Shri Vile Parle Kelavani Mandal's

Dwarkadas J. Sanghvi College of Engineering

(Autonomous College Affiliated to the University of Mumbai)

Course Structure and Syllabus

of

Final Year B.Tech

in

Computer Engineering

Prepared by:- Board of Studies in Computer Engineering

Recommended by:- Academic Council of D. J. Sanghvi College of Engineering

Approved by:- Governing Body of D. J. Sanghvi College of Engineering

Revision: 1 (2019)

With effect from the Academic Year: 2022-2023

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)

Scheme for Fourth Year B.Tech. Program in Computer Engineering : Semester VII (Autonomous)
(Academic Year 2022-2023)

Semester VII

Sr	Course Code	Course	Teaching Scheme				Semester End Examination (A)						Continuous Assessment (B)					Aggregate (A+B)	Credits earned	
			Theory (hrs.)	Practical (hrs.)	Tutorial (hrs.)	Credits	Duration (Hrs)	Theory	Oral	Pract	Oral & Pract	End Sem Exam Total	Term Test 1 (TT1)	Term Test 2 (TT2)	Avg (TT1 & TT2)	Termwork	CA Total			
1	DJ19CEC701	Digital Signal Processing and Applications	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	**4**
	DJ19CEL701	Digital Signal Processing and Applications Laboratory	--	2	--	1	2	--	25	--	--	25	--	--	--	25	25	50	1	
2	DJ19CEC702	Distributed Computing	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	**4**
	DJ19CEL702	Distributed Computing Laboratory	--	2	--	1	2	--	25	--	--	25	--	--	--	25	25	50	1	
3@	DJ19CEEC7011	Deep Learning	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	**4**
	DJ19CEEL7011	Deep Learning Laboratory	--	2	--	1	2	--	25	--		25	--	--	--	25	25	50	1	
	DJ19CEEC7012	Blockchain Technology	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19CEEL7012	Blockchain Technology Laboratory	--	2	--	1	2	--	25	--	--	25	--	--	--	25	25	50	1	
	DJ19CEEC7013	Predictive Modeling	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19CEEL7013	Predictive Modeling Laboratory	--	2	--	1	2	--	25	--	--	25	--	--	--	25	25	50	1	
4#	DJ19ILO7011	Product Life Cycle Management	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	**3**
	DJ19ILO7012	Management Information System	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO7013	Operations Research	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO7014	Cyber Security and Laws	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO7015	Personal Finance Management	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO7016	Energy Audit and Management	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO7017	Disaster Management and Mitigation Measures	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO7018	Science of Well-being	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO7019	Research Methodology	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO7020	Public Systems and Policies	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
5	DJ19CEP703	Project-Stage I	--	4	--	2	2	--	50	--	--	50	--	--	--	50	50	100	2	**2**
		Total	**12**	**10**	**0**	**17**	**20**	**300**	**125**	--	--	**425**	**100**	**100**	**100**	**125**	**225**	**650**	**17**	**17**

@ Any 1 Elective Course

Any 1 Institute Professional Elective

Prepared by: **HoD**

Name and Signatures (with date) **Department of Computer Engineering** **Vice-Principal** **Principal**

Checked By

Shri Vile Parle Kelavani Mandal's
DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
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Scheme for Fourth Year B.Tech. Program in Computer Engineering : Semester VIII (Autonomous)
(Academic Year 2022-2023)

Semester VIII

Sr	Course Code	Course	Teaching Scheme				Semester End Examination (A)						Continuous Assessment (B)					Aggregate (A+B)	Credits earned	
			Theory (hrs.)	Practical (hrs.)	Tutorial (hrs.)	Credits	Duration (Hrs)	Theory	Oral	Pract	Oral & Pract	End Sem Exam Total	Term Test 1 (TT1)	Term Test 2 (TT2)	Avg (TT1 & TT2)	Termwork / Term Work Total	CA Total			
1	DJ19CEC801	Web Intelligence	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	4
	DJ19CEL801	Web Intelligence Laboratory	--	2	--	1	2	--	25	--	--	25	--	--	--	25	25	50	1	
2	DJ19CEC802	High Performance Computing	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	4
	DJ19CEL802	High Performance Computing Laboratory	--	2	--	1	2	--	25	--	--	25	--	--	--	25	25	50	1	
3@	DJ19CEEC8011	Natural Language Processing	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	4
	DJ19CEEL8011	Natural Language Processing Laboratory	--	2	--	1	2	--	25	--	--	25	--	--	--	25	25	50	1	
	DJ19CEEC8012	Software Architecture	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19CEEL8012	Software Architecture Laboratory	--	2	--	1	2	--	25	--	--	25	--	--	--	25	25	50	1	
	DJ19CEEC8013	Software Testing and Quality Assuarance	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19CEEL8013	Software Testing and Quality Assuarance Laboratory	--	2	--	1	2	--	25	--	--	25	--	--	--	25	25	50	1	
4#	DJ19ILO8021	Project Management	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	3
	DJ19ILO8022	Entrepreneurship Development and Management	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO8023	Corporate Social Responsibility	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO8024	Human Resource Management	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO8025	Corporate Finance Management	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO8026	Logistic and Supply Chain Management	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO8027	IPR and Patenting	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO8028	Digital Marketing Management	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO8029	Environmental Management	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
	DJ19ILO8030	Labour and Corporate Law	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	
5	DJ19CEP803	Project Stage - II	--	10	--	5	2	--	--	--	100	100	--	--	--	100	100	200	5	5
		Total	**12**	**16**	**0**	**20**	**20**	**300**	**75**	**0**	**100**	**475**	**100**	**100**	**100**	**175**	**275**	**750**	**20**	**20**

@ Any 1 Elective Course

Any 1 Institute Professional Elective

Prepared by: **HoD**

Name and Signatures (with date) **Department of Computer Engineering** **Vice-Principal** **Principal**

Checked By

Name and Signatures (with date)

<table>
<tr><td colspan="5">Program: Final Year B.Tech. in Computer Engineering</td><td colspan="5">Semester: VII</td></tr>
<tr><td colspan="5">Course: Project-Stage I</td><td colspan="5">Course Code: DJ19CEP703</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
(Hours / week)</td><td colspan="9">Evaluation Scheme</td></tr>
<tr><td colspan="3">Semester End Examination Marks (A)</td><td colspan="4">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="3">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
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<tr><td colspan="3">Laboratory Examination</td><td colspan="3">Term work</td><td rowspan="2">Total Term work</td><td rowspan="3">100</td></tr>
<tr><td>-</td><td>4</td><td>-</td><td>2</td><td>Oral</td><td>Practical</td><td>Oral &Practical</td><td>Laboratory Work</td><td>Tutorial / Mini project / presentation/ Journal</td></tr>
<tr><td colspan="4"></td><td>50</td><td>-</td><td>-</td><td>-</td><td>-</td><td>50</td></tr>
</table>

Course Objectives:

The Project work enables students to develop further skills and knowledge gained during the program by applying them to the analysis of a specific problem or issue, via a substantial piece of work carried out over an extended period. For students to demonstrate proficiency in the design of a research project, application of appropriate research methods, collection and analysis of data and presentation of results.

Guidelines:

1. Project Topic:

- To proceed with the project work it is very important to select a right topic. Project can be undertaken on any subject addressing the programme. Research and development projects on problems of practical and theoretical interest should be encouraged.
- Project work must be carried out by the group of at least two students and maximum three and must be original.
- Students can certainly take ideas from anywhere, but be sure that they should evolve them in the unique way to suit their project requirements.
- The project work can be undertaken in a research institute or organization/company/any business establishment.
- Student must consult internal guide along with external guide (if any) in selection of topic.
- Head of department and senior staff in the department will take decision regarding selection of projects.

- Student has to submit weekly progress report to the internal guide and whereas internal guide has to keep track on the progress of the project and also has to maintain attendance report. This progress report can be used for awarding term work marks.
- In case of industry projects, visit by internal guide will be preferred.

2. Project Report Format:

At the end of semester, a project report should preferably contain at least following details: -

- Abstract
- Introduction
- Literature Survey
  - Survey Existing system
  - Limitation Existing system or research gap
  - Problem Statement and Objective
  - Scope
- Proposed System
  - Analysis/Framework/ Algorithm
  - Details of Hardware & Software o
  - Design details
  - Methodology (your approach to solve the problem)
- Implementation Plan for next semester
- Conclusion
- References

Evaluation Scheme:

Semester End Examination (A):

Laboratory:

- Oral examination of Project Stage-I 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

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 Principal

<table>
<tr><td colspan="8">Program: Final Year B.Tech. in Computer Engineering</td><td colspan="4">Semester : VII</td></tr>
<tr><td colspan="8">Course : Digital Signal Processing and Applications</td><td colspan="4">Course Code: DJ19CEC701</td></tr>
<tr><td colspan="8">Course : Digital Signal Processing and Applications Laboratory</td><td colspan="4">Course Code: DJ19CEL701</td></tr>
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<tr><td>25</td><td>-</td><td>-</td><td>15</td><td>10</td><td>25</td></tr>
</table>

Pre-requisite: Engineering Mathematics-III, Engineering Mathematics- IV

Course Objectives:

1. To understand the fundamental concepts of signal processing and applications.
2. To develop a thorough understanding of DFT and FFT and their applications.
3. To apply image enhancement techniques.
4. To apply image segmentation techniques

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

1. Understand concept of digital signal processing and applications
2. Classify and analyze discrete time signals and systems
3. Apply the efficient computing algorithms of DFT and FFT in finding the response of the system.
4. Use the enhancement techniques for digital Image Processing
5. Apply digital image processing techniques for edge detection

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Discrete-Time Signal and Discrete-Time System** 1.1 Introduction to Digital Signal Processing, Sampling and Reconstruction, Standard DT Signals, Concept of Digital Frequency, Representation of DT signal using Standard DT Signals, Signal Manipulations (shifting, reversal, scaling, addition, multiplication). 1.2 Classification of Discrete-Time Signals, Classification of Discrete Systems 1.3 Linear Convolution formulation for 1-D and 2-D signal (without mathematical proof), Circular Convolution (without mathematical proof), Linear convolution using Circular Convolution. Auto and Cross Correlation formula evaluation, LTI system, Concept of Impulse Response and Step Response, Output of DT system using Time Domain Linear Convolution.	10
2	**Discrete Fourier Transform** 2.1 Introduction to DTFT, Relation between DFT and DTFT, DFT of DT signal, Inverse DFT. 2.2 Properties of the DFT: Scaling and Linearity, Symmetry for real valued signal, Periodicity, Time Shift and Frequency Shift, Time Reversal, Convolution Property and Parsevals Energy Theorem. **Fast Fourier Transform** 2.3 Fast Fourier Transform: Need of FFT, Radix-2 DIT-FFT algorithm 2.4 Flow graph for N=4 and 8 using Radix-2 DIT-FFT, Inverse FFT algorithm, Comparison of complex and real, multiplication and additions of DFT and FFT	10
3	**DSP Algorithms** 3.1 Fast Circular Convolution Algorithm, Fast Linear Convolution Algorithm. 3.2 Linear FIR filtering using Overlap Add Algorithm and Overlap Save Algorithm and implementation using FFT **DSP Application** 3.3 Audio and speech processing, statistical signal processing, digital image processing, data compression, video coding, audio coding, image compression, signal processing for telecommunications	04
4	**Digital Image Fundamentals** 4.1 Introduction to Digital Image, Digital Image Processing System, Sampling and Quantization 4.2 Representation of Digital Image, Connectivity, Image File Formats: BMP, TIFF and JPEG	04
5	**Spatial Domain Filtering** 5.1 Intensity transformations, contrast stretching, histogram equalization, 5.2 Smoothing filters, sharpening filters, gradient and Laplacian **Frequency Domain Filtering** 5.3 Hotelling/KL Transform, 2D Fourier Transform, Discrete Cosine Transform, Discrete Sine Transform **Image Compression**	09

	5.4 Fundamentals of compression, The JPEG compression algorithm	
6	**Image Segmentation** Boundary detection-based techniques, Point, line detection, Edge detection, Edge linking, local processing, regional processing, Hough transform, Thresholding, Iterative thresholding, Otsu's method, moving averages, Multivariable thresholding, Region based segmentation, Watershed algorithm, Use of motion in segmentation	07

Books Recommended:

Text Books:

1. John G. Proakis, Dimitris and G.Manolakis, _Digital Signal Processing: Principles, Algorithms, and Applications‘ 4th Edition 2007, Pearson Education.

2. A. Anand Kumar, Digital Signal Processing‘, PHI Learning Pvt. Ltd., 2nd edition , 2015.

3. Rafel C. Gonzalez and Richard E. Woods, _Digital Image Processing‘, Pearson Education Asia,4th Edition, 2018,

4. S. Sridhar, Digital Image Processing‘, Oxford University Press, Second Edition, 2016.

Reference Books:

1. Sanjit Mitra, Digital Signal Processing: A Computer Based Approach‘, TataMcGraw Hill, 3rd Edition.2007

2. S. Salivahanan, A. Vallavaraj, and C. Gnanapriya, Digital Signal Processing‘ Tata McGraw Hill Publication 1st Edition , 2010.

3. S. Jayaraman, E. Esakkirajan and T. Veerkumar, Digital Image Processing‘ TataMcGraw Hill Education Private Ltd, 2009.

4. Anil K. Jain, Fundamentals and Digital Image Processing‘, Prentice Hall of India Private Ltd, 3rd Edition.,2008

Online Resources

1. **NPTEL**

   Digital Image Processing, By Prof. Prabir Kumar Biswas, IIT Kharagpur

   https://nptel.ac.in/courses/117/105/117105135/

Suggested List of Experiments:

Sr. No.	Title of Experiments
1	Sampling and Reconstruction
2	To perform Discrete Correlation and convolution
3	To perform Discrete Fourier Transform
4	To perform Fast Fourier Transform
5	Implementation of Image negative, Gray level Slicing and Thresholding
6	Implementation of Contrast Stretching, Dynamic range compression & Bit plane Slicing
7.	Implementation of Histogram Processing
8.	Apply DFT, DCT and DST transforms on the image
9.	Implementation of Image smoothing/ Image sharpening
10.	Implementation of Edge detection using Sobel and Prewitt masks
11.	Suggested Mini Projects based on content of the syllabus. (Group of 2-3 students) [Real life Applications/problems]. • License plate recognition • Face Emotion recognition • Face recognition • Cancer detection • Object detection • Pedestrian detection • Lane detection • Blind assistance systems • Face Mask Detection • ECG signals analysis • Speech Pitch Detection • Audio Steganography • Audio Fingerprinting • Beat Tracking • Audio source separation

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus, summing up to 75 marks.

2. Total duration allotted for writing the paper is 3 hrs.

Laboratory:

1. Oral examination will be based on the entire syllabus including, the practical's 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 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.

Laboratory: (Term work)

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

i. Experiments and Mini Project work (Design and Implementation): 15 Marks
ii. Documentation (Journal 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.

<table>
<tr><td colspan="8">Program: Final Year B.Tech. in Computer Engineering</td><td colspan="3">Semester : VII</td></tr>
<tr><td colspan="8">Course : Distributed Computing</td><td colspan="3">Course Code: DJ19CEC702</td></tr>
<tr><td colspan="8">Course : Distributed Computing Laboratory</td><td colspan="3">Course Code: DJ19CEL702</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
(Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
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<tr><td>25</td><td>-</td><td>-</td><td>15</td><td>10</td><td>25</td></tr>
</table>

Pre-requisite: Java Programming, Operating systems, Computer Network

Course Objectives:

1. To provide students with contemporary knowledge in distributed systems

2. To equip students with skills to analyze and design distributed applications.

3. To provide master skills to measure the performance of distributed synchronization algorithms

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

1. Demonstrate knowledge of the basic elements and concepts related to distributed system technologies;

2. Illustrate the middleware technologies that support distributed applications such as RPC, RMI and Object based middleware.

3. Analyse the various techniques used for clock synchronization and mutual exclusion

4. Demonstrate the concepts of Resource and Process management and synchronization algorithms

5. Demonstrate the concepts of Consistency and Replication Management

6. Apply the knowledge of Distributed File System to analyse various file systems like NFS, AFS and the experience in building large-scale distributed applications.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	Introduction to Distributed Systems 1.1 Characterization of Distributed Systems: Issues, Goals, and Types of distributed systems, Distributed System Models, Hardware concepts, Software Concept. 1.2 Middleware: Services offered by middleware, Client Server model.	**4**
2	Communication 2.1 Layered Protocols, Interprocess communication (IPC): MPI, Remote Procedure Call (RPC), Remote Object Invocation, Remote Method Invocation (RMI) 2.2 Message Oriented Communication, Stream Oriented Communication, Group Communication	**8**
3	Synchronization 3.1 Exclusion, Distributed Mutual Exclusion-Classification of mutual Exclusion Algorithm, Requirements of Mutual Exclusion Algorithms, Performance measure. 3.2 Non Token based Algorithms: Lamport Algorithm, Ricart–Agrawala‘s Algorithm, Maekawa‘s Algorithm 3.3 Token Based Algorithms: Suzuki-Kasami‘s Broardcast Algorithms, Singhal‘s Heurastic Algorithm, Raymond‘s Tree based Algorithm, Comparative Performance Analysis.	**8**
4	Resource and Process Management 4.1 Desirable Features of global Scheduling algorithm, Task assignment approach, Load balancing approach, load sharing approach, Classification of Static and Dynamic Load Balancing algorithms, Comparison of LBA. 4.2 Introduction to process management, process migration, Threads	**8**
5	Consistency, Replication and Fault Tolerance 5.1 Introduction to replication and consistency, Data-Centric and Client-Centric Consistency Models, Replica Management 5.2 Fault Tolerance: Introduction, Process resilience, Reliable client-server and group communication, Recovery	**7**
6	Distributed File Systems 6.1 Introduction and features of DFS, File models, File Accessing models, File-Caching Schemes, File Replication, 6.2 Case Study: Distributed File Systems (DFS), Network File System (NFS), Andrew File System (AFS) 6.3 Trends in Distributed Computing: Edge Computing, Cloud Computing, Fog Computing	**7**

Books Recommended:

Text books:

1. Andrew S. Tanenbaum and Maarten Van Steen, ―Distributed Systems: Principles and Paradigms, 2nd edition, Pearson Education.

2. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems: Concepts and Design", 4th Edition, Pearson Education, 2005.

Reference Books:

1. A. S. Tanenbaum and M. V. Steen, "Distributed Systems: Principles and Paradigms", Second Edition, Prentice Hall, 2006.

2. M. L. Liu, ―Distributed Computing Principles and Applications‖, Pearson Addison Wesley, 2004.

Suggested List of Experiments:

Sr. No.	Title of Experiments
1	Client/server using RPC/RMI.
2	Inter-process communication
3	Group Communication
4	Load Balancing Algorithm
5	Name Resolution protocol
6	Election Algorithm
7	Clock Synchronization algorithms
8	Deadlock management in Distributed systems
9	Distributed File System
10	Suggested Mini Projects based on content of the syllabus. (Group of 2-3 students) 1) The Global Name Service 2) Designing Distributed Systems: Google Case Study 3)The X.500 Directory Service 4) Facebook Distributed file system 5) Design And Development Of The Data Synchronization/Clock Synchronization 6) Any real world application of Distributed Computing

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Laboratory:

1. Oral examination will be based on the entire syllabus including, the practical's 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 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.

Laboratory: (Term work)

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 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.

Program: Final Year B.Tech. in Computer Engineering	Semester : VII
Course: Deep Learning	Course Code: DJ19CEEC7011
Course: Deep Learning Laboratory	Course Code: DJ19CEEL7011

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	Avg.		
				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		

Pre-requisite: Artificial Intelligence, Machine Learning

Course Objective:

1. To understand Hyper parameter Tuning
2. To explore Deep Learning Techniques with different learning strategies
3. To design Deep Learning Models for real time applications

Course Outcomes (CO): At the End of the course, students will be able to

1. Understand and Apply Hyper parameters Tuning
2. Interpret working of deep learning models
3. Create Deep learning Models for real-world problems
4. Investigate suitable deep learning algorithms for various applications.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Introduction to Deep Learning:** Overview of Neural Network, Deep learning and human brain, Why is Deep Learning taking off?, Deep Learning applications Overview of Tools: Torch, TensorFlow, Keras,	04
2	**Hyperparameter Tuning, Batch Normalization** Tuning Process, Using an Appropriate Scale to pick Hyperparameters, Hyperparameters Tuning in Practice: Pandas vs. Caviar, Normalizing Activations in a Network, Fitting Batch Norm into a Neural Network, why does Batch Norm work, Batch Norm at Test Time	05
3	**Convolutional Neural Network:** Introduction to CNNs, Kernel filter, Principles behind CNNs, Multiple Filters, CNN applications **ConvNet Architectures** Discussions on famous convnet architectures: AlexNet, VGG, GoogLeNet, ResNet	09
4	**Recurrent Neural Networks:** Introduction to Sequence Models and RNNs, Recurrent Neural Network Model, Backpropagation Through Time, Different Types of RNNs: Unfolded RNNs, Seq2Seq RNNs, Long Short-Term Memory (LSTM), Bidirectional RNN, Vanishing Gradients with RNNs, Gated Recurrent Unit (GRU), RNN applications	10
5	**Adversarial Networks** Introduction to adversarial Networks, Auto encoders (standard, denoising, contractive, etc.), Vibrational Auto encoders, Generative Adversarial Networks, Applications of Adversarial Networks	10
6	**Deep Learning Case Studies:** Image Processing, Natural Language Processing, Speech Recognition, Video Analytics	04

Books Recommended:

Text Book

1. Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016.
2. Umberto Michelucci , Advanced Applied Deep Learning: Convolutional Neural Networks and Object Detection, 2019
3. Neural Networks and Deep Learning, Michael Nielsen (Goodreads Author)
4. TensorFlow 1.x Deep Learning Cookbook, Gulli and Kapoor, Packt, 2017

Reference Books

1. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.
2. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education, 2004.
3. Neural Networks: A Systematic Introduction, Raúl Rojas, 1996
4. David Foster, Generative Deep Learning: Teaching Machines to Paint, Write, Compose, and Play O'Relly
5. Maxim Lapan , Deep Reinforcement Learning HandsOn: Apply modern RL methods, with deep Q-networks, value iteration, policy gradients, TRPO, AlphaGo Zero and more, Packt 2018
6. SantanuPattanaya K, Pro Deep Learning with TensorFlow A Mathematical Approach to Advanced Artificial Intelligence in Python, APress

Online Resources

1. **NPTEL:**

   Deep Learning, By Prof. Prabir Kumar Biswas, IIT Kharagpur

   https://onlinecourses.nptel.ac.in/noc22_cs22/preview

2. **Coursera:**

   Deep Learning Specilization, By DeepLearning.AI

   https://www.coursera.org/specializations/deep-learning#courses

Suggested List of Experiments:

Sr. No.	Title of the Experiment
1	Building own Neural Network from scratch
2	To implement EBPTA algorithm.
3	Understanding ANN using Tensor Flow
4	Visualizing Convolutional Neural Network using Tensor Flow with Keras Data.
5	Object detection using RNN using Tensor Flow
6	Students are supposed to complete any one mini project not limited to following list of projects. 1. Sequence Prediction 2. Object Detection 3. Traffic Sign Classification 4. Automatic Music Generation 5. Music Genre Classification 6. Text Summarizer 7. Gender and Age Detection Using Voice 8. Chatbot Using Deep Learning 9. Neural Style Transfer 10. Face Aging 11. Driver Drowsiness Detection 12. Language Translator 13. Image Reconstruction

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Laboratory:

1. Oral examination will be based on the entire syllabus including, the practical's 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 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.

Laboratory: (Term work)

Laboratory work will be based on satisfactory completion of Experiments conducted in **DJ19CEEl7011** lab **along with minimum One Mini project**.

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

i. Experiments and Mini Project work (Design and Implementation): 15 Marks
ii. Documentation (Journal and Report): 10 marks

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

Prepared by Checked by Head of the Department Principal

<table>
<tr><td colspan="5">Program: Fourth Year B.Tech. in Computer Engineering</td><td colspan="5">Semester : VII</td></tr>
<tr><td colspan="5">Course : Blockchain Technology</td><td colspan="5">Course Code: DJ19CEEC7012</td></tr>
<tr><td colspan="5">Course : Blockchain Technology Laboratory</td><td colspan="5">Course Code: DJ19CEEL7012</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
(Hours / week)</td><td colspan="9">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
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</table>

Pre-requisite: Knowledge of

1. Information Security
2. Network Fundamentals

Objectives:

1. To understand emerging abstract models for Blockchain Technology and its relevance with cryptography.
2. To identify major research challenges and technical gaps existing between theory and practice in crypto currency domain.
3. To provide conceptual understanding of the function of Blockchain as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable.
4. To apply hyperledger Fabric and Etherum platform to implement the Block chain Application.

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

1. Acquire basic knowledge of Blockchain technology and Analyze various algorithms used in Blockchain.
2. Introduce about cryptocurrency and various regulations.
3. Aware of privacy and security issues and applications in Blockchain.
4. Design and understand various applications using Blockchain and Distributed Foundation and case studies.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Introduction and Basics of Distributed Computing:** Need for Distributed Record Keeping, Modeling faults and adversaries Byzantine Generals problem, Consensus algorithms and their scalability problems, Why Nakamoto Came up with Blockchain based cryptocurrency? Technologies Borrowed in Blockchain – hash pointers, consensus, byzantine fault-tolerant distributed computing, digital cash. Atomic Broadcast, Consensus, Byzantine Models of fault tolerance.	**07**
2	**Basic Crypto primitives and Blockchain 1.0:** Hash functions, Puzzle friendly Hash, Collison resistant hash, digital signatures, public key crypto, verifiable random functions, Zero-knowledge systems. Bitcoin blockchain, the challenges, and solutions, proof of work, Proof of stake, alternatives to Bitcoin consensus, Bitcoin scripting language and their use.	**07**
3	**Blockchain 2.0:** Ethereum and Smart Contracts, The Turing Completeness of Smart Contract Languages and verification challenges, using smart contracts to enforce legal contracts, comparing Bitcoin scripting vs. Ethereum Smart Contracts.	**07**
4	**Blockchain 3.0:** Hyperledger fabric, the plug and play platform and mechanisms in permissioned blockchain. The Linux Foundation's Hyperledger Fabric and Microsoft Azure's Blockchain as a Service.	**07**
5	**Privacy, Security Issues in Blockchain:** Pseudo-anonymity vs. anonymity, Zcash and Zk-SNARKS for anonymity preservation, attacks on Blockchains such as Sybil attacks, selfish mining, 51% attacks advent of algorand, and Sharding based consensus algorithms to prevent these attacks.	**07**
6	**Blockchain Applications and DiFi Foundations:** Applications of Blockchain in Healthcare, Automotive, Government, Insurance, Media and Entertainment. Distributed Ledger Technology: Governance and Regulations, Applications in Governance, Global Perspectives, Case Study: – Estonian block chains transform paying, trading, and signing. DiFi Foundations, Role of quantum computing in crypto ecosystem. a key ingredient for Distributed Finance.	**07**

Books Recommended:

Text books:

1. Josh Thompson, - Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming, Create Space Independent Publishing Platform, 2017.
2. S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, -Blockchain Technology: Cryptocurrency and Applications, Oxford University Press, 2019.

Reference Books:

1. Dr. Gavin Wood -ETHEREUM: A Secure Decentralized Transaction Ledger, Yellow paper.2014
2. Antony Lewis, Basics of Bitcoins and Blockchain, Mango Publishing, 2018.

Web resources:

1. Centre of Excellence, IIT Bombay (https://isrdc.iitb.ac.in/blockchain/coe/areas.html, portal accessed on 15.11.2021).
2. Course Link by IIT Kanpur (https://www.cse.iitk.ac.in/pages/CS731.html, portal accessed on 15.11.2021)
3. Course Link by Coursera (https://www.coursera.org/learn/decentralized-finance-infrastructure-duke, portal accessed on 10.11.2021)
4. Course Link by Coursera (Bitcoin and Cryptocurrency Technologies | Coursera, portal accessed on 09.11.2021)

Suggested Mini Project:

Students are supposed to complete any one mini project not limited to the following list of projects.

1. Design and Implement Trusted Crowdfunding Platform Using a Smart Contract. A smart contract helps to block the funds within blockchain until the project or startup founder makes progress in the project.
2. Implement a system that collects location data from many interconnected systems and delivers exact location details to the customers.
3. Implement blockchain applications where both riders and drivers can get connected directly to provide safe and reliable transportation.
4. Design and Implement Fake Product Identification System, by embedded a 2D barcode on the product which is tied to a blockchain system.
5. Design and Implement Electronic voting systems where a blockchain-based system can ensure transparent and publicly verifiable elections in the country. Voting can be done using a mobile application that is attached to a blockchain system.
6. Design and Implement Transparent and Genuine Charity Application. The blockchain system can bring transparency to online charity trusts. Contributors can see the journey of the donation in realtime and confirm if it is reaching the deserving hands or not.
7. Design and Implement a Decentralized Web Hosting System. The way web hosting works today is by hosting all the web content including textual content, code and media content on a centralized location which can then be accessed over the world wide web. With blockchain, you can split website content into granules and distribute it all over the internet and then link them together using a blockchain registry.
8. Design and Implement Disk Space Renting System. The idea is to allow everybody on the planet to rent out their unused disk space which can be attached to a blockchain registry to create a massive worldwide cloud.
9. Design and Implement Loyalty Points Exchange System. With blockchain, you can implement a project that allows consumers to combine and transparently trade loyalty rewards.

10. Design and Implement Food Trackback System. Using blockchain technology, you can implement a system that can help consumers trace back the journey of fresh produce or meat to its source.

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Laboratory:

1. Oral examination will be based on the entire syllabus including, the practical's 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 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.

Laboratory: (Term work)

Laboratory work will be based on **DJ19CEEL7012 with minimum One Mini project** to be satisfactorily completed.

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

i. Mini Project work (Design and Implementation): 15 Marks
ii. Documentation (Report and Assignments): 10 marks

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

<table>
<tr><td colspan="5">Program: Final Year B.Tech. in Computer Engineering</td><td colspan="5">Semester: VII</td></tr>
<tr><td colspan="5">Course: Predictive Modelling</td><td colspan="5">Course Code: DJ19CEEC7013</td></tr>
<tr><td colspan="5">Course: Predictive Modelling Laboratory</td><td colspan="5">Course Code: DJ19CEEL7013</td></tr>
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</table>

Pre-requisite: Machine Learning and Statistics

Course Objectives:

1. To learn, how to develop models to predict categorical and continuous outcomes.
2. To advice on when and how to use each model. Also learn how to combine two or more models to improve prediction
3. To use the predictive analytics to aid decision making, and model implementation.

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

1. Understand the process of formulating business objectives, data selection/collection, preparation and process to successfully design, build, evaluate and implement predictive models for a various business application.
2. Compare the underlying predictive modeling techniques. Compare the underlying predictive modeling techniques.
3. Apply statistical analysis to wide range of problems such as decision tree.
4. Implement neural network and regression in predictive modeling.

Detailed Syllabus: (unit wise)		
Module	**Contents**	**Duration**
1	**Introduction** Identifying the business problem, Designing the model, Preparing the data, Selecting features, How to choose a model, Interpreting the output, Sharing the output.	**4**
2	**Working with Data** Understanding and Preparing the Data, Retrieving data from different sources, Visualizing the data and finding the relationship among the data variables, Handling the missing data, Applying distributions and summary statistics. Applying Segmentation, Sampling, Outlier analysis, Aggregating the data.	**8**
3	**Developing and Using Models** Model selection for data, Model development, Model evaluation and validation, comparing and combining models, Deploying Model, Assessing Model Performance, Updating a model.	**8**
4	**Building Decision Tree model to predict Response and Risk** Overview of Decision tree and development of decision tree in SAS, cultivating decision trees, optimizing the complexity of decision trees, understanding additional diagnostic tools.	**4**
5	**Predictive Modeling with Neural Networks and Regression** Introduction to neural network models, Neural Network model to predict loss frequency in Auto Insurance, Comparison of alternative built in architectures of the Neural Network node. **Regression:** Regression using exploratory data analysis, producing correlations, understanding the concepts of multiple regression, building and interpreting models, describing all regression techniques, exploring stepwise selection techniques, Logistic regression for predictive response to a mail Campaign, Regression for a continuous target	**10**
6	**Comparing and combination of different Models** Introduction, Models for Binary targets, Models for Ordinal Targets, Comparison of all three accidents risk models, Boosting and combining predictive modellings, comparing the models generated by DMNeural, AutoNeural and Dmine Regression.	**8**

Books Recommended:

Text Books:

1. "Machine Learning, A probabilistic perspective", Kevin P Murphy, IGHT Press Aug 2012.
2. Applied Analytics Using SAS Enterprise Miner
3. Predictive & Advanced Analytics (IBM ICE Publication)

Reference Books:

1. Predictive Modeling with SAS Enterprise Miner: Practical Solutions for Business Applications, Second Edition
2. Predictive Modeling Applications in Actuarial Science: Volume 2, Case Studies in Insurance (International Series on Actuarial Science). by Edward W. Frees (Editor), Glenn Meyers (Editor), Richard A. Derrig (Editor), By Cambridge press.
3. "Predictive Modeling with Logistic Regression using SAS"
4. Regression Modeling Fundamentals

Web resources:

1. Course offered by Coursera "Predictive Modeling with Logistic Regression using SAS"
2. Course offered by Coursera "Regression Modeling Fundamentals"

Suggested List of Experiments:

Sr. No.	Title of Experiments
1	Case Study: Identify types of data, Data cleansing and interpreting the data from data visualization
2	Relationship between attributes: Covariance, Correlation Coefficient, Chi Square, Measure of Distribution (Skewness and Kurtosis), Box and Whisker Plot (Box Plot and its parts. Using Box Plots to compare distribution) and other statistical graphs.
3	Applying statistical distributions and outlier analysis on data to summarize the data.
4	Applications of Time Series in financial markets to find Moving Averages, Trend, Cyclical and Seasonal analysis.
5	Case study to demonstrate and build a Decision tree.
6	Demonstration of Predictive Modelling using Regression.
7	Demonstration of Predictive modelling using Neural Network.
8	Mini Project.

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Laboratory:

1. Oral examination will be based on the entire syllabus including, the practical's 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 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.

Laboratory: (Term work)

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 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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
(Academic Year 2022-2023)

<table>
<tr><td colspan="5">Program: Final Year (Common for All Programs)</td><td colspan="5">Semester: VII</td></tr>
<tr><td colspan="5">Course: Product Life Cycle Management</td><td colspan="5">Course Code: DJ19ILO7011</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
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</table>

Pre-requisite: Knowledge of basic concepts of Management.

Objectives:

1. To familiarize the students with the need, benefits and components of PLM
2. To acquaint students with Product Data Management & PLM strategies
3. To give insights into new product development program and guidelines for designing and developing a product
4. To familiarize the students with Virtual Product Development

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

1. Gain knowledge about phases of PLM, PLM strategies and methodology for PLM feasibility study and PDM implementation.
2. Illustrate various approaches and techniques for designing and developing products.
3. Apply product engineering guidelines / thumb rules in designing products for moulding, machining, sheet metal working etc.
4. Acquire knowledge in applying virtual product development tools for components, machining and manufacturing plant

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
1	**Introduction to Product Lifecycle Management (PLM):** Product Lifecycle Management (PLM), Need for PLM, Product Lifecycle Phases, Opportunities of Globalization, Pre-PLM Environment, PLM Paradigm, Importance & Benefits of PLM, Widespread Impact of PLM, Focus and Application, A PLM Project, Starting the PLM Initiative, PLM Applications **PLM Strategies:** Industrial strategies, Strategy elements, its identification, selection and implementation, Developing PLM Vision and PLM Strategy, Change management for PLM	**10**
2	**Product Design:** Product Design and Development Process, Engineering Design, Organization and Decomposition in Product Design, Typologies of Design Process Models, Reference Model, Product Design in the Context of the Product Development Process, Relation with the Development Process Planning Phase, Relation with the Post design Planning Phase, Methodological Evolution in Product Design, Concurrent Engineering, Characteristic Features of Concurrent Engineering, Concurrent Engineering and Life Cycle Approach, New Product Development (NPD) and Strategies, Product Configuration and Variant Management, The Design for X System, Objective Properties and Design for X Tools, Choice of Design for X Tools and Their Use in the Design Process	**08**
3	**Product Data Management (PDM):** Product and Product Data, PDM systems and importance, Components of PDM, Reason for implementing a PDM system, financial justification of PDM, barriers to PDM implementation **Virtual Product Development Tools:** For components, machines, and manufacturing plants, 3D CAD systems and realistic rendering techniques, Digital mock-up, Model building, Model analysis, Modelling and simulations in Product Design, Examples/Case studies	**08**
4	**Integration of Environmental Aspects in Product Design:** Sustainable Development Design for Environment, Need for Life Cycle Environmental Strategies, Useful Life Extension Strategies, End-of-Life Strategies, Introduction of Environmental Strategies into the Design Process, Life Cycle Environmental Strategies and Considerations for Product Design.	**08**
5	**Life Cycle Assessment and Life Cycle Cost Analysis:** Properties, and Framework of Life Cycle Assessment, Phases of LCA in ISO Standards, Fields of Application and Limitations of Life Cycle Assessment, Cost Analysis and the Life Cycle Approach, General Framework for LCCA, Evolution of Models for Product Life Cycle Cost Analysis	**08**

Books Recommended:

Text books:

1. Product Lifecycle Management: Paradigm for 21st Century Product Realization, John Stark, Springer-Verlag, 2004.
2. Product Design for the environment-A life cycle approach, Fabio Giudice, Guido La Rosa, Antonino Risitano, Taylor & Francis 2006.

Reference Books:

1. Product Life Cycle Management‖, Saaksvuori Antti, Immonen Anselmie, Springer, Dreamtech.
2. Product Lifecycle Management: Driving the next generation of lean thinking, Michael Grieve, Tata McGraw Hill, 2006.
3. Product Life-Cycle Management: Geometric Variations, François Villeneuve, Luc Mathieu, Max Giordano, Wiley, 2010.

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
(Academic Year 2022-2023)

<table>
<tr><td colspan="5">Program: Final Year (Common for All Programs)</td><td colspan="5">Semester: VII</td></tr>
<tr><td colspan="5">Course: Management Information System</td><td colspan="5">Course Code: DJ19ILO7012</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
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</table>

Objectives:

1. The course is blend of Management and Technical field.
2. Discuss the roles played by information technology in today‘s business and define various technology architectures on which information systems are built
3. Define and analyze typical functional information systems and identify how they meet the needsof the firm to deliver efficiency and competitive advantage
4. Identify the basic steps in systems development

Outcomes: Learner will be able to…

1. Explain how information systems Transform Business
2. Identify the impact information systems have on an organization
3. Describe IT infrastructure and its components and its current trends
4. Understand the principal tools and technologies for accessing information from databases to improve business performance and decision making
5. Identify the types of systems used for enterprise-wide knowledge management and how they provide value for businesses

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
1	**Foundation Concepts:** Information Systems in Business, Functional Area Information System**,** The Components of Information Systems**,** Impact of IT on organizations and society, Organizational Strategy, Information systems for strategic advantage.	**05**
2	**Information Technologies:** Hardware and Software **Computer Systems:** End User and Enterprise Computing **Computer Peripherals:** Input, Output, and Storage Technologies **Application Software:** End User Applications **System Software:** Computer System Management **Data Resource Management:** Technical Foundations of Database Management, Managing Data Resources, Big data, Data warehouse and Data Marts**,** Knowledge Management **Networks:** The Networked Enterprise (Wired and wireless), Pervasive computing, Cloud Computing models	**08**
3	**MIS Tools and applications for Decision making:** ERP and ERP support of Business Process Reengineering, **Business intelligence (BI):** Managers and Decision Making, BI for Data analysis and Visualization **Artificial Intelligence Technologies in Business**	**08**
4	**Security and Ethical Challenges:** Security, Ethical, and Societal Challenges of IT Security Management of Information Technology	**06**
5	**Social Computing (SC):** Web 2.0 and 3.0, SC in business-shopping, Marketing, Operational and Analytic CRM, E-business and E-commerce – B2B B2C, Mobile commerce.	**07**
6	**Information System within Organization:** Acquiring Information Systems and Applications: Various System development life cycle models. **Enterprise and Global Management of Information Technology:** Managing Information Technology, Managing Global IT.	**08**

Books Recommended:

Reference Books:

1. Management Information Systems, 11th edition by James A O'Brien, George M., Ramesh Behl.
2. Kelly Rainer, Brad Prince, Management Information Systems, Wiley.
3. K.C. Laudon and J.P. Laudon, Management Information Systems: Managing the Digital Firm, 10th Ed., Prentice Hall, 2007.
4. D. Boddy, A. Boonstra, Managing Information Systems: Strategy and Organization, Prentice Hall, 2008

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
(Academic Year 2022-2023)

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
(Academic Year 2022-2023)

<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VII</td></tr>
<tr><td colspan="8">Course: Operations Research</td><td colspan="3">Course Code: DJ19ILO7013</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="4">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="4">75</td><td>25</td><td>25</td><td>25</td><td>100</td></tr>
<tr><td colspan="4">Laboratory Examination</td><td colspan="2">Term work</td><td rowspan="2">Total Term work</td><td rowspan="3">--</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">--</td><td rowspan="2">--</td><td rowspan="2">3</td><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Laboratory Work</td><td>Tutorial / Mini project / presentation/ Journal</td></tr>
<tr><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td></tr>
</table>

Pre-requisites: Basic Knowledge of Algebra, Probability and Statistics.

Objectives:

1. To formulate a real-world decision problem as a mathematical programming model.
2. To learn the mathematical tools that are employed to solve mathematical programming models.

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

1. **Convert** a real-world problem in to a Linear Programming Problem and **analyse** the solution obtained using Simplex method or other algorithms.
2. **Identify** real-world problems as Transportation Problem and Assignment Problem and **Solve** the decision problem by choosing appropriate algorithm.
3. **Identify** the decision situations which vary with time and **analyse** them using principle of dynamic programming to real life situations.
4. **Explain** reasons of formation of queues, classify various queuing systems and **apply** parameters defined for various queuing systems for decision making in real life situations.
5. **Understand** the concept of decision making in situation of competition and **recommend** strategies in case of two-person zero sum games.
6. **Describe** concept of simulation and **apply** Monte Carlo Simulation technique to systems such as inventory, queuing and **recommend** solutions for them.
7. **Understand** need for right replacement policy and **determine** optimal replacement age.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
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Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
1	**Introduction to Operations Research:** Concept of decision making. Definition of OR. Formulation of decision problem as OR model, Concept of Optimization, **Linear Programming Problem:** Mathematical Formulation. Finding optimal solution - Graphical method, Simplex Method, Big M-method, Two Phase Method. Duality, Primal – Dual construction, Symmetric and Asymmetric Dual. Dual Simplex Method.	10
2	**Assignment Problems:** Mathematical Formulation, Finding optimal solution - Hungarian Method **Transportation problem:** Mathematical Formulation, Finding initial basic feasible solution – Northwest corner rule, row minima, column minima, least cost method and Vogel's approximation method. Optimality test: the stepping stone method and MODI method. Improving the solution.	08
3	**Dynamic Programming**: Bellman's Principle of optimality - Applications of dynamic programming- Employment smoothening problem, capital budgeting problem, shortest path problem, cargo loading problem	06
4	**Queuing Models:** Characteristics of queuing models. Single Channel – Single and multi phase servers, Poisson arrivals, exponential service time - with infinite population and finite population models – with infinite and finite capacity. Multichannel – Single phase server - Poisson arrivals, exponential service time with infinite population. **Game Theory:** Introduction. Minimax & Maximin Criterion and optimal strategy. Solution of games with saddle points, rectangular games without saddle points - 2 x 2 games, dominance principle. Approximate methods - Iterative method, m x 2 & 2 x n games -Graphical method and method of sub-games. Expressing game as LPP.	10
5	**Simulation:** Definition. Types of simulation models. Monte Carlo simulation technique. Applications of simulation - Inventory and Queuing problems. Simulation Languages. **Replacement Models:** Replacement of items that deteriorate with time - when money value is not counted and counted, Replacement of items that fail suddenly – individual and group replacement policy.	08

Note: Educator is expected to introduce relevant software available for solving various mathematical models.

Books Recommended:

Text books:

1. Operations Research, Sharma J. K., Trinity Press
2. Operations Research, Gupta P. K., Hira D. S., S. Chand Limited

Reference Books:

1. Operations Research - An Introduction; Taha, H.A.; Prentice Hall

2. Operations Research: Principles and Practice; Ravindran, A, Phillips, D. T and Solberg, J. J.; John Willey and Sons
3. Introduction to Operations Research; Hiller, F. S. and Liebermann, G. J.; Tata McGraw Hill
4. Operations Research Principles and Practice; Pradeep Prabhakar Pai; Oxford University Press
5. Operations Research, R. Panneerselvam, PHI Publications.
6. Operations Research, A. M. Natarajan, P. Balasubramani, A. Tamilarasi, Pearson Education.
7. Operations Research; Kanti Swarup, P. K. Gupta and Man Mohan; Sultan Chand & Sons

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
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<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VII</td></tr>
<tr><td colspan="8">Course: Cyber Security and Laws</td><td colspan="3">Course Code: DJ19ILO7014</td></tr>
<tr><td colspan="4" rowspan="3">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="3">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="2">Lectures</td><td rowspan="2">Practical</td><td rowspan="2">Tutorial</td><td rowspan="2">Total Credits</td><td colspan="3">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
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</table>

Objectives:

1. To understand and identify different types cybercrime and cyber offences.
2. To recognized Indian IT Act 2008 and its latest amendments
3. To learn various types of security standards compliances

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

1. Understand the different types of cybercrime and security issues E Business.
2. Analyses different types of cyber threats and techniques for security management.
3. Explore the legal requirements and standards for cyber security in various countries to regulate cyberspace.
4. Impart the knowledge of Information Technology Act and legal frame work of right to privacy, data security and data protection.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
1	**Introduction to Cybercrime**: Cyber Crime, Cyber Law, Cyber Security, History of Cyber Crime, Hacking, Data Theft, Cyber Terrorism, Virus & Worm's, Email Bombing, Pornography, online gambling, Forgery, Web Defacements, Web Jacking, Illegal online Selling, Cyber Defamation, Software Piracy, Electronics/ Digital Signature, Phishing, Password Cracking, Key loggers and Spywares, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Over Flow, Attacks on Wireless Networks, Phishing Identity Theft (ID Theft) **Cyber offenses:** How criminal plan the attacks, Social Engineering, Cyber stalking, Cyber café and Cybercrimes, Botnets, Attack vector	**12**
2	**Cyber Threats Analysis** Knowledge of Dynamic and Deliberate Targeting Knowledge of Indications and Warning Knowledge of Internal Tactics to Anticipate and/or, Emulate Threat Capabilities and Actions Knowledge of Key Cyber Threat Actors and their Equities Knowledge of Specific Target Identifiers and Their Usage **Cyber Security Management** Knowledge of Emerging Security Issues, Risks, and Vulnerabilities	**08**
3	**Electronic Business and legal issues** Evolution and development in Ecommerce, Policy Frameworks for Secure Electronic Business, paper vs paper less contracts, E-Commerce models- B2B, B2C, E security. E-Payment Mechanism; Payment through card system, E-Cheque, E-Cash, E-Payment Threats & Protections, Security for E-Commerce.	**06**
4	**Indian IT Act** Cyber Crime and Criminal Justice, Penalties, Adjudication and Appeals Under the IT Act, 2000, IT Act. 2008 and its Amendments **Security aspect in cyber Law** The Contract Aspects in Cyber Law , The Security Aspect of Cyber Law, The Intellectual Property Aspect in Cyber Law ,The Evidence Aspect in Cyber Law ,The Criminal Aspect in Cyber Law	08
5	**Security Industries Standard Compliances** IT Security v/s IT Compliance, Cyber Security Standards, critical security controls for cyber security, GRC (Governance, Risk Management, and Compliance), SOX, GLBA, HIPAA, ISO/IEC 27001, NIST Cyber Security Framework (CSF), PCI-DSS. OWASP Top Ten Project, GDPR (General Data Protection Regulation), NIST (National Institute of Standards and Technology), CIS Controls (Center for Internet Security Controls)	08

Books Recommended:

Reference Books and Material:

1. Nina Godbole, Sunit Belapure, Cyber Security, Wiley India, New Delhi
2. The Indian Cyber Law by Suresh T. Vishwanathan; Bharat Law House New Delhi
3. The Information Technology Act, 2000; Bare Act- Professional Book Publishers, New Delhi.
4. E-Commerce Security and Privacy", Anup K. Ghosh, Springer Science and Business Media, 2012
5. Izzat Alsmadi , The NICE Cyber Security Framework Cyber Security Intelligence and Analytics, Springer
6. Cyber Law & Cyber Crimes, Advocate Prashant Mali; Snow White Publications, Mumbai
7. Nina Godbole, Information Systems Security, Wiley India, New Delhi
8. Kennetch J. Knapp, Cyber Security &Global Information Assurance Information Science Publishing.
9. William Stallings, Cryptography and Network Security, Pearson Publication
10. Websites for more information is available on : The Information Technology ACT, 2008- TIFR : https://www.tifrh.res.in
11. Website for more information, A Compliance Primer for IT professional: https://www.sans.org/reading-room/whitepapers/compliance/compliance-primer-professionals-33538

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
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<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VII</td></tr>
<tr><td colspan="8">Course: Personal Finance Management</td><td colspan="3">Course Code: DJ19ILO7015</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
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<tr><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td></tr>
</table>

Pre-requisites: Basic Knowledge of Algebra, Probability and Statistics.

Objectives:

1. To create awareness and educate consumers on access to financial services.
2. To make the students understand the basic concepts, definitions and terms related to direct taxation.
3. To help the students compute the Goods and Service Tax (GST) payable by a supplier after considering the eligible input tax credit.
4. To familarise the students with microfinance for accelerating the expansion of local microbusinesses.

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

1. Use a framework for financial planning to understand the overall role finances play in his/her personal life.
2. Compute income from salaries, house property, business/profession, capital gains and income from other sources.
3. Compute the amount of CGST, SGST and IGST payable after considering the eligible input tax credit.
4. Understand how Microfinance can help in financial inclusion.

Syllabus for Final Year of B.Tech. (Common for All Programs)
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Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
01	**Overview of Indian Financial System:** Characteristics, Components and Functions of Financial System. Financial Instruments and Financial Markets, Financial inclusion. **Introduction to Personal Finance** Person Financial Planning in Action, Money Management Skills, Taxes in Your Financial Plan, Savings and Payment Services. Consumer Credit: Advantages, Disadvantages, Sources and Costs.	**07**
02	**Personal Financial Management** **Loans:** Home, Car, Education, Personal, Loan against property and Jewel loan. **Insurance:** Types of Insurance – ULIP and Term; Health and Disability Income Insurance, Life Insurance. **Investment:** Investing Basics and Evaluating Bonds, Investing in Stocks and Investing in Mutual Funds, Planning for the Future.	**07**
03	**Income Tax** **Income Tax Act Basics-** Introduction to Income Tax Act, 1961 **Heads of Income and Computation of Total Income and Tax Liability-** Heads of Income and Computation of Total Income under various heads, Clubbing Provisions, Set off and Carry forward of Losses, Deductions, Assessment of Income and tax liability of different persons. **Tax Management, Administrative Procedures and ICDS -** TDS, TCS and Advance Tax Administrative Procedures, ICDS.	**08**
04	**Goods and Services Tax** GST Constitutional framework of Indirect Taxes before GST (Taxation Powers of Union & State Government); Concept of VAT: Meaning, Variants and Methods; Major Defects in the structure of Indirect Taxes prior to GST; Rationale for GST; Structure of GST (SGST, CGST, UTGST & IGST); GST Council, GST Network, State Compensation Mechanism, Registration. **Levy and Collection of GST** Taxable event- "Supply" of Goods and Services; Place of Supply: Within state, Interstate, Import and Export; Time of supply: Valuation for GST- Valuation rules, taxability of reimbursement of expenses; Exemption from GST: Small supplies and Composition Scheme: Classification of Goods and Services	**10**
05	**Introduction to Micro – finance** Micro-Finance: Definitions, Scope & Assumptions, Types of Microfinance, Customers of Micro-finance, Credit Delivery Methodologies, SHG concept, origin, Formation & Operation of Self Help Groups (SHGs). **Models in Microfinance -** Joint Liability Groups (JLG), SHG Bank Linkage Model and GRAMEEN Model: Achievements & Challenges, **Institutional Mechanism** Current Challenges for Microfinance, Microfinance Institutions (MFIs): Constraints & Governance Issues, Institutional Structure of Microfinance in India :NGO-MFIs, NBFC-MFIs, Co-operatives, Banks, Microfinance Networks and Associations; Demand & Supply of Microfinance Services in India, Impact assessment and social assessments of MFIs,	**10**

Books Recommended:

Reference Books:

1. Banking and Financial Sector Reforms in India , by Asha Singh, M.S. Gupta, Serials Publication.
2. Indian Banking Sector: Essays and Issues (1st) , by M.S. Gupta & J.B. Singh, Serials Publication.
3. Basics Of Banking & Finance , by K.M. Bhattacharya O.P. Agarwal , Himalaya Publishing House
4. Agricultural Finance And Management, by S. Subba Reddy , P. Raghu Ram .
5. The Indian Financial System And Development , by Dr.Vasant Desai, Himalaya Publishing House; Fourth Edition
6. Income Tax Management , Simple Way of Tax Management, Tax Planning and Tax Saving , By Sanjay Kumar Satapathy
7. Direct Tax System Income Tax by Dr. R. K. Jain, SBPD Publications.
8. Simplified Approach to GST Goods and Services Tax, By S K Mishra , Educreation Publishing.
9. Introduction To Microfinance , By Todd A Watkins , World Scientific Publishing Company

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 **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.

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<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VII</td></tr>
<tr><td colspan="8">Course: Energy Audit and Management</td><td colspan="3">Course Code: DJ19ILO7016</td></tr>
<tr><td colspan="4" rowspan="3">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="3">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
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<tr><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td></tr>
</table>

Objectives:

1. To understand the importance of energy security for sustainable development and the fundamentals of energy conservation.
2. To identify and describe the basic principles and methodologies adopted in energy audit of a utility
3. To introduce performance evaluation criteria of various electrical and thermal installations to facilitate the energy management.
4. To relate the data collected during performance evaluation of systems for identification of energy saving opportunities.

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

1. To identify and describe present state of energy security and its importance.
2. To identify and describe the basic principles and methodologies adopted in energy audit of a utility.
3. To describe the energy performance evaluation of some common electrical installations and identify the energy saving opportunities.
4. To describe the energy performance evaluation of some common thermal installations and identify the energy saving opportunities.
5. To analyze the data collected during performance evaluation and recommend energy saving measures.

Syllabus for Final Year of B.Tech. (Common for All Programs)
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Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
01	**Energy Scenario:** Present Energy Scenario, Energy Pricing, Energy Sector Reforms, Energy Security, Energy Conservation and its Importance, Energy Conservation Act-2001 and its Features. Basics of Energy and its various forms, Material and Energy balance.	**05**
02	**Energy Audit:** Definition, Energy audit- need, Types of energy audit, Energy management (audit) approach-understanding energy costs, Bench marking, Energy performance, matching energy use to requirement, Maximizing system efficiencies, Optimizing the input energy requirements, Fuel and energy substitution. Elements of monitoring & targeting, Energy audit instruments. Technical and economic feasibility, Classification of energy conservation measures. Safety considerations during energy audit. **Financial analysis techniques:** Simple payback period, NPV, Return on investment (ROI) Internal rate of return (IRR).	**10**
03	**Energy Management and Energy Conservation in Electrical System:** Electricity billing, Electrical load management and maximum demand Control; Power factor improvement, Energy efficient equipments and appliances, star ratings. Energy efficiency measures in lighting system, lighting control: Occupancy sensors, daylight integration, and use of intelligent controllers. Energy conservation opportunities in water pumps, compressor, fan and blower. industrial drives, induction motors, motor retrofitting, soft starters, variable speed drives.	**10**
04	**Energy Management and Energy Conservation in Thermal Systems:** Review of different thermal loads; Energy conservation opportunities in: Steam distribution system, Steam leakages, Steam trapping, Condensate and flash steam recovery system. Waste heat recovery, use of insulation- types and application. Energy conservation opportunities in: Boiler system. Refrigeration system and HVAC system.	**10**
05	**Energy conservation in Buildings**: Energy Conservation Building Codes (ECBC): Green Building, LEED rating, Application of Non-Conventional and Renewable Energy Sources, Energy sources and energy management in electric vehicles.	**07**

Books Recommended:

Reference Books:

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

Syllabus for Final Year of B.Tech. (Common for All Programs)
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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.

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<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="4">Semester: VII</td></tr>
<tr><td colspan="8">Course: Disaster Management and Mitigation Measures</td><td colspan="4">Course Code: DJ19ILO7017</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
(Hours / week)</td><td colspan="8">Evaluation Scheme</td></tr>
<tr><td colspan="5">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
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<tr><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td></tr>
</table>

Objectives:

1. To provide basic understanding hazards, disaster and various types and categories of disaster occurring around the world.
2. To identify extent and damaging capacity of a disaster.
3. To study and understand the means of losses and methods to overcome /minimize it.
4. To understand roles and responsibilities of individual and various organization during and after disaster.
5. To appreciate the significance of GIS, GPS in the field of disaster management.
6. To understand the emergency government response structures before, during and after disaster.

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

1. Know natural as well as manmade disaster and their extent and possible effects on the economy.
2. Know the institutional framework and organization structure in India for disaster management and get acquainted with government policies, acts and various emergency laws.
3. Get to know the simple dos and don'ts in such extreme events and build skills to respond accordingly.
4. Understand the importance of disaster prevention and various mitigation measure with the exposure to disasters hotspots across the globe.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
1	**General Information about Disaster:** Brief concept of Hazards, definition and types of Disasters – Natural, Man-made, and hybrid, Groups of Disasters- Natural and Technological, global Scenario, Significance of studying various aspects of disasters, effects of disasters, India's vulnerability to disasters, Impact of disaster on National development. Study of Natural disasters: Flood, drought, cloud burst, Earthquake, Landslides, Avalanches, Volcanic eruptions, Mudflow, Cyclone, Storm, Storm Surge, climate change, global warming, sea level rise, ozone depletion etc. Study of Human/Technology Induced Disasters: Chemical, Industrial and Nuclear disasters, Internally displaced persons, road and train accidents Fire Hazards, terrorism, militancy, Role of growing population and subsequent industrialization, urbanization and changing lifestyle of human beings in frequent occurrences of manmade disasters.	**10**
2	**Disaster Management:** Brief Introduction, Disaster management cycle, Evolution of Disaster and Disaster management in India, Disaster management acts, policies and guidelines, laws of emergencies etc. Prior, During and Post disaster management activities: (Preparedness, strengthening emergency centers, Logistics, optimum resource management, emergency response and relief, Training, Public awareness, Research, Reconstruction of essential services and livelihood restoration.	**08**
3	**Institutional framework and Mechanism for disaster management in India:** Institutions in India for dealing with various disasters, Organizational structure, functions and responsibilities of National Institute of Disaster Management (NIDM) and National disaster management authority (NDMA) in India, roles and responsibilities of central and state government during and after disaster, NGO's involved in disasters and their task, Jobs carried out by armed forces. Financial Relief During disaster (State, National and International Disaster Assistance)	**08**
4	**Disaster risk reduction and Mitigation Measures:** Need of disaster prevention and mitigation, mitigation guiding principles, challenging areas, structural and non-structural measures for disaster risk reduction. Mitigation measures for flood, earthquake, cyclone monitoring, air quality, water quality, climate change, land use, winter storms and aquatic biology etc. Use of information management, GIS, GPS and remote sensing Mitigation measure. Do's and don'ts in case of disasters and effective implementation of relief aids.	**08**
5	**Case studies on disaster (National /International):** Case study discussion of Hiroshima – Nagasaki (Japan), India – Tsunami (2004) , Bhopal gas tragedy, Kerala and Uttarakhand flood disaster, Cyclone Phailin (2013), Fukushima Daiichi nuclear disaster (2011), 26th July 2005 Mumbai flood, Chernobyl meltdown and so on. (Discuss case studies on disaster with respect to reason for the disaster, incidents, effects of disaster, present scenario and safety measures taken)	**08**

Books Recommended:

Reference Books and Reports:

1. Disaster Management, by Harsh K.Gupta, Universities Press Publications (2003).
2. Disaster Management: An Appraisal of Institutional Mechanisms in India, by O.S.Dagur, published by Centre for land warfare studies, New Delhi, 2011.
3. Introduction to International Disaster Management, by Damon Copolla, Butterworth Heinemann Elsevier Publications (2015).
4. Disaster Management Handbook, by Jack Pinkowski, CRC Press, Taylor and Francis group (2008).
5. Disaster management & rehabilitation, by Rajdeep Dasgupta, Mittal Publications, New Delhi (2007).
6. Natural Hazards and Disaster Management, Vulnerability and Mitigation, by R B Singh, Rawat Publications (2006).
7. Concepts and Techniques of GIS, by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications (2006).
8. Risk management of natural disasters, by Claudia G. Flores Gonzales, KIT Scientific Publishing (2010).
9. Disaster Management – a disaster manger's handbook, by W. Nick Carter, Asian Development Bank (2008).
10. Disaster Management in India, by R. K. Srivastava, Ministry of Home Affairs, GoI, New Delhi (2011)
11. The Chernobyl Disaster: Legacy and Impact on the Future of Nuclear Energy, by Wil Mara, Marshall Cavendish Corporation, New York, 2011.
12. The Fukushima 2011 Disaster, by Ronald Eisler, Taylor & Francis, Florida, 2013.

(Learners are expected to refer reports published at national and international level and updated information available on authentic web sites)

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
(Academic Year 2022-2023)

<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VII</td></tr>
<tr><td colspan="8">Course: Science of Well-being</td><td colspan="3">Course Code: DJ19ILO7018</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="4">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="4">75</td><td>25</td><td>25</td><td>25</td><td>100</td></tr>
<tr><td colspan="4">Laboratory Examination</td><td colspan="2">Term work</td><td rowspan="2">Total Term work</td><td rowspan="3">--</td></tr>
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<tr><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td></tr>
</table>

Objectives:

1. To create consciousness about importance of holistic health and physical as well as mental well-being.
2. To make learners aware of the concepts of Happiness, Gratitude, Self-Compassion, Empathy etc.
3. To introduce the learners to the means of mental and physical well-being, ill effects of mal-practices like alcoholism, smoking etc.
4. To equip the learners to manage and cope up with stress in their daily living.

Outcomes: Upon Completion of the course, the learner should be able to:

1. Describe concepts of holistic health and well-being, differentiate between its true meaning and misconceptions and understand the benefits of well-being.
2. Recognize meaning of happiness, practice gratitude and self-compassion and analyze incidents from one's own life.
3. Understand the causes and effects of stress, identify reasons for stress in one's own surrounding and self.
4. Recognize the importance of physical health and fitness, assess their life style and come up with limitations or effectiveness.
5. Inspect one's own coping mechanism, assess its effectiveness, develop and strategize for betterment and execute it.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
1	**Health and well-being:** The concept of health, dimensions of health, the notion of well-being, various facets of well-being, relation between health and well-being. Concept of holistic health, its principles and importance, concept and benefits of holistic care, misconceptions about holistic health approach, the application of a true holistic approach to our well-being.	**06**
2	**Concepts of happiness:** Happiness: what is it and how do we measure it? Philosophical perspectives on happiness, Happiness: Nature or Nurture? Happiness in the modern world: impediments and accelerators, Narrow vs. Broad Band Approaches to Happiness, Benefits of Happiness, Self-Compassion and Gratitude. Misconceptions of happiness.	**08**
3	**Stress and mental health/well-being**: Nature and concept of stress, meaning and definitions of stress, types of stress, meaning of stressors, types of stressors, symptoms of stress, effects of stress, different models of stress. Sources of stress and how does stress cause illness, various sources of stress, delineate between external and internal sources of stress, differentiate between continuous and discrete stressors, the effects of these stressors on health and well-being, diversity of stressors and their health consequences, relation between stress and illness from different perspectives association between stress related physiological mechanisms and different illnesses.	**10**
4	**Physical Well-being / Health management:** concept of health behaviours, dimensions of health behaviours. Health enhancing behaviors: Exercise and Weight control, application and importance of these health enhancing behaviours. Health protective behaviors and illness management: concept of illness management, effectiveness of illness management. Concept of Nutrition, Role of Nutrition, Components of Nutrition, concept of Malnutrition, Health compromising behaviours: Alcoholism, Smoking and its effects on health.	**10**
5	**Dealing with Difficult Times / Coping mechanisms:** The concept of chronic stress, Health and safety risks of chronic stress, Forms and Treatment of chronic stress, Coping with Acute and Chronic stress, theories of the stress-illness link, role of stress in mental disorders. Concept of coping, Ways of coping and stress management, basic knowledge about stress management, various techniques of stress management, stress management programs. Mental strengths and virtues, Hope, Optimism, Resilience – concept, pathways and models, Meditation and Self-introspection.	**08**

Books Recommended:

Textbooks:

1. The Science of well-being by Felicia Huppert, Nick Baylis, Barry Keverne; Oxford University Press
2. Health and Well-Being: Emerging Trends by S. Ojha, U. Rani Srivastava, Shobhna Joshi, Global Vision Publishing House
3. Positive psychology: The scientific and practical explorations of human strengths by Shane J. Lopez, Jennifer Teramoto Pedrotti, Charles Richard Snyder; Sage Publications.

Reference Books:

1. The pursuit of happiness and the realization of sympathy: Cultural patterns of self, social relations, and well-being by Kitayama, S., & Markus, H. R, Culture and subjective well-being, The MIT Press.
2. Man Adapting by Dubos, R; New Haven: Yale University Press.
3. Happiness a history by McMahon D. M., Atlantic Monthly Press.
4. Well-being: The foundations of hedonic psychology by D. Kahneman & E. Diener & N. Schwarz, New York: Russell Sage
5. Selye H. The Stress of Life. New York; McGraw-Hill; 1984.

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.

Syllabus for Final Year of B.Tech. Program in Mechanical Engineering:
Semester VII (Autonomous)
(Academic Year 2022-2023)

<table>
<tr><td colspan="7">Program: Final Year Mechanical Engineering</td><td colspan="4">Semester: VII</td></tr>
<tr><td colspan="7">Course: Research Methodology</td><td colspan="4">Course Code: DJ19ILO7019</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
(Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="3">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="3">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="3">75</td><td>25</td><td>25</td><td>25</td><td>100</td></tr>
<tr><td colspan="3">Laboratory Examination</td><td colspan="2">Term work</td><td rowspan="2">Total Term work</td><td rowspan="3">--</td></tr>
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</table>

Pre-requisites: Basic Knowledge of Probability and Statistics.

Objectives:
1. To understand Research and Research Process
2. To acquaint learners with identifying problems for research and develop research strategies
3. To familiarize learners with the techniques of data collection, analysis of data and interpretation

Outcomes: On completion of the course, learner will be able to:
1. Prepare a preliminary research design for projects in their subject matter areas
2. Accurately collect, analyze and report data
3. Present complex data or situations clearly
4. Review and analyze research findings
5. Write report about findings of research carried out

Syllabus for Final Year of B.Tech. Program in Mechanical Engineering:
Semester VII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
1	**Basic Research Concepts** Meaning of research, Objectives of research, Types of research, Significance of research Research process	07
2	**Research Methodology:** Identification of research problem, Literature review, Formulation of hypothesis, Formulation of Research design.	10
3	**Research and Sample Design:** Meaning of research and sample design, Need of research design, Features of good research design, Important concepts, Different research designs, Types of sampling designs	10
4	**Data Collection and Data Analysis:** Types of data, Methods for collecting data: Experiments and surveys, Collection of primary and secondary data, Hypothesis testing and interpretation of Data	10
5	**Interpretation and Report Writing:** Interpretation and drawing conclusions on the research, Preparation of the report, Ethical Issues	05

Books Recommended:

Reference Books:

1. Dawson, Catherine, 2002, Practical Research Methods, New Delhi, UBS Publishers Distributors.
2. Kothari, C.R.,1985, Research Methodology-Methods and Techniques, New Delhi, Wiley Eastern Limited.
3. Kumar, Ranjit, 2005, Research Methodology-A Step-by-Step Guide for Beginners, (2nd Edition), Singapore, Pearson Education

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
(Academic Year 2022-2023)

<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VII</td></tr>
<tr><td colspan="8">Course: Public Systems and Policies</td><td colspan="3">Course Code: DJ19ILO7020</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
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</table>

Pre-requisites: Basic Knowledge of Social science and Current affairs

Objectives:

1. To analyze the transformations in public systems with emphasis on current initiatives and emerging challenges in the field.
2. To understand public systems in a fast-changing environment in the global context.
3. To provide an in-depth understanding of the ills prevailing in the society and aids to identify the solutions for them.
4. To explain public policy and its operations with special focus on policy relating to Government finance.
5. To analyze and evaluate the impact of the public policy on firms and economy at large.

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

1. Understand the importance of public systems in a fast-changing environment in the global context.
2. Analyze the transformations in public systems with emphasis on current initiatives and emerging challenges in the field.
3. Explain public policy and its operations with special focus on policy relating to Government finance.
4. Make policies and know about the happenings in the world, in the nation and those in their locality.
5. Analyze and evaluate the impact of the public policy on firms and economy at large and work under various fields as policymakers.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
1	**Introduction and Overview of Public Systems:** Ideology of Public Systems; Mechanistic and Organic view of Society and Individuals, The Legal Framework; Federal Government; State and Local Governments, Government growth; The size of Government.	10
2	**Public Sector in the Economics Accounts:** Public Sector in the circular flow; Public Sector in the National Income Accounts.	6
3	**Public Choice and Fiscal Politics:** Direct Democracy; Representative Democracy; The Allocation Function; The Distribution Function; The Stabilization Function; Coordination of Budget Functions; The Leviathan Hypothesis.	8
4	**Introduction and Overview of Public Policy:** Markets and Government; Social goods and Market failure, Public expenditure and its evaluation; Cost Benefit Analysis, Public policy and Externalities, Taxation Policy and its impact, Income distribution, redistribution and social security issues Fiscal & Budgetary Policy, Fiscal Federalism in India.	12
5	**Case Studies in Expenditure Policy: Public Services** A) National Defense B) Highways C) Outdoor Recreation D) Education	6

Books Recommended:

Reference Books:

1. Introduction to Public Policy by Charles Wheelan, W.W. Norton & Company.
2. Understanding Public Policy by Thomas R. Dye, Prentice Hall.
3. Public Policy-Making: An Introduction by Anderson J.E., Boston, Houghton.
4. Public Administration by Avasthi & Maheshwari, Lakshminarayan Agarwal, Agra.
5. New Horizons of Public Administration by Bhattacharya, Mohit, Jawahar Publishers, New Delhi.
6. Public Administration and Public Affairs by Henry, Nicholas, Prentice Hall of India, New Delhi.
7. Public Finance 10th Edition by Harvey S Rosen and Ted Gayer, McGraw-Hill Education, 2013.
8. Public Finance in Theory and Practice by Musgrave and Musgrave.

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 carrying15 marks, total summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VII (Autonomous)
(Academic Year 2022-2023)

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 the two tests will be considered for final grading.

<table>
<tr><td colspan="8">Program: Final Year B.Tech. in Computer Engineering</td><td colspan="3">Semester: VIII</td></tr>
<tr><td colspan="8">Course: Web Intelligence</td><td colspan="3">Course Code: DJ19CEC801</td></tr>
<tr><td colspan="8">Course: Web Intelligence Laboratory</td><td colspan="3">Course Code: DJ19CEL801</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
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<tr><td>25</td><td>-</td><td>-</td><td>15</td><td>10</td><td>25</td></tr>
</table>

Pre-requisite: Statistics, Machine Learning, Data Mining

Course Objectives:

1. To gain a background in Web mining techniques
2. To extract knowledge from the social web for web analytics
3. To enable students to solve complex real-world problems for sentiment analysis and Recommendation systems.

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

1. Interpret the terminologies and perspectives of Web Mining.
2. Perform social network analysis to identify communities and network properties in social media sites.
3. Extract and Integrate information from the web for real-world scenarios.
4. Design new solutions to opinion extraction and sentiment classification problems
5. Provide solutions to the emerging problems with social media using Recommendation systems

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Introduction** Introduction: World Wide Web, History of the Web and the Internet, What is Data Mining? What is Web Mining? Introduction to Association Rule Mining, Supervised Learning & Unsupervised Learning. Information Retrieval and Web Search: Basic Concepts of Information Retrieval, Information Retrieval Models, Relevance Feedback, Evaluation Measures, Text and Web Page Pre-Processing, Inverted Index and Its Compression, Latent Semantic Indexing, Web Search, Meta-Search: Combining Multiple Rankings, Web Spamming.	4
2	**Social Network Analysis** Social Network Analysis: Introduction, Co-Citation and Bibliographic Coupling, Page Rank, HITS Algorithm, Community Discovery. Web Crawling: A Basic Crawler Algorithm, Implementation Issues, Universal Crawlers, Focused Crawlers, Topical Crawlers, Evaluation, Crawler Ethics and Conflicts.	8
3	**Structured Data Extraction** Structured Data Extraction: Wrapper Generation, Preliminaries, Wrapper Induction, Instance-Based Wrapper Learning, Automatic Wrapper Generation: Problems, String Matching and Tree Matching, Building DOM Trees, Extraction Based on a Single List Page, Extraction Based on Multiple Pages.	8
4	**Information Integration** Information Integration: Introduction to Schema Matching, Pre-Processing for Schema Matching, Schema -Level Matching, Domain and Instance-Level Matching, Combining Similarities, Integration of Web Query Interfaces, Constructing a Unified Global Query Interface.	8
5	**Opinion Mining And Sentiment Analysis** The Problem of Opinion Mining, Document Sentiment Classification, Sentence Subjectivity and Sentiment Classification, Opinion Lexicon Expansion, Aspect- Based Opinion Mining, Opinion Search and Retrieval, Opinion Spam Detection.	8
6	**Web Usage Mining** Web Usage Mining: Data Collection and Pre-Processing, Data Modeling for Web Usage Mining, Discovery and Analysis of Web Usage Patterns, Recommender Systems and Collaborative Filtering, Query Log Mining, Computational Advertising.	6

Books Recommended:

1. Web Data Exploring Hyperlinks, Contents, and Usage , Bing Liu , Springer, Second Edition

Reference books:

1. Data Mining: Concepts and Techniques, Second Edition Jiawei Han, Micheline Kamber (Elsevier Publications)
2. Web Mining: Applications and Techniques by Anthony Scime
3. Mining the Web: Discovering Knowledge from Hypertext Data by Soumen Chakrabarti

Coursera Courses Recommended:

Introduction to Social Media Analytics | Coursera

Suggested List of Experiments:

Sr. No.	Title of Experiments
1	Latent Semantic Indexing
2	Page rank estimation
3	Design a crawler to gather web information
4	Implement a wrapper induction technique to gather data from the web
5	Use linguistic techniques for schema matching
6	Perform Opinion spam detection
7	A) Using Google Analytics, perform Audience Analysis, Acquisition Analysis, Behaviour Analysis, Conversion Analysis
8	Apply analytics to social media activity (Using FB,twitter,Instagram or any social media dataset)

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper based on the entire syllabus, summing up to 75 marks.

2. Total duration allotted for writing the paper is 3 hrs.

Laboratory:

1. Oral Examination will be based on the entire syllabus including, the practical's 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 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.

Laboratory: (Term work)

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 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.

<table>
<tr><td colspan="6">Program: Final Year B.Tech. in Computer Engineering</td><td colspan="6">Semester: VIII</td></tr>
<tr><td colspan="6">Course: High Performance Computing</td><td colspan="6">Course Code: DJ19CEC802</td></tr>
<tr><td colspan="6">Course: High Performance Computing Laboratory</td><td colspan="6">Course Code: DJ19CEL802</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
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</table>

Pre-requisite: Operating System, Computer Organization.

Course Objectives:

To learn concepts of parallel processing as it pertains to high-performance computing.

1. To design, develop and analyze parallel programs on high performance computing resources using parallel programming.
2. Learn to design parallel programs on high performance computing.

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

1. Comprehend fundamental concepts parallel processing approaches
2. Describe different parallel processing platforms involved in achieving High Performance Computing.
3. Discuss different design issues in parallel programming
4. Develop efficient and high-performance parallel programming
5. Learn parallel programming using message passing paradigm using open-source APIs and shared address space platforms.

Detailed Syllabus: (unit wise)		
Module	**Contents**	**Hours**
1	**Introduction to Parallel Computing:** Motivating Parallelism, Scope of Parallel Computing, Levels of parallelism (instruction, transaction, task, thread, memory, function) Classification Models: Architectural Schemes (Flynn‘s, Shore‘s, Feng‘s, Handler‘s) and Memory access (Shared Memory, Distributed Memory, Hybrid Distributed Shared Memory) Parallel Architectures: Pipeline Architecture, Array Processor, Multiprocessor Architecture.	**06**
2	**Parallel Programming Platforms** Parallel Programming Platforms: Implicit Parallelism: Trends in Microprocessor & Architectures, Limitations of Memory System Performance, Dichotomy of Parallel Computing Platforms, Physical Organization of Parallel Platforms, Communication Costs in Parallel Machines.	**06**
3	**Parallel Algorithm Design** Principles of Parallel Algorithm Design: Preliminaries, Decomposition Techniques, Characteristics of Tasks and Interactions, Mapping Techniques for Load Balancing, Methods for Containing Interaction Overheads. Parallel Algorithm Models, Basic Communication operations: Broadcast and Reduction Communication types.	**08**
4	**Performance Measures** Performance Measures : Speedup, execution time, efficiency, cost, scalability, Effect of granularity on performance, Scalability of Parallel Systems, Amdahl‘s Law, Gustavson‘s Law, Performance Bottlenecks.	**08**
5	**Programming Using the Message-Passing Paradigm:** Principles of Message Passing Programming, The Building Blocks: Send and Receive Operations MPI: the Message Passing Interface, Topology and Embedding, Overlapping Communication with Computation, Collective Communication and Computation Operations.	**06**
6	**Programing Shared Address Space Platform** Thread Basics, The POSIX Thread API, Synchronization Primitives in Pthreads, Controlling Thread and Synchronization attributes, Thread Cancellation, OpenMP: a Standard for Directive Based Parallel Programming.	**08**

Text books:

1. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, ―Introduction to Parallel Computing‖, Pearson Education, Second Edition, 2007
2. Michael J. Quinn, ―Parallel Programming in C with MPI and OpenMP‖, McGraw-Hill International Editions, Computer Science Series, 2008

Reference Books:

1. Laurence T. Yang, MinyiGuo, ―High- Performance Computing: Paradigm and Infrastructure‖ Wiley, 2006.
2. Georg Hager, Gerhard Wellein, ―Introduction to High Performance Computing for Scientists and Engineers", Chapman & Hall / CRC Computational Science series, 2011.
3. Kai Hwang, Naresh Jotwani, ―Advanced Computer Architecture: Parallelism, Scalability, Programmability‖, McGraw Hill, Second Edition, 2010.
4.

Web Resources:

1. Coursera Course on " Parallel, Concurrent, and Distributed Programming in Java Specialization".

Suggested List of Experiments:

Sr. No.	Title of Experiments
1	Execution of Simple Hello world program on MPI platform.
2	a. Program to send data and receive data to/from processors using MPI b. Program illustrating Broadcast of data using MPI.
3	Implement a parallel program to demonstrate the cube of N number within a set range.
4	Sorting Algorithm
5	Implement a program to demonstrate balancing of workload on MPI platform.
6	Using directives of MPI/OpenMP implement parallel programming for calculator application (add, sub, multiplication, and division).
7	Mini Project Evaluate performance enhancement of HPC for any of the following: One-Dimensional Matrix-Vector Multiplication/ Single-Source Shortest-Path/ Sample Sort/Two-Dimensional Matrix-Vector Multiplication.

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Laboratory:

1. Oral examination will be based on the entire syllabus including, the practical's 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 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.

Laboratory: (Term work)

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 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.

Program: Final Year B.Tech. in Computer Engineering	**Semester: VIII**
Course: Natural Language Processing	**Course Code: DJ19CEEC8011**
Course: Natural Language Processing Laboratory	**Course Code: DJ19CEEL8011**

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**	**Avg.**	
				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**	

Pre-requisite: Finite Automata, Deep Learning, Probability Mathematics

Course Objectives:

1. To introduce the fundamental concepts and techniques of Natural language Processing for analyzing words based on Morphology and CORPUS.
2. To examine the NLP models and interpret algorithms for classification of NLP sentences by using both the traditional, symbolic and the more recent statistical approach.
3. To get acquainted with the algorithmic description of the main language levels that includes morphology, syntax, semantics, and pragmatics for information retrieval and machine translation applications.

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

1. Understand the principles and Process the Human Languages Such as English and other Indian Languages using computers.
2. Creating CORPUS linguistics based on digestive approach (Text Corpus method)
3. Demonstrate understanding of state-of-the-art algorithms and techniques for text-based processing of natural language with respect to morphology.
4. Perform POS tagging for a given natural language and select a suitable language modelling technique based on the structure of the language.
5. Check the syntactic and semantic correctness of sentences using grammars and labelling.
6. Develop Computational Methods for Real World Applications and explore deep learning based NLP

Detailed Syllabus: (unit wise)		
Module	**Contents**	**Hours**
1	**Introduction:** History Of NLP, Generic NLP System, Levels Of NLP, Knowledge In Language Processing, Ambiguity In Natural Language, Stages In NLP, Challenges Of NLP, Applications of NLP	**03**
2	**Word Level Analysis:** Morphology Analysis –Survey of English Morphology, Inflectional Morphology & Derivational Morphology, Lemmatization, Regular Expression, Finite Automata, Finite State Transducers (FST), Morphological Parsing With FST, Lexicon Free FST Porter Stemmer. N –Grams, Unigrams/Bigrams Language Models, Corpora, Computing the Probability Of Word Sequence, Training and Testing. Perplexity And Entropy: Smoothing and Backup, Zipf's Law, Add One Smoothing, Witten-Bell Discounting, Good Turing Discounting, Back Off Methods, Class Based Models, Google N-Gram Release.	**08**
3	**Syntax Analysis:** Part-Of-Speech Tagging (POS) - Open and Closed Words. Tag Set for English (Penn Treebank), Rule Based POS Tagging, Transformation Based Tagging, Stochastic POS Tagging and Issues –Multiple Tags & Words, Unknown Words. Hidden Markov Model (HMM), Maximum Entropy, And Conditional Random Field (CRF). CFG: Derivations, Constituency, Phrase Structure and Dependency Structure	**08**
4	**Semantic Analysis:** Lexical Semantics, Attachment for Fragment of English- Sentences, Noun Phrases, Verb Phrases, Prepositional Phrases, Relations Among Lexemes & Their Senses – Homonymy, Polysemy, Synonymy, Hyponymy, WordNet, Robust Word Sense Disambiguation (WSD), Lexical Disambiguation, Resolving Lexical Ambiguity, Lexical Ambiguity Resolution	**06**
5	**Pragmatics:** Discourse –Reference Resolution, Reference Phenomenon, Syntactic & Semantic Constraints on Co Reference	**06**
6	**Neural Models of Word Representations:** Problems With SVD; Intro to Word2vec, Learning Word Representations, Recurrent Neural Networks (RNNs), RNNs On POS Tagging, Statistical Machine Translation with RNNs	**06**

7	**Applications (Preferably for Indian Regional Languages):** Machine Translation, Information Retrieval, Question Answers System, Categorization, Summarization, Sentiment Analysis, Named Entity Recognition Linguistic Modeling – Neurolinguistics Models- Psycholinguistic Models – Functional Models of Language – Research Linguistic Models- Common Features of Modern Models of Language	**05**

Textbook:

1. Speech and Language Processing, ***2nd Edition***, Jurafsky and Martin, Prentice Hall; (January 26, 2000), ISBN: 0130950696

Reference Books:

1. Manning and Schutze, "Statistical Natural Language Processing", MIT Press; 1st edition (June 18, 1999), ISBN: 0262133601
2. James Allen. Natural Language Understanding. The Benajmins/Cummings Publishing Company Inc. 1994. ISBN 0-8053-0334-0.
3. Tom Mitchell. Machine Learning. McGraw Hill, 1997. ISBN 0070428077
4. Cover, T. M. and J. A. Thomas: Elements of Information Theory. Wiley. 1991. ISBN 0-471-06259-6.
5. Charniak, E.: Statistical Language Learning. The MIT Press. 1996. ISBN 0-262-53141-0.
6. Jelinek, F.: Statistical Methods for Speech Recognition. The MIT Press. 1998. ISBN 0-262-10066-5.

Suggested List of Experiments:

Sr. No.	**Title of Experiments**
1	Preprocessing steps in NLP Named Entity recognition & Chunking using NLTK and SPACY
2	Build a POS tagger using HMM
3	TF-IDF vectors in Natural Language Processing
4	Generate recursive set of sentences using Context Free Grammar Identify the word senses using "synset" in NLTK
5	Similarity Detection in NLP
6	Generate recursive set of sentences using Context Free Grammar
7	Word embeddings in NLP
8	Any application of NLP : Spell Check, Autocorrect, plagiarism detection, sentiment analysis, sarcasm detection or text analytics in any domain

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Laboratory:

1. Oral examination will be based on the entire syllabus including, the practical's 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 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.

Laboratory: (Term work)

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 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 Principal

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<tr><td colspan="8">Program: Final Year B.Tech. in Computer Engineering</td><td colspan="4">Semester: VIII</td></tr>
<tr><td colspan="8">Course: Software Architecture</td><td colspan="4">Course Code: DJ19CEEC8012</td></tr>
<tr><td colspan="8">Course: Software Architecture Laboratory</td><td colspan="4">Course Code: DJ19CEEL8012</td></tr>
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</table>

Pre-requisite: Object Oriented Concepts, Software Engineering

Course Objectives: To learn and use the Software Architecture with modern tools and techniques.

Outcomes: students will be able to:

1. Specify and evaluate software architectures.
2. Select and use appropriate architectural styles.
3. Select and use appropriate software design patterns.
4. Understand and perform a design review with agile project architecture.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Basic Concepts:** Concepts of Software Architecture, Models, Processes, Stakeholders **Designing Architectures:** The Design Process, Architectural Conception. Refined Experience in Action: Styles and Architectural Patterns, Architectural Conception in Absence of Experience.	**05**
2	**Connectors:** Connectors in Action: A Motivating Example, Connector Foundations, Connector Roles, Connector Types and Their Variation Dimensions, Example Connectors.	**06**
3	**Modeling:** Modeling Concepts, Ambiguity, Accuracy, and Precision, Complex Modeling: Mixed Content and Multiple Views, Evaluating Modeling Techniques, Specific Modeling Techniques.	**04**
4	**Analysis:** Analysis Goals, Scope of Analysis, Architectural Concern being Analyzed, Level of Formality of Architectural Models, Type of Analysis, Analysis Techniques.	**08**
5	**Implementation and Deployment** Concepts, Existing Frameworks, Software Architecture and Deployment, Software Architecture and Mobility. **Conventional Architectural styles:** Pipes and Filters, Event- based, Implicit Invocation, Layered systems, Repositories, Interpreters, Process control.	**08**
6	**Agile methodology software architecture:** Fundamentals of Agile Architecting: Object Orientation Achieving the Vision, Shortcomings of the Models, DCI as a new Paradigm, DCI and Architecture Refactoring Software Architecture: Code Refactoring, Refactoring to Patterns Managing Software Architecture in Agile Projects.	**07**
7	**Analyzing Architectures:** The ATAM, The CBAM, The World Wide Web. **Moving from one System to Many:** Software Product Lines, CelsiusTech (Case Study), J2EE/EJB (Case Study), Service-Oriented Architecture (SOA) (Case Study).	**04**

Books Recommended:

Text Books:

1. Software Architecture: Foundations, Theory, and Practiceî by Richard N. Taylor, Nenad Medvidovic, Eric Dashofy , ISBN: 978-0-470-16774-8
2. M. Shaw: Software Architecture Perspectives on an Emerging Discipline, Prentice- Hall.
3. Len Bass, Paul Clements, Rick Kazman: Software Architecture in Practice, Pearson.
4. Agile Software Architecture by Muhammad Ali Babar, Alan W. Brown, Ivan Mistrik,Publisher(s): Morgan Kaufmann, ISBN: 9780124078857

Reference Books:

1. Pattern Oriented Software Architectureî by Frank Buchnan etal, Wiley India.

2. The Art of Software Architectureî by Stephen T. Albin

Suggested List of Experiments:

Sr. No.	Title of Experiments
1.	Modeling using xADL
2.	Visualization using xADL 2.0
3.	Integrate software components using a middleware
4.	Use middleware to implement connectors
5.	Wrapper to connect two applications with different architectures
6.	Creating and analyzing web service
7.	Domain specific architecture development.
8.	Analysis of Architecture
9.	Case Study on Service-Oriented Architecture (SOA)

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Laboratory:

1. Oral examination will be based on the entire syllabus including, the practical's 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 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 marks scored in the two tests will be considered for final grading.

Laboratory: (Term work)

Laboratory work will be based on **DJ19CEEL8012** with a minimum of 08 experiments to be incorporated.

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 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 Principal

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<tr><td colspan="6">Course: Software Testing and Quality Assurance</td><td colspan="6">Course Code: DJ19CEEC8013</td></tr>
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</table>

Pre-requisite: Software Engineering

Course Objectives: This course equips the students with a solid understanding of:

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

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

1. Use various Software testing techniques to produce quality software.
2. Identify Learn Life-cycle models for requirements.
3. Design process models for units, integration, system, and acceptance testing
4. Identify various Quality Models.

Detailed Syllabus: (unit wise)		
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, Predicate Coverage 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.	**10**
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, Measuring Test 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.	**10**

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**

Books Recommended:

Text books:

1."Software Testing and Quality Assurance: Theory and Practice", Sagar Naik, University of Waterloo, Piyu Tripathy, Wiley, 2008.

2. Roger Pressman, ―Software Engineering: A Practitioners Approach", McGraw-Hill Publications,2011

Reference Books:

1."Effective methods for Software Testing "William Perry, Wiley.

2. "Software Testing - A Craftsman's Approach", Paul C. Jorgensen, CRC Press, 1995.

3. "The Art of Creative Destruction", Rajnikant Puranik, SPD.

4. "Software Testing", Srinivasan Desikan and Gopalaswamy Ramesh – Pearson Education 2006.

5. "Introducing to Software Testing", Louis Tamres, Addison Wesley Publications, First Edition.

6."The Art of Software Testing", Glenford J. Myers, John Wiley & Sons, 1979.

7. "Testing Object-Oriented Systems: Models Patterns and Tools", Robert V. Binder, Addison Wesley, 2000.

8. "Software Testing Techniques", Boris Beizer, 2nd Edition, Van Nostrand Reinhold, 1990.

9. "Software Quality Assurance", Daniel Galin, Pearson Education.

Suggested List of 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 Income Tax Calculator
4.	Black Box Testing on Units/Modules of Income Tax Calculator
6.	To design test cases for given problem statement based on Decision Table Testing method
7.	Study of Automation Software Testing with JUnit
8.	To study software Automation Testing with JMeter
9.	To study software Automation Testing tool WinRunner for Setting Up the GUI Map
10.	To study software Automation Testing tool WinRunner for Checking GUI Objects
11.	To study software Automation Testing tool WinRunner Creating Data-Driven Tests

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper 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's 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 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 marks scored in the two tests will be considered for final grading.

Laboratory: (Term work)

Laboratory work will be based on **DJ19CEEL8013** with a minimum of 08 experiments to be incorporated.

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 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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VIII</td></tr>
<tr><td colspan="8">Course: Project Management</td><td colspan="3">Course Code: DJ19ILO8021</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
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</table>

Pre-requisites: Basic concepts of Management.

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.

Outcomes: On completion of the course, learner 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 break down 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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
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.	**12**
4	**Monitoring and Controlling Projects** Planning monitoring and controlling cycle, Information needs and reporting, engaging with all stakeholders of the projects, communication and project meetings. 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.	**08**
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**

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VIII</td></tr>
<tr><td colspan="8">Course: Entrepreneurship Development and Management</td><td colspan="3">Course Code: DJ19ILO8022</td></tr>
<tr><td colspan="4" rowspan="3">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="3">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="3">75</td><td>25</td><td>25</td><td>25</td><td>100</td></tr>
<tr><td colspan="3">Laboratory Examination</td><td colspan="2">Term work</td><td rowspan="2">Total Term work</td><td rowspan="3">--</td></tr>
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<tr><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td></tr>
</table>

Pre-requisites: Basic concepts of Management.

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 starting and running an enterprise.

Outcomes: On completion of the 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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
1	**Entrepreneur & Entrepreneurship:** 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	**6**
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.	**10**
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 - District Industries Centers - Single Window System.	**6**
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	**8**
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 safety and 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	**12**

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)

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VIII</td></tr>
<tr><td colspan="8">Course: Corporate Social Responsibility</td><td colspan="3">Course Code: DJ19ILO8023</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="4">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
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</table>

Objectives:

1. To make students understand the concept, theories and application of CSR for the Development of the Society.

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

1. Understand the key characteristics of Corporate Social Responsibility (CSR) in the context of present-day management.
2. Apprise regarding business decision-making which is informed by ethical values and respect for people communities and the environment.
3. Become aware of creating a strategic plan that enables an organization to reach out to its internal and external stakeholders with consistent messages.
4. Understand critical issues of Corporate Social Responsibility (CSR) in a cross-cultural setting

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
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.	**06**
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.	**10**
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.	**10**
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**

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 Hittner, IBA Global Business Services, 2008
3. Strategic Corporate Social Responsibility: Stakeholders in a Global Environment, William B. Werther Jr. and David Chandler, 2nd Edition, Sage Publications, 2011

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="4">Semester: VIII</td></tr>
<tr><td colspan="8">Course: Human Resource Management</td><td colspan="4">Course Code: DJ19ILO8024</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="8">Evaluation Scheme</td></tr>
<tr><td colspan="5">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="5">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
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</table>

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.

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

1. Understand the concepts, aspects, techniques and practices of the human resource management.
2. Understand the Human resource management (HRM) processes, functions, changes and challenges in today's emerging organizational perspective.
3. Gain knowledge about the latest developments and trends in HRM.
4. Apply the knowledge of behavioral skills learnt and integrate it with in inter personal and intergroup environment emerging as future stable engineers and managers.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
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.	**09**
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.	**10**

	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.	

Books Recommended:

Reference Books:

1. Stephen Robbins, Organizational Behavior, 16th Ed, 2013
2. V S P Rao, Human Resource Management, 3rd Ed, 2010, Excel publishing
3. Aswathapa, Human resource management: Text & cases, 6th edition, 2011
4. C. B. Mamoria and S V 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

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
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<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VIII</td></tr>
<tr><td colspan="8">Course: Corporate Finance Management</td><td colspan="3">Course Code: DJ19ILO8025</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
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</table>

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.

Outcomes: On completion of the 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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
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Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
1	**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**
2	**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	**09**
3	**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**
4	**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)	**10**
5	**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	**09**

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 I. 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, 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 **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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
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<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VIII</td></tr>
<tr><td colspan="8">Course: Logistic and Supply Chain Management</td><td colspan="3">Course Code: DJ19ILO8026</td></tr>
<tr><td colspan="4" rowspan="3">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="3">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
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</table>

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.

Outcomes: On completion of the 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. Understand various sustainability aspects of a supply chain.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
1	**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. **Creating the Responsive Supply Chain:** Product push versus demand pull, The Japanese philosophy, The foundations of agility, A route-map to responsiveness.	**08**
2	**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.	**14**
3	**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**

4	**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**
5	**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**

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.

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VIII</td></tr>
<tr><td colspan="8">Course: IPR and Patenting</td><td colspan="3">Course Code: DJ19ILO8027</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="4">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
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<tr><td colspan="4">Laboratory Examination</td><td colspan="2">Term work</td><td rowspan="2">Total Term work</td><td rowspan="3">--</td></tr>
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</table>

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.

Outcomes: On completion of the 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

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
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	**06**
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 licence, 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 and 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	**12**
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	**10**
4	**GI, PVP and LDP** Geographical indication: meaning, difference between GI and trademarks, procedure for registration, effect of registration and term of protection Plant variety protection: meaning, benefit sharing, farmers' rights, procedure for registration, effect of registration and term of protection Layout Design protection: meaning, procedure for registration, effect of registration, term of protection	**08**
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	**06**

Books Recommended:

Reference 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.

4. Innovation and entrepreneurship by Drucker. F. Peter, Harper business, (2006).
5. Intellectual Property Rights, Deborah. E. Bouchoux, Cengage Learing.
6. Intellectual Property Rights– Unleashmy The Knowledge Economy, Prabuddha Ganguli, Tate Mc Graw Hill Publishing Company Ltd.,
7. The Design of Business- by Martin Roger, Harvard Business Publishing (2009)

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VIII</td></tr>
<tr><td colspan="8">Course: Digital Marketing Management</td><td colspan="3">Course Code: DJ19ILO8028</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="4">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
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</table>

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.

Outcomes: On completion of the 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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
1	**Introduction to 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.	**08**
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 developing 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.	**13**
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.	**08**
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**

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- 6 th 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, 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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
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<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VIII</td></tr>
<tr><td colspan="8">Course: Environmental Management</td><td colspan="3">Course Code: DJ19ILO8029</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
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</table>

Pre-requisite: Knowledge of environmental science.

Objectives:

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

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

1. Identify Environmental issues and get familiarized to the concept of Ecosystem and environmental management.
2. Know policies and legal aspects and understand EM system standards.
3. Understand Environment Impact assessment.
4. Understand Environment Auditing procedures.
5. Describe Environmental management Techniques

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
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.	**10**
3	**Environmental Impact Assessment (EIA) :-** Purpose, steps, hierarchy of EIA, Environmental Impact Statement and Impact Indicators, Evolution of IA in India and worldwide. Preliminary stages of EIA, Impact, Prediction, Evaluation and Mitigation.	**10**
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.	**08**

Books Recommended:

Text Books:

1. Environmental Management, T V Ramachandra and Vijay Kulkarni, TERI Press
2. Environmental Management: Principles and Practice, C J 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, 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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

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.

Syllabus for Final Year of B.Tech. (Common for All Programs)
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<table>
<tr><td colspan="8">Program: Final Year (Common for All Programs)</td><td colspan="3">Semester: VIII</td></tr>
<tr><td colspan="8">Course: Labour and Corporate Law</td><td colspan="3">Course Code: DJ19ILO8030</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
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</table>

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.

Outcomes: On completion of the 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

Syllabus for Final Year of B.Tech. (Common for All Programs)
Semester VIII (Autonomous)
(Academic Year 2022-2023)

Detailed Syllabus (Unit wise)		
Unit	**Description**	**Duration in Hours**
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	9
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	8
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.	9
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	8
5	**Case Studies on** A) Labour law B) Labour relations C) Corporate laws D) Securities laws	8

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 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.

<table>
<tr><td colspan="5">Program: Final Year B.Tech. in Computer Engineering</td><td colspan="5">Semester: VIII</td></tr>
<tr><td colspan="5">Course: Project Stage – II</td><td colspan="5">Course Code: DJ19CEP803</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
(Hours / week)</td><td colspan="9">Evaluation Scheme</td></tr>
<tr><td colspan="3">Semester End Examination Marks (A)</td><td colspan="4">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
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<tr><td rowspan="2">-</td><td rowspan="2">10</td><td rowspan="2">-</td><td rowspan="2">5</td><td>Oral</td><td>Practical</td><td>Oral &Practical</td><td>Laboratory Work</td><td colspan="2">Tutorial / Mini project / presentation/ Journal</td></tr>
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</table>

Course Objectives:

The primary objective is to meet the milestone s formed in the overall project plan decided in Project -I. The idea presented in Project -I should be implemented in Project -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 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 work and upon fulfilling minimum passing criteria in the term work.