Selection, Introduction to Testing techniques, Introduction to Testing strategies, Test Planning and Design, Monitoring and Measuring Test Execution, Test Tools and Automation, Test Team Organization and Management.	04

2	**System testing techniques and strategies** **Unit Testing:** Concept of Unit Testing, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Mutation Testing, Debugging, Unit Testing in eXtreme Programming **System Integration Testing** Concept of Integration Testing, Different Types of Interfaces and Interface Errors, Granularity of System Integration Testing, System Integration Techniques, Software and Hardware Integration, Test Plan for System Integration, Off-the-Shelf Component Integration: Off-the-Shelf Component Testing, Built-in Testing. **Acceptance Testing** Types of Acceptance Testing, Acceptance Criteria, Selection of Acceptance Criteria, Acceptance Test Plan, Acceptance Test Execution, Acceptance Test Report, Acceptance Testing in eXtreme Programming.	**08**
3	**Control Flow Testing** Outline of Control Flow Testing, Control Flow Graph, Paths in a Control Flow Graph, Path Selection Criteria: All-Path Coverage Criterion, Statement Coverage Criterion, Branch Coverage Criterion and PredicateCoverage Criterion, Generating Test Input, Examples of Test Data Selection. **Data Flow Testing** Data Flow Anomaly, Overview of Dynamic Data Flow Testing, Data Flow Graph, Data Flow Terms, Data Flow Testing Criteria, Comparison of Data Flow Test Selection Criteria, Feasible Paths and Test Selection Criteria, Comparison of Testing Techniques.	**07**
4	**System Test Categories** Basic Tests, Functionality Tests, Robustness Tests, Interoperability Tests, Performance Tests, Scalability Tests, Stress Tests, Load and Stability Tests, Reliability Tests, Regression Tests, Documentation Tests. **System Test Execution** Preparedness to Start System Testing, Metrics for Tracking System Test, Metrics for Monitoring Test Execution, Beta Testing, First Customer Shipment, System Test Report, Product Sustaining, MeasuringTest Effectiveness. **Functional Testing** Equivalence Class Partitioning, Boundary Value Analysis, Decision Tables, Random Testing, Error Guessing, Category Partition. **System Test Design** Test Design Factors, Requirement Identification, Characteristics of Testable Requirements, Test Design Preparedness Metrics, Test Case Design Effectiveness.	**08**
5	**System Test Planning and Automation** Structure of a System Test Plan, Introduction and Feature Description, Assumptions, Test Approach, Test Suite Structure, Test Environment, Test Execution Strategy, Test Effort Estimation, Scheduling and Test Milestones, System Test Automation, Evaluation and Selection of Test Automation Tools, Test Selection Guidelines for Automation, Characteristics of Automated Test Cases, Structure of an Automated Test Case, Test Automation Infrastructure	**06**

6	**Software Quality:** Five Views of Software Quality, McCall's Quality Factors and Criteria: Quality Factors, Quality Criteria, Relationship between Quality Factors and Criteria, Quality Metrics, ISO 9126 Quality Characteristics, ISO 9000:2000 Software Quality Standard : ISO 9000:2000 Fundamentals, ISO 9001:2000 Requirements	04
Total		**39**

List of Laboratory Experiments	
Sr. No.	**Title of Experiments**
1.	Prepare a test case verification document for a given scenario
2.	Detailed Test Plan in IEEE format for given case study
3.	White Box Testing on Units/Modules of specific application.
4.	Black Box Testing on Units/Modules of specific application
6.	To design test cases for given problem statement based on Decision Table Testing method
7.	To demonstrate Automation Software Testing with JUnit
8.	To demonstrate software Automation Testing with JMeter
9.	To use software Automation Testing tool WinRunner for GUI based application
10.	To study software Automation Testing tool WinRunner Creating Data-Driven Tests
11.	To use software Automation Testing tool Selenium with Java

Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.

Books Recommended:

Text books:

1. Kshirasagar Naik "Software Testing and Quality Assurance: Theory and Practice" , University of Waterloo,Priyadarshi Tripathy, Wiley, 2008.
2. Roger Pressman, "Software Engineering: A Practitioners Approach", McGraw-Hill , Publications,2011

Reference Books:

1. William Perry "Effective methods for Software Testing ", Wiley.
2. Paul C. Jorgensen "Software Testing - A Craftsman's Approach", CRC Press, 1995.
3. Rajnikant Puranik "The Art of Creative Destruction", SPD.
4. Srinivasan Desikan and Gopalaswamy Ramesh "Software Testing", Pearson Education 2006.
5. Louis Tamres "Introducing to Software Testing", Addison Wesley Publications, 1st Edition.
6. Glenford J. Myers, John Wiley & Sons "The Art of Software Testing", 1979.Edition.

7. Robert V. Binder, Addison Wesley ,"Testing Object-Oriented Systems: Models Patterns and Tools", 2000.
8. Boris Beizer ,Van Nostrand Reinhold , "Software Testing Techniques", 2nd Edition, 1990.
9. Daniel Galin, "Software Quality Assurance", Pearson Education, 2004.

Web Resources:

1. https://www.ibm.com/topics/software-testing
2. https://www.guru99.com/software-testing.html

Online Courses: NPTEL

1. Course on- Software Testing- https://onlinecourses.nptel.ac.in/noc22_cs61/preview

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Laboratory:

Oral examination will be based on the entire syllabus including, the practical performed during laboratory sessions.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 03 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading

Laboratory: (Term work)

Term work shall consist of minimum 8 experiments.

The distribution of marks for term work shall be as follows:

i. Laboratory work (Performance of Experiments): 15 Marks
ii. Journal documentation (Write-up and/or Assignments): 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work, and upon fulfilling minimum passing criteria in the term work.

Prepared by **Checked by** **Head of the Department** **Vice Principal** **Principal**

Program: Final Year (Common for All Programs)				Semester: VIII							
Course: Project Management				Course Code: DJ19ILO8021							
Teaching Scheme (Hours / week)				Evaluation Scheme							
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)				Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average		
				75			25	25	25		100
				Laboratory Examination			Term work			Total Term work	--
3	-	-	3	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal			
				-	–	-	–	-		–	

Prerequisite:

Basic concepts of Management

Course Objectives:

1. To familiarize the students with the use of a structured methodology/approach for every unique project undertaken, utilizing project management concepts, tools and techniques.
2. To appraise the students with the project management life cycle and make them knowledgeable about the various phases from project initiation through closure.

Course Outcomes: On completion of this course, learners will be able to

1. Explain project management life cycle and the various project phases as well as the role of project manager.
2. Apply selection criteria and select an appropriate project from different options.
3. Create a work breakdown structure for a project and develop a schedule based on it. Manage project risk strategically.
4. Use Earned value technique and determine & predict status of the project.
5. Capture lessons learned during project phases and document them for future reference.

Detailed Syllabus		
Unit	Description	Duration
1	**Project Management Foundation** Definition of a project, Project Vs Operations, Necessity of project management, Triple constraints, Project life cycles (typical & atypical) Project phases and stage gate process. Role of project manager, Negotiations and resolving conflicts, Introduction to project leadership, ethics in projects, Multicultural and virtual projects, Project management in various organization structures, PM knowledge areas as per Project Management Institute (PMI).	07

2	**Initiating Projects** How to get a project started, selecting project strategically, Project selection models (Numeric /Scoring Models and Non-numeric models), Project portfolio process, Project sponsor and creating charter, Effective project team, Stages of team. development & growth (forming, storming, norming & performing), team dynamics.	**08**
3	**Project Planning** Work Breakdown structure (WBS) and linear responsibility chart, Project cost estimation and budgeting, Top down and bottoms up budgeting. Networking and Scheduling techniques, PERT, CPM, Crashing project time, Resource loading and levelling, Goldratt's critical chain, GANTT chart, Project Stakeholders and Communication plan, Introduction to Project Management Information System (PMIS). Risk Management in projects: Risk management planning, Risk identification and risk register, Qualitative and quantitative risk assessment, Probability and impact matrix. Risk response strategies for positive and negative risks.	**10**
4	**Monitoring and Controlling Projects** Planning monitoring and controlling cycle, Information needs and reporting, engaging all stakeholders of the projects, communication and project meetings. With Earned Value Management techniques for measuring value of work completed, using milestones for measurement, change requests and scope creep, Project audit. Project Contracting Project procurement management, contracting and outsourcing.	**07**
5	**Closing the Project** Customer acceptance, Reasons of project termination, Various types of project terminations (Extinction, Addition, Integration, Starvation), Process of project termination, completing a final report, doing a lessons learned analysis, acknowledging successes and failures.	**07**
	Total	**39**

Books Recommended:

Text books:

1. Project Management: A managerial approach, Jack Meredith & Samuel Mantel, 7th Edition, Wiley India.
2. Project Management: The Managerial Process, 6th edition, Erik Larson, Clifford Gray, McGraw Hill Education.

Reference Books:

1. A Guide to the Project Management Body of Knowledge (PMBOK® Guide), 5th Ed. Project Management Institute PA, USA.
2. Project Management, Gido Clements, Cengage Learning.
3. Project Management, Gopalan, Wiley India.
4. Project Management, Dennis Lock, 9th Edition, Gower Publishing England.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 03 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Prepared by **Checked by** **Head of the Department** **Vice Principal** **Principal**

Program: Final Year (Common for All Programs)				Semester: VIII						
Course: Entrepreneurship Development and Management				Course Code: DJ19ILO8022						
Teaching Scheme (Hours / week)				Evaluation Scheme						
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)			Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average	
				75			25	25	25	100
				Laboratory Examination			Term work		Total Term work	--
3	-	-	3	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal		
				-	–	-	–	-	–	

Course Objectives:

1. To develop entrepreneurial abilities by providing background information about support systems, skill sets, financial and risk covering institutions.
2. To appraise the students with the fundamentals that can help them to make right decisions for

Course Outcomes: On completion of this course, learner will be able to

1. Develop idea generation, creative and innovative skills
2. Prepare a Business Plan
3. Compare different entrepreneur supporting institutions
4. Correlate suitable MSME scheme for an entrepreneur
5. Interpret financial and legal aspect of a business.

Detailed Syllabus		
Unit	Description	Duration
1	**Meaning of Entrepreneur** Evolution of the concept -Functions of an Entrepreneur-Types of Entrepreneurs Intrapreneur- an emerging class Concept of Entrepreneurship Evolution of Entrepreneurship Development of Entrepreneurship Entrepreneurial Culture Stages in entrepreneurial process Develop idea generation, creative and innovative skills	07
2	**Business Planning Process** Meaning of business plan Business plan process Advantages of business planning Marketing plan - Production/operations plan - Organization plan - Financial plan- Final Project Report with Feasibility Study - Preparing a model project report for starting a new venture.	08

3	**Institutions Supporting Entrepreneurs:** Small industry financing developing countries - A brief overview of financial institutions in India Central level and state level institutions - SIDBI-NABARD-IDBI-SIDCO - Indian Institute of Entrepreneurship System. District Industries Centers - Single Window	**07**
4	**Micro, Small, and Medium Enterprises (MSMES):** MSMEs - Definition and Significance in Indian Economy; MSME Schemes, Challenges and Difficulties in availing MSME Schemes, Forms of Business; Make-In India, Start-Up India, Stand-Up India. Women Entrepreneurship; Rural Entrepreneurship; Family Business and First-Generation Entrepreneurs	**08**
5	**Finance, Account, Costing and Legal Aspect of Business:** Funding new ventures Conventional Source of Finance bootstrapping, crowd sourcing- angel investors, VCs, debt financing, due diligence, Legal aspects of business (IPR, GST, Labour law)- Cost, volume, profit and break-even analysis - Margin of safetyand degree of operating leverage Capital budgeting for comparing projects or opportunities Product costing- Product pricing- Introduction to financial statements Profit & Loss statement Balance sheet - Cash flow-Closure of Business	**09**
	Total	**39**

Books Recommended:

Reference Books:

1. Effective Entrepreneurial Management: Strategy, Planning, Risk Management, and Organization - by Robert D. Hisrich Veland Ramadani, Springer Publication (2017)
2. Entrepreneurship-Theory, Process Practice -by Donald F.Kuratko, Cengage Learning(2014)
3. Entrepreneurship 6/E-by Robert D. Hisrich McGraw-Hill Education (India) (2011)
4. Entrepreneurship and small business- by Burns, P. New Jersey: Palgrave. (2001).
5. Innovation and entrepreneurship by Drucker. F. Peter, Harper business, (2006).
6. Entrepreneurship development small business enterprises, Poornima M Charantimath Pearson Publication (2013)
7. Entrepreneurial Development -Jayshree Suresh, Margham Publishers, Chennai
8. The Design of Business- by Martin Roger, Harvard Business Publishing (2009)
9. Entrepreneurship-by Roy Rajiv Oxford University Press (2011)

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Prepared by **Checked by** **Head of the Department** **Vice Principal** **Principal**

Program: Final Year (Common for All Programs)				Semester: VIII					
Course: Corporate Social Responsibility				Course Code: DJ19ILO8023					
Teaching Scheme (Hours / week)				Evaluation Scheme					
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)		Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average
				75			25	25	25
				Laboratory Examination			Term work		Total Term work
3	-	-	3	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal	
				-	-	-	-	-	-

Course Objectives:

1. To acquaint learners with the concept, theories, and application of CSR for the development of society
2. To impart an understanding of the international framework and legislations of CSR
3. To identify stakeholders and drivers of CSR

Course Outcomes: On completion of this course, learner will be able to

1. Describe the fundamental concepts of Corporate Social Responsibility (CSR)
2. Recognize the international framework for CSR to enable business decision-making which is informed by human values.
3. Explain CSR Legislation in India and the world
4. Relate the drivers of CSR in India
5. Identify the key stakeholders of CSR

Detailed Syllabus		
Unit	Description	Duration
1	**Introduction to CSR** Meaning and Definition, History of CSR, Concepts of Charity, Corporate philanthropy, Corporate Citizenship, Sustainability and Stakeholder Management. Environmental aspect of CSR Chronological evolution and Models of CSR in India Carroll's model Major codes on CSR Initiatives in India.	07
2	**International framework for Corporate Social Responsibility** Millennium Development Goals, Sustainable Development Goals, Relationship between CSR and MDGs. United Nations (UN) Global Compact 2011. UN guiding principles on business and human rights. OECD CSR policy tool, ILO tri-partite declaration of principles on multinational enterprises and social policy.	08

3	**CSR-Legislation in India and the World** Section 135 of Companies Act 2013.Scope for CSR Activities under Schedule VII, Appointment of Independent Directors on the Board, and Computation of Net Profit's Implementing Process in India.	08
4	**The Drivers of CSR in India** Market based pressure and incentives, civil society pressure, the regulatory environment in India Counter trends, Review of current trends and opportunities in CSR, Review of successful corporate initiatives and challenges of CSR. Case Studies of Major CSR Initiatives, Corporate Social Responsibility and Public-Private Partnership (PPP).	08
5	**Identifying key stakeholders of CSR** Role of Public Sector in Corporate, government programs, Nonprofit and Local Self Governance in implementing CSR, Global Compact Self-Assessment Tool, National Voluntary Guidelines by Govt. of India, Roles and responsibilities of corporate foundations.	08
	Total	39

Books Recommended:

Text books:

1. Corporate Social Responsibility in India, Sanjay K Agarwal, Sage Publications, 2008
2. Corporate Social Responsibility in India, Bidyut Chakrabarty, Routledge, New Delhi, 2015.

Reference Books:

1. Corporate Social Responsibility: An Ethical Approach, Mark S. Schwartz, Broadview Press, 2011
2. Attaining Sustainable Growth through Corporate Social Responsibility, George Pohle and Jeff
3. Hittner, IBA Global Business Services, 2008
4. Strategic Corporate Social Responsibility: Stakeholders in a Global Environment, William B.
5. Werther Jr. and David Chandler, 2nd Edition, Sage Publications, 2011

Web resources:

1. https://pitt.libguides.com/csr/websites
2. https://study.sagepub.com/sites/default/files/carroll.pdf
3. https://study.sagepub.com/sites/default/files/orlitzkysiegelwaldman.pdf

Online Courses: NPTEL

1. History, planning, implementation, evaluation, and development of the CSR cycle in profit making organizations. https://youtu.be/CpB5TehNia8?si=HPHgtIxMOuvoxHQ-
2. Evolution, theories, stakeholders, Corporate Governance and Citizenship https://youtu.be/VM_E0RRUe9I?si=JlcMuOasEqD7br4C

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Prepared by **Ch cked by** **Head of the Department** **Vice Principal** **Principal**

Program: Final Year (Common for All Programs)									Semester: VIII			
Course: Human Resource Management									Course Code: DJ19ILO8024			
Teaching Scheme (Hours / week)				Evaluation Scheme								
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)				Total marks (A+ B)	
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1		Term Test 2	Average		
				75			25		25	25	100	
				Laboratory Examination			Term work			Total Term work	--	
				Oral	Practical	Oral & Practical	Laboratory Work		Tutorial / Mini project / presentation/ Journal			
3	-	-	3	-	-	-	-		-	-		

Course Objectives:

1. To introduce the students with basic concepts, techniques and practices of the human resource management.
2. To provide opportunity of learning Human resource management (HRM) processes, related with the functions, and challenges in the emerging perspective of today's organizations.
3. To familiarize the students about the latest developments, trends & different aspects of HRM.
4. To acquaint the student with the importance of inter-personal & inter-group behavioral skills in an organizational setting required for future stable engineers, leaders and managers.

Course Outcomes: On completion of this course, learner will be able to

1. Understand the key concepts, aspects, techniques and practices of the human resource management.
2. Apply Principles of Organizational Behavior to analyze the impact of personality, perception, and motivation on individual behavior and decision-making within organizations.
3. Evaluate Group Dynamics and Team Effectiveness
4. Analyze Strategic HRM and Organizational Structure
5. Demonstrate knowledge of basic labor laws and current trends in HRM, including diversity management and the role of technology in shaping the future of work.

Detailed Syllabus

Unit	Description	Duration
1	**Introduction to HR** Human Resource Management- Concept, Scope and Importance, Interdisciplinary Approach Relationship with other Sciences, Competencies of HR Manager, HRM functions.Human resource development (HRD): changing role of HRM.Human resource Planning, Technological change, Restructuring and rightsizing. Empowerment, TQM, Managing ethical issues.	07
2	**Organizational Behaviour (OB)** Introduction to OB Origin, Nature and Scope of Organizational Behaviour, Relevance to Organizational Effectiveness and Contemporary issues. Personality: Meaning and Determinants of Personality, Personality development, Personality Types, Assessment of Personality Traits for Increasing Self Awareness. Perception: Attitude and Value, Effect of perception on Individual Decision-making. Attitude and Behaviour. Motivation: Theories of Motivation and their Applications for Behavioural Change (Maslow, Herzberg, McGregor); Group Behaviour and Group Dynamics: Work groups formal and informal groups and stages of group development, Team Effectiveness: High performing teams, Team Roles, cross functional and self-directed team. Case study.	08
3	**Organizational Structure & Design** Structure, size, technology, Environment of organization; Organizational Roles & conflicts: Concept of roles; role dynamics; role conflicts and stress. Leadership: Concepts and skills of leadership, Leadership and managerial roles, Leadership styles and contemporary issues in leadership. Power and Politics: Sources and uses of power, Politics at workplace, Tactics and strategies.	08
4	**Human resource Planning** Recruitment and Selection process, Job-enrichment, Empowerment-Job Satisfaction, employee morale. Performance Appraisal Systems: Traditional & modern methods, Performance Counselling. Career Planning. Training & Development: Identification of Training Needs, Training Methods. Strategic HRM: Role of Strategic HRM in the modern business world, Concept of Strategy, Strategic Management Process, Approaches to Strategic Decision Making: Strategic Intent-Corporate Mission, Vision, Objectives and Goals.	08
5	**Labor Laws & Industrial Relations:** Evolution of IR, IR issues in organizations, Overview of Labor Laws in India; Industrial Disputes Act, Trade Unions Act, Shops and Establishments Act. **Emerging Trends in HR** Organizational development; Business Process Re-engineering (BPR), BPR as a tool for organizational development, managing processes & transformation in HR. Organizational Change, Culture, Environment. Cross Cultural Leadership and Decision Making: Cross Cultural Communication and diversity at work, Causes of diversity, managing diversity with special reference to handicapped, women and ageing people, intra company cultural difference in employee motivation.	08
	Total	39

Books Recommended:

Reference Books:

1. Stephen Robbins, Organizational Behavior, 16th Ed, 2013
2. V SP Rao, Human Resource Management, 3rd Ed, 2010, Excel publishing
3. Aswathapa, Human Resource Management: Text & Cases, 6th edition,
4. C. B. Mamoria and SV Gankar, Dynamics of Industrial Relations in India, 15th Ed, 2015, Himalaya Publishing, 15thedition, 2015
5. P. Subba Rao, Essentials of Human Resource management and Industrial relations, 5th Ed, 2013, Himalaya Publishing
6. Laurie Mullins, Management & Organizational Behavior, Latest Ed, 2016, Pearson Publications

Web Resources:

1. Case studies and best practices in HRM: https://www.shrm.org/
2. Strategic HRM and HR practices: https://www.hr.com/en?t=/
3. Handbook of HRM: https://hrmhandbook.com/

Online Courses: NPTEL

1. Human Resource Development by Prof. KBL Srivastava from IIT Kharagpur
https://onlinecourses.nptel.ac.in/noc20_hs48/preview
2. **Management of Human Resources** by Dr. Nayantara Padhi from IGNOU
https://onlinecourses.swayam2.ac.in/nou20_mg02/preview

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, butwith internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Prepared by	Checked by	Head of the Department	Vice Principal	Principal

Program: Final Year (Common for All Programs)				Semester: VIII				
Course: Corporate Finance Management				Course Code: DJ19ILO8025				
Teaching Scheme (Hours / week)				Evaluation Scheme				
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)			Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average	
				75			25	25	25	100
				Laboratory Examination			Term work		Total Term work	--
3	-	-	3	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal		
				-	-	-	-	-	-	

Prerequisite:

1. Basic Knowledge of Algebra
2. Probability and Statistics.

Course Objectives:

1. Overview of Indian financial system, instruments and market.
2. Basic concepts of value of money, returns and risks, corporate finance, working capital and its management.
3. Knowledge about sources of finance, capital structure, dividend policy.

Course Outcomes: On completion of this course, learner will be able to

1. Understand Indian finance system.
2. Apply concepts of time value money and risk returns to product, services and business.
3. Understand corporate finance; evaluate and compare performance of multiple firms.
4. Take Investment, finance as well as dividend decisions.

Detailed Syllabus

Unit	Description	Duration
01	**Overview of Indian Financial System** Characteristics, Components and Functions of Financial System. Financial Instruments: Meaning, Characteristics and Classification of Basic Financial Instruments Equity Shares, Preference Shares, Bonds-Debentures, Certificates of Deposit, and Treasury Bills. Financial Markets: Meaning, Characteristics and Classification of Financial Markets - Capital Market, Money Market and Foreign Currency Market Financial Institutions: Meaning, Characteristics and Classification of Financial Institutions-Commercial Banks, Investment-Merchant Banks and Stock Exchanges	07

02	**Overview of Corporate Finance** Objectives of Corporate Finance; Functions of Corporate Finance Investment Decision, Financing Decision, and Dividend Decision. Financial Ratio Analysis: **Overview of Financial Statements** Balance Sheet, Profit and Loss Account, and Cash Flow Statement; Purpose of Financial Ratio Analysis; Liquidity Ratios; Efficiency or Activity Ratios; Profitability Ratios; Capital Structure Ratios: Stock Market Ratios; Limitations of Ratio Analysis	08
03	**Concepts of Returns and Risks** Measurement of Historical Returns and Expected Returns of a Single Security and a Two-security Portfolio; Measurement of Historical Risk and Expected Risk of a Single Security and a Two-security Portfolio. Time Value of Money: Future Value of a Lump Sum, Ordinary Annuity, and Annuity Due; Present Value of a Lump Sum, Ordinary Annuity, and Annuity Due; Continuous Compounding and Continuous Discounting.	07
04	**Working Capital Management** Concepts of Meaning Working Capital; Importance of Working Capital Management; Factors Affecting an Entity's Working Capital Needs; Estimation of Working Capital Requirements; Management of Inventories; Management of Receivables; and Management of Cash and Marketable Securities. Capital Budgeting: Meaning and Importance of Capital Budgeting; Inputs for Capital Budgeting Decisions; Investment Appraisal Criterion-Accounting Rate of Return, Payback Period, Discounted Payback Period, Net Present Value(NPV), Profitability Index, Internal Rate of Return (IRR), and Modified Internal Rate of Return (MIRR).	09
05	**Capital Structure** Factors Affecting an Entity's Capital Structure; Overview of Capital Structure Theories and Approaches Net Income Approach, Net Operating Income Approach; Traditional Approach, and Modigliani-Miller Approach. Relation between Capital Structure and Corporate Value; Concept of Optimal Capital Structure Dividend Policy: Meaning and Importance of Dividend Policy; Factors Affecting an Entity's Dividend Decision; Overview of Dividend Policy Theories and Approaches- Gordon's Approach, Walter's Approach, and Modigliani-Miller Approach	08
	Total	39

Books Recommended:

Reference Books:

1. Fundamentals of Financial Management, 13th Edition (2015) by Eugene F. Brigham and Joel F. Houston; Publisher: Cengage Publications, New Delhi.
2. Analysis for Financial Management, 10th Edition (2013) by Robert C. Higgins; Publishers: McGraw Hill Education, New Delhi.
3. Indian Financial System, 9th Edition (2015) by M. Y. Khan; Publisher: McGraw Hill Education, New Delhi.
4. Financial Management, 11th Edition (2015) by 1. M. Pandey; Publisher: S. Chand (G/L) & Company Limited, New Delhi.
5. Financial Management, Theory & Practice 8th Edition (2011), by Prasanna Chandra: Tata McGraw Hill Education Private Limited, New Delhi.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, butwith internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Consisting **One Class Tests for 25 marks** based on approximately 50% of contents and one case study with presentations for 25 Marks.
2. Total duration allotted for writing test paper is 1 hr.
3. Average of the marks scored in the tests and case study will be considered for final grading.

Prepared by **Checked by** **Head of the Department** **Vice Principal** **Principal**

Program: Final Year (Common for All Programs)				Semester: VIII							
Course: Logistics and Supply Chain Management				Course Code: DJ19ILO8026							
Teaching Scheme (Hours / week)				Evaluation Scheme							
				Semester End Examination Marks (A)			Continuous Assessment Marks(B)				Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average		
				75			25	25	25		100
				Laboratory Examination			Term work			Total Term work	--
				Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal			
3	-	-	3	-	–	-	–	-		–	

Course Objectives:

1. To acquaint with the concept of key drivers of supply chain performance and their inter-relationships with strategy.
2. To acquaint with the design problems and develop an understanding of information technology in supply chain optimization.
3. To acquaint with the complexity of inter-firm and intra-firm coordination in implementing programs such as e-collaboration, quick response, jointly managed inventories and strategic alliances.

Course Outcomes: On completion of this course, learner will be able to:

1. Demonstrate the functional strategy map of supply chain management.
2. Analyze the determinants of Supply Chain and Transportation networks design.
3. Demonstrate the need of coordination and sourcing decisions in supply chain.
4. Understand pricing, revenue management and role of IT in supply chain.
5. Gain knowledge of various sustainability aspects of a supply chain.

Detailed Syllabus		
Unit	Description	Duration
01	**Understanding the Supply Chain:** Objective, Importance, Decision Phases, Process Views. **Achieving Strategic Fit and Scope:** Competitive and Supply Chain Strategies, Achieving Strategic Fit, Expanding Strategic Scope, Challenges to Achieving and Maintaining Strategic Fit. **Supply Chain Drivers and Metrics:** Financial Measures of Performance, Drivers of Supply Chain Performance, Framework for Structuring Drivers, Facilities, Inventory, Transportation, Information, Sourcing, Pricing.	08

	Creating the Responsive Supply Chain: Product push versus demand pull, The Japanese philosophy, The foundations of agility, A route-map to responsiveness.	
02	**Designing the Supply Chain and Transportation Networks** **Designing Distribution Networks:** The Role of Distribution in the Supply Chain, Factors Influencing Distribution Network Design, Design Options for a Distribution Network. **Network Design in the Supply Chain:** The Role of Network Design in the Supply Chain, Factors Influencing Network Design Decisions, Framework for Network Design Decisions, Models for Facility Location and Capacity Allocation. **Designing Global Supply Chain Networks:** The Impact of Globalization on Supply Chain Networks, The Offshoring Decision: Total Cost, Risk Management in Global Supply Chains, Discounted Cash Flows, Evaluating Network Design Decisions Using Decision Trees. **Transportation in a Supply Chain:** The Role of Transportation in a Supply Chain, Modes of Transportation and their Performance Characteristics, Design Options for a Transportation Network, Trade-Offs in Transportation Design, Tailored Transportation.	**11**
03	**Coordination in a Supply Chain:** Lack of Supply Chain Coordination and the Bullwhip Effect, The Effect on Performance of Lack of Coordination, Obstacles to Coordination in a Supply Chain, Managerial Levers to Achieve Coordination, Continuous Replenishment and Vendor-Managed Inventories, Collaborative Planning, Forecasting, and Replenishment. **Sourcing Decisions in a Supply Chain:** The Role of Sourcing in a Supply Chain, In-House or Outsource, Third- and Fourth-Party Logistics Providers, Using Total Cost to Score and Assess Suppliers, Supplier Selection- Auctions and Negotiations, Contracts, Risk Sharing and Supply Chain Performance, Design Collaboration, The Procurement Process.	**07**
04	**Pricing and Revenue Management in a Supply Chain:** The Role of Pricing and Revenue Management in a Supply Chain, Pricing and Revenue Management for Multiple Customer Segments, Pricing and Revenue Management for Perishable Assets, Pricing and Revenue Management for Seasonal Demand, Pricing and Revenue Management for Bulk and Spot Contracts. **Information Technology in a Supply Chain:** The Role of IT in a Supply Chain, The Supply Chain IT Framework, Customer Relationship Management, Internal Supply Chain Management, Supplier Relationship Management, The Transaction Management Foundation, Managing the supply chain as a network, Seven major business transformations, From 3PL to 4PL. The Future of IT in the Supply Chain.	**08**
05	**Creating a Sustainable Supply Chain:** The Role of Triple Bottom Line, Key Metrics for Sustainability, Greenhouse gases and the supply chain, Reducing the transport-intensity of supply chains, Beyond the carbon footprint, Reduce, reuse, recycle, Sustainability and Supply Chain Drivers.**Introduction to the Supply Chain of the Future:** Emerging Megatrends.	**05**
	Total	**39**

Books Recommended:

Reference Books:

1. Logistics & Supply Chain Management, Martin Christopher, Pearson Education Limited, 2016.
2. Supply Chain Management Strategy, Planning, and Operation, Sunil Chopra and Peter Meindl, Pearson, 2016.
3. Essentials of Supply Chain Management, Michael H. Hugos, Wiley, 2018.
4. Supply Chain Management For Dummies, Daniel Stanton, Wiley, 2020.
5. Global Supply Chain and Operations Management A Decision-Oriented Introduction to the Creation of Value, Dmitry Ivanov, Alexander Tsipoulanidis and Jörn Schönberger, Springer International Publishing, 2016.
6. Supply Chain Management, Sinha, McGraw-Hill Education (India) Pvt Limited, 2012.

Web Resources

1. Supply chain case studies on cost reduction and management: https://www.logisticsbureau.com/7-mini-case-studies-successful-supply-chain-cost-reduction-and-management/
2. Detailed case study on Zara Clothing Company Supply chain: https://www.scmglobe.com/zara-clothing-company-supply-chain/
3. Latest research on supply chains from Harvard Business School on issues including supply chain management and digital supply chain: https://hbswk.hbs.edu/Pages/browse.aspx?HBSTopic=Supply%20Chain

Online Courses: NPTEL

1. **Supply Chain Digitization** by Prof. Priyanka Verma, IIM Mumbai https://onlinecourses.nptel.ac.in/noc24_mg59/preview
2. **Supply Chain Analytics** by Prof. Rajat Agrawal, IIT Roorkee https://onlinecourses.nptel.ac.in/noc21_mg12/preview

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Consisting of **Two Compulsory Class Tests for 25 marks**, First test based on approximately 40% of contents and second test based on remaining contents (approximately 40% but excluding contents covered in Test I)
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the tests will be considered for final grading.

Meelanjanthi — **Prepared by** | **Checked by** | **Head of the Department** | **Vice Principal** | **Principal**

Program: Final Year (Common for All Programs)										Semester :VIII	
Course : IPR and Patenting										Course Code: DJ19ILO8027	
Teaching Scheme (Hours / week)				Evaluation Scheme							
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)				Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average		
				75			25	25	25		100
				Laboratory Examination			Term work			Total Term work	--
3	-	-	3	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal			
				-	-	-	-	-		-	

Course Objectives:

1. Understanding, defining and differentiating different types of intellectual properties (IPs)
2. Assessing different IP management (IPM) approaches
3. Exposure to the Legal management of IP and understanding of real life practice of IPM.
4. Understanding post-grant processes related to Intellectual Property.

Course Outcomes: On completion of this course, learner will be able to

1. Recognize the crucial role of IP for the purposes of product and technology development.
2. Understand how and when to file a patent.
3. Apply the knowledge to understand the entire ecosystem.
4. Derive value from IP and leverage its value in new product and service development.
5. Identify appropriate Intellectual Property Right for a creation.

Detailed Syllabus

Unit	Description	Duration
1	**Concept of Intellectual Property Law** Idea/ Expression dichotomy, Introduction and the need for intellectual property right (IPR), Intellectual Property laws, IPR in India: Genesis and development, IPR abroad, Major International Instruments concerning Intellectual Property Rights: Paris Convention, the Berne Convention, the Universal Copyright Convention, the WIPO Convention, the Patent Cooperation Treaty, the TRIPS Agreement, incentive theory, Types of IPR, India's New National IP Policy, 2016, Govt. Schemes in IPR IP	6

2	**Patents and Trademarks** Elements of Patentability: Novelty, Non-Obviousness, Industrial Application, Non-Patentable Subject Matter, Registration Procedure, Rights and Duties of Patentee, Assignment and License, Restoration of Lapsed Patents, Surrender and Revocation of Patents, Infringement, Remedies & Penalties, Patent Office and Appellate Board, Case Study of Existing Patents related to software, healthcare, devices. Concept of Trademarks, Different Kinds of Marks: (Brand names, Logos, Signatures, Symbols, Well-known marks, Certification marks, Service marks), Non-Registrable Trademarks, Registration of Trademarks, Rights of Holder and Assignment and Licensing of Marks, Infringement, Remedies & Penalties, Trademarks Registry and Appellate Board.	11
3	**Copyrights and Design** Copyrights: Nature, Subject Matter: original literary, dramatic, musical, artistic works, cinematograph films and sound recordings, Registration Procedure, Term of protection, Ownership of copyright, Assignment and licence of copyright, Infringement, Remedies & Penalties, Related Rights, Distinction between related rights and copyrights. Design: Meaning and concept of novel and original, Procedure for registration, Effect of registration and term of protection.	9
4	**GI, PVP, and LDP** Geographical Indication (GI): Meaning, difference between GI and trademarks, procedure for registration, effect of registration, and term of protection. Plant Variety Protection (PVP): Meaning, benefit sharing, farmers' rights, procedure for registration, effect of registration, and term of protection. Layout Design Protection (LDP): Meaning, procedure for registration, effect of registration, and term of protection.	8
5	**Beyond IP** Introduction to Competition Law: concept of competition, relationship and interaction between IPR and competition law, IP and competition issues, Technology transfer agreements. EU experience with IP and Competition Law, Indian Competition Act and IPR protection, IPR issues in merger and acquisition, Harmonization of IP protection and competition Law in India	5
	Total	39

Books Recommended:

Text books:

1. Feroz Ali, The Law of Patents, LexisNexis.
2. Ronald D. Slusky, Invention Analysis and Claiming – A Patent Lawyer's Guide, Second Edition, American Bar Association, 2012.

3. Feroz Ali, The Touchstone Effect – The Impact of Pre-grant Opposition on Patents, LexisNexis, 2009.

Reference Books:

1. Innovation and entrepreneurship by Drucker. F. Peter, Harper business, (2006).
2. Intellectual Property Rights, Deborah. E. Bouchoux, Cengage Learning.
3. Intellectual Property Rights—Unleashmy The Knowledge Economy, Prabuddha Ganguli, Tate Mc Graw Hill Publishing Company Ltd.,
4. The Design of Business by Martin Roger, Harvard Business Publishing (2009)

Web resources:

1. Maps of Intellectual Property - https://cyber.harvard.edu/people/tfisher/IP/IPMaps.htm
2. The Patents Act, 1970 - https://ipindia.gov.in/acts-patents.htm
3. The Trademarks Act, 1957 - https://ipindia.gov.in/acts-rules-tm.htm
4. The Designs Act, 2000 - https://ipindia.gov.in/acts-designs.htm

Online Courses: NPTEL

1. Patent Drafting for Beginners, by Prof. Feroz Ali https://onlinecourses.nptel.ac.in/noc24_hs59/preview
2. Patent Law for Engineers and Scientists, by Prof. Feroz Ali https://onlinecourses.nptel.ac.in/noc24_hs155/preview
3. World Intellectual Property Organisation courses https://www.wipo.int/academy/en/

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Prepared by **Checked by** **Head of the Department** **Vice Principal** **Principal**

Shri Vile Parle Kelavani Mandal's

DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING

(Autonomous College Affiliated to the University of Mumbai)

NAAC Accredited with "A" Grade (CGPA : 3.18)

Program: Final Year (Common for All Programs)	Semester: VIII
Course: Digital Marketing Management	Course Code: DJ19ILO8028

Teaching Scheme (Hours / week)				Evaluation Scheme							
				Semester End Examination Marks (A)			Continuous Assessment Marks(B)				Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average		
				75			25	25	25		100
				Laboratory Examination			Term work				
				Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal	Total Term work		
3	-	-	3	-	–	-	–	-	–		--

Course Objectives:

1. To explain the evolution of digital marketing and outline the underlying technology and frameworks within which digital marketing operates.
2. To understand digital marketing business models elucidating on the six core digital value elements and how they can be used to generate customer value.
3. To understand the key concepts of developing strategy for digital business and the emerging business structures.
4. To plan the digital marketing strategy roadmap, its four key stages and their elements and understand the 6S Digital Marketing Implementation Stages.
5. To understand digital marketing planning & operations setup.
6. To explain the implementation of search campaigns which include Search Engine Marketing (SEM) and Search Engine Optimization (SEO) concepts.
7. To explain upcoming digital marketing concepts including Big Data and Internet of Things (IoT), Small and Medium Businesses (SMB), B2B marketing and Social, Local and Mobile (SoLoMo) concept.

Course Outcomes: On completion of this course, learner will be able to

1. Understand the digital marketing framework & model and consumer behaviour.
2. Develop digital marketing strategy roadmap.
3. Explain the terminology and concepts for developing web-specific media plans.
4. Understand concepts related to digital campaign management and revenue generation models.
5. Get a perspective on global digital marketing technology/tools and future trends.

Detailed Syllabus		
Unit	**Description**	**Duration**
1	**Emergence of Digital Marketing** Emergence of Digital Marketing as a tool, media consumption drivers for new marketing environment, applications and benefits of digital marketing. Digital Marketing Framework Delivering enhanced customer value, market opportunity analysis and digital services development, ASCOR framework, critical success factors for digital marketing. Digital Marketing Models Creation Factors impacting digital marketplace, value chain digitization, business models. The Consumer for Digital Marketing Consumer behavior on the internet, evolution of consumer behavior models, managing consumer demand, integrated marketing communications (IMC), impact of digital channels on IMC	07
2	**Digital marketing Strategy Development** Elements of assessment phase, macro-micro environmental analysis, marketing situation analysis. **Digital Marketing Internal Assessment and Objectives Planning** Analyzing present offerings mix, marketing mix, core competencies analysis and internal resource mapping. Digital presence analysis, digital marketing objectives development and review. **Digital Marketing Strategy Definition** Understanding digital business strategy and structures, consumer development strategy, offering mix for Digital, digital pricing models, managing promotional channels and eveloping the extended Ps- People, process, programs and performance. **Digital marketing Strategy Roadmap** Developing digital marketing strategy roadmap, the 6s digital marketing implementation strategy, marketing across the product life cycle.	12
3	**Digital Marketing Planning and Setup** Understanding digital media planning terminology and stages, steps to creating marketing communications strategy, introduction to search marketing, display marketing, social media marketing. **Digital Marketing Operations Setup** Basics of lead generation and conversion marketing, website content development and management, elements of user experience, web usability and evaluation.	07
4	**Digital marketing Execution** Basic elements of digital campaign management, search execution, display execution, social media execution, content marketing. **Digital marketing Execution Elements** Digital revenue generation models, managing service delivery and payments, managing digital implementation challenges like e commerce, internal & external and consumer specific challenges.	08

5	**Digital Business - Present and Future** Digital Marketing - Global Landscape, digital marketing overview global spend, advertising spend, and technology/tools landscape. Data technologies (Big data and IOT) impacting marketing, segment based digital marketing and SoLoMo - the next level of hyperlocal marketing.	05
	Total	39

Books Recommended:

Reference Books:

1. Fundamentals of Digital Marketing by Puneet Singh Bhatia, Pearson Education Limited
2. Digital Marketing by Seema Gupta- McGraw Hill Education.
3. Digital Marketing Excellence: Planning, Optimizing and Integrating Online Marketing by Dave Chaffey and P. R. Smith, 5 th edition, Taylor & Francis.
4. Digital Marketing: Strategy, Implementation and Practice- 6th edition by Dave Chaffey Fiona Ellis-Chadwick, Pearson Education Limited,
5. Digital marketing by Vandana Ahuja, Oxford University Press.
6. The Art of Digital Marketing by Ian Dodson, John Wiley & Sons.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, butwith internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Prepared by	Checked by	Head of the Department	Vice Principal	Principal

Program: Final Year (Common for All Programs)				Semester: VIII						
Course: Environmental Management				Course Code: DJ19ILO8029						
Teaching Scheme (Hours / week)				Evaluation Scheme						
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)			Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average	
				75			25	25	25	100
				Laboratory Examination			Term work		Total Term work	--
3	-	-	3	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal		
				-	–	-	–	-	–	

Prerequisites:

Knowledge of environmental science.

Course Objectives:

1. Understand and identify environmental issues relevant to India and global concerns
2. Learn concepts of ecology
3. Familiarize environment related legislations
4. Understand Environmental Auditing Procedures.

Course Outcomes: On completion of this course, learner will be able to

1. Understand and identify environmental issues relevant to India and global concerns
2. Learn concepts of ecology
3. Familiarize environment related legislations
4. Understand Environmental Auditing Procedures.

Detailed Syllabus		
Unit	Description	Duration
1	**Principles of Environmental management (EM):** Introduction of EM, Definition, Ecosystem concept, Participants in EM, Ethics and the environment, International Environmental Movement, Environmental issues relevant to India.	08
2	**Policy and Legal Aspects of EM:** Introduction to various Environmental Policies, Indian and International Environmental laws and legislation. EM system Standards: Core Elements, Benefits, Certification Body Assessment & Documentation for EMS, ISO-14000 Standards.	09
3	**Environmental Impact Assessment (EIA):-** Purpose, steps, hierarchy of EIA, Environmental Impact Statement and Impact Indicators, Evolution of IA in India and	09

	worldwide. Preliminary stages of EIA, Impact, Prediction, Evaluation and Mitigation.	
4	**Environmental Auditing (EA):-** Objectives, Scope and Types of EA, Audit Methodology, Elements of Audit Process, Auditing of EMS.	**06**
5	**Environmental Management Techniques:** Environmental Monitoring and Modelling, Environmental technology Assessment and Environmental Risk Assessment, Eco-mapping.	**07**
	Total	**39**

Books Recommended:

Text Books:

1. Environmental Management, T V Ramachandra and Vijay Kulkarni, TERI Press
2. Environmental Management: Principles and Practice, CJ Barrow, Routledge Publishers London, 1999

Reference Books:

1. A Handbook of Environmental Management Edited by Jon C. Lovett and David G. Ockwell, Edward Elgar Publishing
2. Indian Standard Environmental Management Systems Requirements with Guidance for Use, Bureau Of Indian Standards, February 2005
3. Environmental Management: An Indian Perspective, S N Chary and Vinod Vyasulu, Macmillan India, 2000
4. Introduction to Environmental Management, Mary K Theodore and Louise Theodore, CRC Press
5. Environment and Ecology, Majid Hussain, 3rd Ed. Access Publishing.2015

Evaluation Scheme:

Semester End Examination (A):

Theory

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, butwith internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Prepared by **Checked by** **Head of the Department** **Vice Principal** **Principal**

Program: Final Year (Common for All Programs)				Semester: VIII				
Course: Labour and Corporate Law				Course Code: DJ19ILO8030				
Teaching Scheme (Hours / week)				Evaluation Scheme				
				Semester End Examination Marks (A)	Continuous Assessment Marks (B)			Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory	Term Test 1	Term Test 2	Average	
				75	25	25	25	100
				Laboratory Examination			Term work	
3	-	-	3	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal	Total Term work	--
				-	-	-	-	-	-	

Course Objectives:

1. To understand the development and judicial setup of Labour Laws.
2. To learn the laws relating to Industrial Disputes, Social Security and Working conditions.
3. To analyse the laws related to corporate governance in different settings.
4. To develop awareness of legal principles involved in economic relationships and business transactions.
5. To develop an understanding of free enterprise system and legal safeguards of the same.

Course Outcomes: On completion of this course, learner will be able to:

1. Illustrate the role of trade union in the industrial setup.
2. Understand the important causes, impact of industrial disputes and settlement procedures.
3. To provide in-depth understanding of corporate social responsibility.
4. Apply concepts, principles and theories to understand simple business laws.
5. Analyse the principle of international business and strategies adopted by firms to expand globally

Detailed Syllabus		
Unit	Description	Duration
1	**Trade Unions and Collective Bargaining:** Trade Unionism in India, Definition of Trade Union and Trade Dispute, General and Political Funds of Trade Union, Civil and Criminal Immunities of Registered Trade Unions, Recognition of Trade Union, Collective Bargaining	09
2	**Industrial Dispute and Instruments of Economic Coercion**: Industrial Dispute and Individual Dispute, Settlement of Industrial Dispute. Concept of strike Gherao, Bandh and Lock-out, Types of Strike Rights to Strike and Lock-out	08

3	**Formation of a Company and Corporate governance:** Company and Other Forms of Business Organizations, Different Kinds of Company: One Person Company, Foreign Company. Kinds of Company Meetings and Procedure Powers, Duties and Kinds of Director: Independent Director, Women Director Different Prevention of Oppression and Mismanagement Investor Protection, Insider Trading, Corporate Fraud.	08
4	**Corporate Social Responsibility and Corporate Liquidation:** Evolution of Corporate Social Responsibility, Corporate Criminal liability, Corporate Environmental Liability Different Types of Winding up of Company, Role of Courts in Winding up of Company Merger and Acquisition of Company, Cross Border Merger, Takeover Code: Role of SEBI	08
5	Case Studies on A) Labour law B) Labour relations C) Corporate laws D) Securities laws	08
	Total	39

Books Recommended:

Reference Books:

1. Surya Narayan Misra, An Introduction to Labour and Industrial Law, Allahabad Law Agency, 1978
2. Indian Law Institute, Cases and Materials on Labour Law and Labour Relations
3. P.L. Malik, Industrial Law, Eastern Book Company, 2013
4. S.C. Srivastava, Industrial Relations and Labour Law, Vikas Publishing House, New Delhi
5. C.A. Kamal Garg, Bharat's Corporate and Allied Laws, 2013.
6. Institute of Company Secretaries of India, Companies Act 2013, CCH Wolter Kluver Business, 2013
7. Saleem Sheikh & William Rees, Corporate Governance & Corporate Control, Cavendish Publishing Ltd., 1995
8. Taxmann, A Comparative Study of Companies Act 2013 and Companies Act 1956

Evaluation Scheme:

Semester End Examination (A):

Theory

1. Question paper based on the entire syllabus will comprise of 5 questions (All compulsory, but with internal choice as appropriate), each carrying 15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory

1. Two term tests of 25 marks each will be conducted during the semester, out of

which one will be a compulsory term test (on minimum 02 Modules) and the other can either be a termtest or an assignment on live problems or a course project.

2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in the two tests will be considered for final grading.

Prepared by	Checked by	Head of the Department	Vice Principal	Principal

Program: B.Tech. in Computer Science and Engineering (IoT and Cyber Security with Block Chain Technology)										Final Year	Semester: VIII
Course: Project Stage II										Course Code: DJ19ICP803	
Teaching Scheme (Hours / week)				Evaluation Scheme							
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)				Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Average		
				-			-	-	-		-
				Laboratory Examination			Term work		Total Term work		
				Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal			
-	10	-	5	-	-	100	-	-	100		200

Course Objectives:

The primary objective is to meet the milestones formed in the overall project plan decided in Project Stage I. The idea presented in Project Stage I should be implemented in Project Stage II with results, conclusion and future work. The project will culminate in the production of a thesis by each individual student.

Guidelines:

Project Report Format: At the end of semester a student need to prepare a project report as per the guidelines. Along with project report a storage drive containing: project documentation, Implementation code, required utilities, Softwares and user manuals need to be attached.

Evaluation Scheme:

Semester End Examination (A)

Laboratory

- Oral and Practical examination of Project stage II should be conducted by Internal and External examiners.
- Students have to give presentation and demonstration on the project

Continuous Assessment (B)

Laboratory: (Term work)

The distribution of marks for term work shall be as follows:

1. Weekly Attendance on Project Day
2. Project work contribute
3. Mid-Sem Review
4. Project Report
5. Term End Presentation
6. Technical Paper/Patent publication

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory workand upon fulfilling minimum passing criteria in the term work.

Prepared by	Checked by	Head of the Department	Vice Principal	Principal