MALNAD COLLEGE OF ENGINEERING, HASSAN

(An Autonomous Institution Affiliated to VTU, Belgaum)



Autonomous Programmes

Bachelor of Engineering



DEPARTMENT OF

INFORMATION SCIENCE AND ENGINEERING

SYLLABUS

VII & VIII Semester (2021 Admitted Batch)

(4th Year)

Academic Year 2024-25

VISION

The department will be a premier centre focusing on knowledge dissemination and generation to address the emerging needs of information technology in diverse fields.

MISSION

- 1. To make students competent to contribute towards the development of IT field
- 2. Promote learning and practice of latest tools and technologies among students and prepare them for diverse career options
- Collaborate with industry and institutes of higher learning for Research and Development, innovations and continuing education
- 4. Developing capacity of teachers in terms of their teaching and research abilities
- 5. Develop software applications to solve engineering and societal problems

PROGRAM EDUCATIONAL OBJECTIVES(PEOs)

Graduates will:

- PEO1: Be successful professionals in IT industry with good design, coding and testing skills, capable of assimilating new information and solve new problems.
- PEO2: Communicate proficiently and collaborate successfully with peers, colleagues and organizations.
- PEO3: Be ethical and responsible members of the computing profession and society.
- PEO4: Acquire necessary skills for research, higher studies, entrepreneurship and continued learning to adopt and create new applications.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

- 1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

Upon graduation, students with a degree B.E. in Information Science & Engineering will be able to:

- 1. Design and Develop efficient information systems for organizational needs.
- 2. Ability to adopt software engineering principles and work with various standards of computing systems

Scheme of Evaluation (Theory Courses)

Assessment	Marks
THREE CIE's conducted for a total of 30 marks	30
Activities as decided by course faculty / Lab component for integrated courses	20
SEE	50
Total	100

Scheme of Evaluation (Laboratory Courses)

Assessment	Marks
Continuous Evaluation in every lab session by the Course coordinator	10
Record Writing	20
Laboratory CIE conducted by the Course coordinator	20
SEE	50
Total	100

Examination	Maximum Marks	Minimum marks to qualify
CIE	50	20
SEE	50	20

Seventh Semester					
Course Category	Course Code	Course Title	L-T-P in hours	Credits	Contact Hours
IPCC	21IS701	Machine Learning	3-0-2	4	5
PI	21IS702	Main Project Phase 1	0-0-2	2	4
PEC	21IS7XX	Elective - III	3-0-0	3	3
PEC	21IS7XX	Elective - IV	3-0-0	3	3
PEC	21IS7XX	Elective - V	3-0-0	3	3
OEC	210EISXX	Open Elective – II	3-0-0	3	3
AEC	21RMIP	Research Methodology &IPR(Mandatory non credit course)	0-2(A)-0	AUDIT	2
	Total				23

Professional Elective Course					
Stream	Elective Group III	Elective Group IV	Elective Group V		
Data Storage & Analytics	21IS731 – Information Storage Management	21IS741 – Deep Learning	21IS751 – Data Science using R		
Software Application Development	21IS732 – C# & .Net	21IS742 -Enterprise Resource Planning	21IS752 – Service Oriented Architecture		
Networking	21IS733 – Block Chain Technologies	21IS743 – Cryptography, Network Security & Cyber Law	21IS753 – Robotic Process Automation		

Open Elective Course				
220EIS71	Web Technologies	220EIS73	Internet of Things	
220EIS72	Java Programming	220EIS74	Data Science	

Eighth Semester					
Course Category	Course Code	Course Title	L-T-P in hours	Credits	Contact Hours
PI	21IS801	Main Project Work Phase 2	0-0-8	4	16
PI	21INT-3	Research/Industry Internship - III	0-0-12	12	24
Total				16	

Course Title	Machine learning		
Course Code	21IS701	(L-T-P)C	(3-0-2) 4
Exam	3 Hrs.	Hours/Week	5
SEE	50 Marks	Total Hours	36L+14P

Course Objective: To apply the techniques of machine learning for real time problems. Course Outcomes (COs): Upon completion of the course, students shall be able to:

#	Course Outcomes	Mapping to PO's	Mapping to PSO's	
1	Describe and Apply preprocessing, Modeling, Evaluation and	2,3	-	
	concept learning for the given problem.			
2.	Depict and Apply supervised and unsupervised machine	3	1	
	learning algorithms for solving the given problem			
3.	Illustrate and utilize the Neural networks, Bayesian learning and	3	1	
	other forms learning for the given problem			
4.	Conduct experiments for demonstrating machine learning	3,5	1	
	algorithms and data visualization methods.			
	MODULE-1			

Introduction to Machine learning: Human learning and its types, Machine learning and its types, Applications, tools and issues in machine learning, Activities in machine learning, Types of data, Exploring structure of data, Data quality and Pre-processing.

Modeling and Evaluation: Introduction, selecting a model, training a model, model representation and Interpretability, Evaluating performance of a model.

MODULE-2			
Learning Problems and Concept Learning: Well Posed learning problems, Designin,	g a Learning		
systems, Concept Learning Tasks, Search, Find-S, Version Spaces and Candidate	Elimination		
Algorithm, Inductive bias.			
Supervised Learning: Introduction, example, classification model, classification learning steps, and			
Common algorithms -KNN, decision tree, and Random Forest model.			
MODULE-3 9 Hrs.			
Supervised Learning: SVM, Regression-Simple linear regression, Multiple linear regressions,			

Assumption in Regression analysis.

Unsupervised Learning: Supervised Vs Unsupervised, Application, clustering, Finding pattern using Association rule.

MODULE-4	9 Hrs	
Basics of Neural Networks: Exploring the artificial neuron, Types of activation function, Early		
implementations of ANN, Architectures of NN, Learning process in ANN, Back propagation algorith		
Bayesian learning: Introduction, Bayes theorem, Bayes theorem and concept learning, Bayesian Belie		
Networks		

Other types of Learning - Representation learning, Active Learning, Instance based Learning, Association rule Learning, Ensemble learning

Prescribed Text Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Machine Learning	Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das	(INDIAN EDITION)	Pearson	2019
2	Machine Learning	Tom M. Mitchell McGraw-Hill Education	(INDIAN EDITION)		2013

Reference Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Hands-on machine learning	<u>O'Reilly</u>	2nd Ed	Tata McGraw-Hill	2019
	with scikit-learn and	Media, Aurélien Géron,			
	tensorflow, Concepts, Tools,				
	and Techniques to Build				
	Intelligent Systems.				
2	Introduction to Machine	Peter Linz	2nd Ed	PHI Learning Pvt.	2013
	Learning			Ltd	
3	The Elements of Statistical	T. Hastie, R. Tibshirani,	1st		2001
	Learning, Springer	J. H. Friedman			

E Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Hands-On Machine	Scikit-Learn, Keras, and	2nd	O'Reilly Media	2019
	Learning	TensorFlow			

MOOC Course:

Sl. No	Course Name	Course offered by	Year	URL
1.	Introduction to Machine	IITKGP	2019	https://swayam.gov.in/nd1_noc19_cs52/preview
	Learning			
2.	Supervised Machine Learning:	coursera		https://www.coursera.org/learn/machine-
	Regression and Classification			learning/
3.	Introduction to Machine	IIT Madras	2024	https://nptel.ac.in/courses/106106139/
	Learning			

Proposed Assessment Plan (for 50 marks of CIE):

Tool	Remarks	Marks
Internals	Three tests conducted for 20 marks each and reduced to 10 marks	30
Lab	Lab Conduction	20
	Total	50

Laboratory Plan:

Lab Program	Program Details
1	Demonstration of Python Libraries for Machine Learning-Pandas, Sklearn, numpy, matplotlib.

2	Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis
	based on a given set of training data samples.
3	Implement and demonstrate the Candidate Elimination algorithm for finding the most
	specific hypothesis based on a given set of training data samples.
4	Consider the given dataset, which demonstrates the salary distribution table of a company
	"ABC" based on years of experience. Using the given data implement the ML algorithm
	(Linear Regression) to predict the salary of a new employee with 5 years of experience.
	Create a visualization to represent training data and regression lines.
5	Consider the Iris dataset from the sklearn.datasets module and implement the ML
	algorithm (k-nearest neighbors) to classify the Iris flowers among three species (Setosa,
	Virginica and Versicolor) from measurements of sepal and petal.
6	Apply K-Means clustering to segment a customer dataset based on various attributes such
	as age, amount spent, satisfaction, and brand loyalty.
7	Consider the given Iris dataset and implement the ML algorithm to classify the Iris flowers
	among three species (Setosa, Virginica and Versicolor) from measurements of sepal, petal
	length and width. (using Decision Tree Algorithm)
1	

Course Outcomes														
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		2	3											
CO2			3										2	
CO3			3										2	
CO4			3		3								3	

Cou	rse Title	SE - I						
Cou	rse Code	21IS702	L-T-P-C	(0-0-4)2				
Exa	m	3 Hours	Hours / Week	4				
CIE		50 Marks	SEE	50 Marks				
Cour	rse Objective	equires technical	solution and					
Cour	Course Outcomes Upon the completion of the course the students will be able to:							
#		Course Outcomes	Mapping to POs	Mapping to PSOs				
1.	Identify a propublication o	oblem, through Extensive literature Survey leading to f a survey paper in a Conference/Journal.	1,2					
2.	Plan & design	the solution to the chosen problem	3	2				
3.	. Make oral presentation and documentation of the work carried out 9,10							
Cou	Course Contents							

During VII semester, candidates in consultation with the guides shall carry out literature survey to finalize the topic of the project. *The same project will be continued in Eighth semester*. Students are expected to present the project synopsis, system analysis, requirements specification and **should publish a technical paper on** Literature Survey. The evaluation will be carried out in three stages

- Project Stage 1 Team Formation, Topic Selection & Guide allotment (No marks)
- Project Stage 2 Extensive Literature Survey, Problem Definition
- Project Stage 3 Preliminary Design, Report Preparation and Publication

The evaluation of the project phases shall be carried out by the evaluation committee comprising of project guide & other faculty members. The committee will be constituted by the project coordinator in consultation with the Head of the department. *For Multidisciplinary projects guides will be allotted from each concerned branch*.

Performance Indicators	Low	Medium	High		
Literature Survey and Problem Definition (20 Marks)	Literature Survey not pertaining to the title of the project (8)	Incomplete literature survey and improper problem definition (14)	Extensive literature survey with clear state of the art problem definition (20)		
Preliminary Design (10 Marks)	inary Design (10 Has no coherent strategies for problem Solving (4) Has some strategies for Solving (4) coherent Has some strategies for problem – solving, but does not apply them consistently (7)		Formulates strategies for solving problems (10)		
Presentation (10 marks)	Disorganized and ineffective presentation (4)	Organized, but ineffective presentation (7)	Effective organized presentation (10)		
Report Preparation (30 Marks)	Disorganized and contents are not sufficient	Organized but not good content wise	Effectively organized and well framed contents		
Paper Publication (20 Marks)	Paper submitted & awaiting results (8)	NationalconferenceInternationalConference(14)(14)	Journal (20)		
Punctuality (Project Dairy Maintenance) (10 marks)	Not meeting the guide regularly (4)	Meeting regularly but doesn't document details of every session (7)	Up to date dairy maintenance(10)		

Course Outcomes	PO 1	PO 2	РО 3	PO 4	PO 5	PO 6	PO 7	PO 8	РО 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	3
CO3	-	-	-	-	-	-	-	-	3	3	-	-	-	-

Course title	Information Storage and Management						
Course Code	21IS731	(L-T-P)C	(3-0-0)3				
Exam	3 Hrs.	Hours/Week	3				
SEE	50 Marks	Total Hours	40				

Course Objective: The course provides an insight into information storage technology and architecture, different backup, archive and replication technologies and also storage infrastructure security aspects.

Course outcomes: At the end of course, student will be able to:

#	Course Outcomes	Mapping to PO's	Mapping to PSO's
1.	Describe the architecture of a Data Centre environment with RAID and Intelligent Storage Systems	1,3	-
2.	Understand and interpret various SAN technologies, storage virtualization concepts and different backup strategies	1,4	-
3.	Classify the applications as per their requirements and select relevant SAN solutions	1	-
4.	Understand different SAN management strategies to fulfil business continuity requirements	1	-

MODULE-1

Introduction to Information Storage: Information Storage, Evolution of Storage Architecture, Data Center Infrastructure, Virtualization and Cloud Computing. Data Center Environment: Application, DBMS, Host, Connectivity, Storage, Disk Drive Components, Disk Drive Performance, Host access to data, DAS, Storage design based on application requirements and disk performance, disk native command queuing. Data Protection - RAID: RAID Implementation methods, RAID Array Components, RAID techniques, RAID Levels, RAID Impact on Disk Performance, RAID Comparison, Hot Spares. Intelligent Storage Systems: Components of an Intelligent Storage System, Types of intelligent storage systems.

MODULE-2

10 Hrs.

Fibre Channel Storage Area Networks: Fibre Channel Overview, The SAN and Its Evolution, Components of FC SAN, FC Connectivity, Switched Fabric Ports, Fibre Channel Architecture, Fabric Services, Switched Fabric Login Types, Zoning, FC SAN Topologies, Virtualization in SAN. **IP SAN and FCoE:** iSCSI, FCIP, FCoE.

Network Attached Storage: General – Purpose Servers vs. NAS Devices, Benefits of NAS, File Systems and Network File Sharing, Components of NAS, NAS I/O Operation, NAS Implementations, NAS File-Sharing Protocols, Factors Affecting NAS Performance, File-Level Virtualization.

Object-Based and Unified Storage: Object-Based Storage Devices, Content-Addressed Stora	ge, CAS
Use Cases, Unified Storage.	

Introduction to Business Continuity: Information Availability, BC Terminology, BC Planning Lifecycle, Failure Analysis, Business Impact Analysis, BC Technology Solutions.

Backup and Archive: Backup Purpose, Backup Considerations, Backup Granularity, Recovery Considerations, Backup Methods, Backup Architecture, Backup and restore Operations, Backup Topologies.

Module-4

Local Replication: Replication Terminology, Uses of Local Replicas, Replica Consistency, Local Replication Technologies, Tracking changes to source and replica, Restore and Restart Considerations, Creating Multiple Replicas.

Remote Replication: Modes of remote replication, Remote Replication Technologies.

Securing the Storage Infrastructure: Information Security Framework, Risk Triad, Storage Security Domains, and Security Implementations in Storage Networking.

Managing the Storage Infrastructure: Monitoring the Storage Infrastructure, Storage Infrastructure Management Activities.

Prescribed Text Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Information Storage and	G.Somasundaram,	2	Wiley India	2012
	Management, EMC	Alok Shrivastava			
	Education Services				

Reference Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Storage Networks Explained	Ulf Troppens	-	Wiley India	2009
2	Storage Networks, The	Robert Spalding	-	Tata McGraw	2003
	Complete Reference			Hill	
3	Storage Area Networks	Richard Barker and	-	Wiley India	2002
	Essentials, A Complete	Paul Massiglia			
	Guide to Understanding and				
	Implementing SANs				

10 Hrs

Module-3

MOOC Course:

Sl.No	Course Name	Course offered by	Year	URL
1	Storage Area	Udemy	2024	https://www.udemy.com/course/storage-
	Networks			area-network-with-oracle-zfs-on-centos-
				<u>linux-12/</u>

E-Book:

Sl. No	Book Title	Authors	Edition	Publisher	Year	URL
1	Online resource	G.Somasund	2	Wiley	2012	www.emc.com/resource
	material	aram, Alok		India		<u>-library</u>
		Shrivastava				/resourcelibrary.esp

Proposed Assessment Plan (for 50 marks of CIE):

Tool	Remarks	Marks		
Internals	Three tests conducted for 20 marks each and reduced to 10 marks	30		
AAT	AAT 1) Case Study presentation – 10 marks 2) Problem Solving test – 10 marks			
	50			

Course Outcomes	Program Outcomes [POs]													
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3		3											
CO2	3			3										
CO3	3													
CO4	3													

Course Ti	Title C# & .Net										
Course Co	Code 21IS732 (L-T-P)C (3-0-0)3										
Exam		3 Hrs.	Hours/Week		3						
SEE		50 Marks Total Hours 40									
Course O	bjective	: Students will be able to apply C	bject Oriented Program	ming concepts	for designing						
Applicatio	ons using	language C# and IDE – Visual S	Studio.								
Course O	utcomes	(COs) : Upon completion of the	course, students shall be	e able to:							
#		Course Outcomes	S	Mapping to PO's	Mapping to PSO's						
1	Develo	p C# programs using Visual Stud	lio IDE.	1,2	-						
2.	Apply	Object Oriented Programmin	ng concepts in C#	1,2	-						
	program	nming language									
3.	Interpre	et Interfaces and define cu	stom interfaces for	1,2	-						
	applicat	tion.									
4.	Analyz	e a C# program for identifying but	ugs.	2	-						
		MODULE-1			10 Hrs.						
Introducin	g Micro	soft Visual C# and Microsoft V	Visual Studio 2015: We	elcome to C#,	working with						
variables,	operator	s, and expressions, writing meth	ods, and applying scop	e, using decision	on statements,						
using com	pound as	ssignment and iteration statement	ts, Managing errors and	exceptions							
		MODULE-2			10 Hrs.						
Understan	ding the	C# object model: Creating and	Managing classes and o	objects, underst	anding values						
and refere	nces, cre	ating value types with enumeration	ons and structures, Usin	g arrays	10.11						
MODULE-3 10 Hrs.											
Understan	ding par	ameter arrays, working with in	heritance, creating inte	rfaces and def	ining abstract						
classes, Us	sing gart	bage collection and resource man	agement		_						
		MODULE-4			10 Hrs						
Defining	Extensib	le Types with C#: Implementin	g properties to access	tields, introdu	cing generics,						
Using coll	ections,	Operator overloading			Using collections, Operator overloading						

Prescribed Text Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Microsoft Visual C# Step by Step	John Sharp	8th	PHI Learning Pvt. Ltd	2016

Reference Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Inside C#,	Tom Archer, Andrew	2nd	WP Publishers	2016
		Whitechapel			
2	The Complete	Herbert Schildt	3rd	Tata McGraw Hill	2019
	Reference C# 3.0			Education Private	
				Limited	

E Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Microsoft Visual	John Sharp	8th	PHI Learning Pvt. Ltd	2016
	C# Step by Step				

MOOC Course:

Sl.No	Course Name	Course offered by	Year	URL
1	C# With .Net	NPTEL Swayam	2024	https://swayam-
				plus.swayam2.ac.in/courses/course-
				details?id=P_GUVI_07

Proposed Assessment Plan (for 50 marks of CIE):

Tool	Remarks	Marks						
Internals	Internals Three tests conducted for 20 marks each and reduced to 10							
	marks							
AAT	AAT .NET application development							
	Total							

Course Outcomes	Program Outcomes [POs]													
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3												
CO2	3	3												
CO3	3	3												
CO4		3												

Course Title	Bloc	Block Chain Technologies									
Course Code	2118733	(L-T-P)C	(3-0-0) 3								
Exam	3 Hrs.	Hours/Week	3								
SEE	50 Marks	Total Hours	40								
	·	·	·								

Course Objective: The course provides the fundamentals, models and technologies of Block chain **Course outcomes:** At the end of course, student will be able to:

#	Course Outcomes	Mapping to PO's	Mapping to PSO's			
1.	Understand the fundamentals of Blockchain	1	-			
2.	Illustrate the technologies of Blockchain	2 -				
3	Describe the models of Blockchain 1					
4	Analyze and demonstrate the Ethereum and Hyper ledger fabric	2	-			
	MODULE-1					

Block chain 101: Distributed systems, History of block chain, Introduction to block chain, Types of Block chain, CAP theorem and block chain, Benefits and limitations of block chain.

Decentralization and Cryptography: Decentralization using block chain, Methods of decentralization, Routes to decentralization, Decentralizations.

MODULE-2

10 Hrs.

10 Hrs.

Introduction to Cryptography & Crypto currencies: Cryptographic Hash Functions, Hash Pointersand Data Structures, Digital Signatures, Public Keys as Identities, A Simple Crypto currency,

How Bitcoin Achieves Decentralization: Distributed consensus, Consensus without identity using ablock chain, Incentives and proof of work, Putting it all together,

MODULE-3

Mechanics of Bit coin: Bit coin transactions, Bit coin Scripts, Applications of Bit coin scripts, Bit coinblocks, The Bit coin network, Limitations and improvements

How to Store and Use Bit coins: Simple Local Storage, Hot and Cold Storage, Splitting and SharingKeys, Online Wallets and Exchanges, Payment Services, Transaction Fees, Currency Exchange Markets

MODULE-4	10 Hrs
Smart Contracts: Smart Contracts: Definition, Ricardian contracts.	
Ethereum 101: Introduction, Ethereum block chain, Elements of the Ethereal block chain, Precompiled c	ontracts.

Prescribed Text Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Mastering Blockchain -	Imran Bashir	3rd	Packt	2017
	Distributed ledgers,			Publishing	
	decentralization and smart			Ltd	
	contracts explained				

2	Bitcoin and Cryptocurrency	Arvind Narayanan, Joseph 2	2nd Princeton 2016
	Technologies: A	Bonneau, Edward W. Felten,	University
	Comprehensive Introduction.	Andrew Miller, Steven	Press
		Goldfeder and	
		Jeremy Clark.,	

Reference Books:

Sl.No		Book Title		Authors	Edition	Publisher	Year
1	Blockchain	Basics:	A Non-	Daniel Drescher	First Edition	Apress	2017
	Technical In	troduction is	n 25 Steps,				
2	Mastering Bitcoin: Unlocking			Andreas M.	First Edition	O'Reilly Media	2014
	Digital Cryp	tocurrencies	5	Antonopoulos			

E Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Mastering Blockchain -	Imran Bashir	3 rd	ISBN 978-1-	2017
	Distributed ledgers,			78712-544-5	
	decentralization and smart				
	contracts explained				
2	Bitcoin and Cryptocurrency	Arvind Narayanan, Joseph	2^{nd}	Princeton	2016
	Technologies: A	Bonneau, Edward W. Felten,		University Press	
	Comprehensive	Andrew Miller, Steven			
	Introduction.	Goldfeder and			
		Jeremy Clark.,			

Mooc Course:

Sl.No	Course Name	Course offered by	Year	URL
1	Blockchain and its Applications	By Prof. Sandip Chakraborty, Prof. Shamik Sural IIT Kharagpur	2022	https://onlinecourses.nptel.ac.in/n oc22_cs44/preview
2	Blockchain	Dr.Mayank Aggarwal , Gurukul Kangri Vishwavidyalaya,Haridwar		https://onlinecourses.swayam2.ac. in/aic21_ge01/preview

Proposed Assessment Plan (for 50 marks of CIE):

Tool	Remarks	Marks
Internals	Three tests conducted for 20 marks each and	30
	reduced to 10 marks	
AAT	Presentation on course related topic -10 Marks Quiz- 10 Marks	20
	50	

Course Outcomes		Program Outcomes [POs]												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2		3												
CO3	3													
CO4		3												

Course Title	Deep Learning						
Course Code	21IS741	(L-Т-Р)С	(3-0-0) 3				
Exam	3 Hrs.	Hours/Week	3				
SEE	50 Marks	Total Hours	40				

Course Objective: To provide students with the knowledge and skills to analyze natural language text, generate natural language, demonstrate text mining techniques, and apply information retrieval techniques. **Course outcomes:** At the end of course, student will be able to:

#	Course Outcomes	Mapping to PO's	Mapping to PSO's		
1.	Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains.	1,2	-		
2.	Implement deep learning algorithms and solve real-world problems.	2,3	-		
3.	Execute performance metrics of Deep Learning Techniques.	2,3	-		
MODULE-1					

Machine Learning Basics: Learning Algorithms, Capacity, Overfitting and Under fitting, Hyper parameters and Validation Sets, Estimator, Bias and Variance, Maximum Likelihood Estimation, Bayesian Statistics.

Machine Learning Basics (Cont..): Supervised Learning Algorithms, Unsupervised Learning Algorithms, Stochastic Gradient Decent, building a Machine Learning Algorithm, Challenges Motivating Deep Learning.

MODULE-3

MODULE-2

10 Hrs.

10 Hrs.

Deep Feedforward Networks: Gradient-Based Learning, Hidden Units, Architecture Design, Back Propagation.

Regularization: Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation,

MODULE-4

10Hrs

Noise Robustness, Semi Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging, Dropout.

Optimization for Training Deep Models: How Learning Differs from Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms. Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates.

SI.No	Book Title	Authors	Edition	Publisher	Year		
1.	Deep Learning	Lan Good fellow and Yoshua Bengio and Aaron Courville	2016	MIT Press	2016		

Prescribed Text Books:

Reference Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1.	Speech and Language Processing:	Daniel Jurafsky	2nd	Prentice Hall	2008
	An introduction to Natural	and James H			
	Language Processing,	Martin			
	Computational Linguistics" and				
	Speech Recognition				
2.	Natural Language Understanding	James Allen	2nd	Benjamin/Cumm ing	1995
				publishing company	

MOOC Course:

Sl.No	Course Name	Course offered by	Year	URL
1.	Deep Learning	IIT, Madras	2024	https://nptel.ac.in/courses/106106184

E-Book:

SI.No	Book Title	Authors	Edition	Publisher	Year	URL
1.	Deep	Lan Good fellow	2016	MIT Press	2016	http://alvarestech.com/temp/
	Learning	and Yoshua	Edition			deep/Deep%20Learning%20by
		Bengio and				%20Ian%20Goodfellow,%20Yo
		Aaron Courville				shua%20Bengio,%20Aaron%20
						Courville%20(z-lib.org).pdf

Proposed Assessment Plan (for 50 marks of CIE):

Tool	Remarks	Marks
Internals	Three tests conducted for 20 marks each and reduced to 10 marks	30
	1) Implementation of Deep Learning Algorithm – 10 marks	
AAT	2) Presentation - 5 Marks	20
	3) Report - 5 Marks	
	Total	50

Course Outcomes		Program Outcomes [POs]												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3												
CO2		3	3											
CO3		3	3											

Course Title	Enterprise Resource Planning					
Course Code	2115742	(L-T-P)C	(3-0-0)3			
Exam	3 Hrs.	Hours/Week	3			
SEE	50 Marks	Total Hours	40			

Course Objective: Students will be able to develop web applications. **Course Outcomes**: At the end of the course, student will be able to:

#	Course Outcomes	Mapping to POs	Mapping to PSOs
1	Understand concepts in Enterprise Resource Planning and its benefits and significance of Business Engineering, ERP and Management concerns	3,10,12	-
2	Understand the social and ethical responsibilities of a professional working in the discipline	7,10	-
3	Understand Industrial and Financial Systems, SAP, Market Dynamics, TQM	8,10,12	-
4	Get an overview of MFG/PRO, Marketing of ERP	11,12	-

Module - 1

10 Hrs

Enterprise Resource Planning: An Overview, Accommodating Variety, Integrated Management Information, Seamless Integration, Supply Chain Management, Resource Management, Integrated Data Model, Scope, Technology, Benefits of ERP, Evolution, ERP revisited, ERF and its Modern Enterprise.

Business Engineering and ERP: An overview, what is Business Engineering? Significance, Principles, BRP, ERP and IT, Business Engineering with Information Technology, ERP and Management Concerns. Business Modelling for ERP: An Overview, Building Business Model.

Module - 2					
ERP- Implementation: An overview, Role of Consultants, Vendors and Users, Cust	omization,				
Precautions, ERP-Post Implementation Options, ERP- Implementation Methodology, Guic	lelines for				
Implementation.					
The ERP Domain-1: An Overview, MFG/PRO, IFS/Avalon- Industrial and Financial Systems.					
Module - 3 10 Hrs					
The ERP Domain-2: Baan IV, SAP, SAP R/3 Applications, Example of an Indian ERP Package, The	e arrival of				
ERP.					
ERP and the Competitive Advantage: An Overview, ERP and the Competitive strategy. Ma	rketing of				
ERP–1: An overview.					
Module - 4 10 Hrs					
Marketing of ERP-2, TQM-1: Market Dynamics and Competitive Strategy, Total Quality Management.					

TQM-2, Case Studies: TQM - ISO 9000, An overview, Mercedes-Benz, KeeHin Industries, Bull Electronics

Angers Plant Manufacturers, Twentieth Century Companies, Ameritech, Essar Steel. Jindal Iron and Steel Company. Godrej Soaps and Associated Companies, Indian Renewable Energy Development Agency, ERP Handles Pressure, Sara ERP Case Study-Hawkins Cookers Ltd., A Wholesome Enterprise Application.

Prescribed Text Books:

SI.No	Book Title	Authors	Edition	Publisher	Year
1	Enterprise Resource	Vinod Kumar Garg.,	-	PHI	2003.
	Planning	N. K.			
		Venkatakrishnan			
2	Enterprise Resource	S. Sadagopan	-	PHI	1999
	Planning				

Reference Books:

SI.No	Book Title	Authors	Edition	Publisher	Year
1	Concepts in	Ellen F. Monk, Bret	4th		
	Enterprise	Wagner	edition	-	2013
	Resource Planning				

E Books:

SI.No	Book Title	Authors	Edition	Publisher	Year
1	Enterprise Resource Planning	Vinod Kumar Garg., N. K. Venkatakrishnan	-	PHI	2003.

MOOC Course:

SI.No	Course Name		Course offered by	Year	URL
1	Enterprise	Resource	National Institute of	2024	https://nptel.ac.in/courses/110/
	Planning		Technical Teachers		<u>105/110105083/</u>
			Training and		
			Research, Chennai.		

Proposed Assessment Plan (for 50 marks of CIE):

Tool	Remarks	Marks
AAT	1) Seminar	50
	2) Assignment	
	3) Concept presentation	
	Total	50

Course Outcomes		Program Outcomes [POs]												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01			3							3		3		
CO2							3			3				
CO3								3		3		3		
CO4											3	3		

Course Title	Cryptography, Network Security and Cyber Law (3-0-0) 3							
Course Code	21 \$743	(L-T-P)C	(3-0-0) 3					
Exam	3 Hrs.	Hours/Week	3					
SEE	50 Marks	Total Hours	40					

Course Objective: To impart the fundamentals of Cryptographic techniques and various algorithms that enables providing network security services.

Course outcomes: At the end of course, student will be able to:

#	Course Outcomes	Mapping to PO's	Mapping to PSO's
1.	Describe the basics of cryptographic techniques, principles & practices.	1	-
2.	Apply cryptographic techniques to secure the data in transit	2	-
3.	Analyze different cryptographic techniques to handle security threats	2 -	
4.	Understand and adopt Cyber security and Cyber law	8	-
	MODULE-1		10 Hrs.

Overview: Computer Security Concepts. The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms. A Model for Network Security. Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques.

Block Ciphers and the Data Encryption Standard: Traditional Block Cipher Structure, The Data Encryption Standard, A DES Example, The Strength of DES, Block Cipher Design Principles.

MODULE-2	10 Hrs.					
Asymmetric Ciphers : Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems, the RSA Algorithm, Diffie Hellman Key Exchange.						
Digital Signatures: Digital Signatures, NIST Digital Signature Algorithm.						
Key Management and Distribution : Symmetric Key Distribution Using Symmetric Encry Symmetric Key Distribution Using Asymmetric Encryption, Distribution of Public Keys	yption, X 509					
Certificates.						
MODULE-3	10 Hrs.					
User Authentication: Kerberos, Federated Identity Management, Personal Identity Network and Internet Security: Network Access Control and Cloud Security: Network Access Control	Verification. cess Control,					

MODULE-4 Transport-Level Security: Web Security Considerations, Secure Sockets Layer, Transport Layer Security, HTTPS, Secure Shell (SSH).

10 Hrs

Cyber Law:IT act aim and objectives, Scope of the act, Major Concepts, Important Provisions, Attribution, acknowledgement, and dispatch of electronic records. Regulation of certifying authorities, Penalties and adjudication, the cyber regulations appellate tribunal.

Prescribed Text Books:

SI.No	Book Title	Authors	Edition	Publisher	Year
1	Cryptography and	William Stallings	7th	Pearson	2018
	Network Security			Education	
2	Cryptography,	Bernard Menezes		Cengage	2010
	Network Security			Learning	
	and Cyber Laws				

Reference Books:

SI.No	Book Title	Authors	Edition	Publisher	Year
1	Network Security:	Charlie Kaufman,	2nd	Pearson	2016
	Private Communication	Radia Perlman, Mike		Education	
	in a Public World	Speciner			
2	Cryptography and	Atul Kahate	3rd	Tata McGraw-	2011
	Network Security			Hill	

MOOC Course:

SI.N o	Course Name	Course offered by	Year	URL
1	Cryptography and Network Security	IITB	2024	https://nptel.ac.in/courses/106/105/106105031/.

E-Book:

Sl.No	Book Title	Authors	Edition	Publisher	Year	URL
1	Cryptography and	William	3 rd	Pearson	2007	http://williamstallings.com/
	Network	Stallings		Education		Crypto3e
	SecurityPrinciples					
	and Practice.					

Proposed Assessment Plan (for 50 marks of CIE):

Tool	Remarks	Marks
Internals	Three tests conducted for 20 marks each and reduced to 10 marks	30
AAT	1) Implementation of cryptographic algorithm – 10 marks	20
	2) Problem Solving test – 10 marks	
	Total	50

AAT - Implementation of cryptographic algorithm

Students are supposed to develop a Cryptographic algorithm/Digital Signature without using libraries or built-in functions. Code demonstration along with a report has to be submitted. Example: Implementation of classical encryption techniques, RSA Digital Signature algorithm, Elgamal Digital Signature, Diffie Hellman Signature, and Modified RSA algorithm for practical purpose, Public key encryption schemes and Hybrid encryption schemes.

Course Outcomes		Program Outcomes (POs)												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2		3												
CO3		3												
CO4								3						

Cours	e Title	tle Data Science Using R							
Course	e Code	2118751	(L-T-P)C	(3-0-	·0) 3				
Ex	am	3 Hrs.	Hours/Week	1	3				
SE	EE	50 Marks	Total Hours	4	0				
Course	Objective	e: Apply the principles of data sci	ence for solving real time	e problems.					
Course	outcomes	s: At the end of course, student w	ill be able to:	1					
#		Course Outcome	S	Mapping to PO's	Mapping to PSO's				
1.	Understa	anding of techniques for data acqu	uisition, cleaning,	1	1				
	transform	nation, and storage.		1					
2.	Describe Explorat	e various Data Science process lik tory data analysis, Data visualizat	ion.		1				
3.	Apply va making.	arious feature selection algorithm	s for effective decision	3	1				
4.	Develop	effective visualization for the given	ven data using R	5	1				
		MODULE	-1		10 Hrs.				
Introdu	ction: W	hat is Data Science? Big Data	and Data Science hype -	and getting p	ast the hype,				
Why no	w? – Data	afication, Current landscape of p	erspectives, Skill sets ne	eded. Statistica	al Inference -				
Populati	ons and s	amples, Statistical modeling, prol	pability distributions, fitting	ng a model.					
		MODULE	-2		10 Hrs.				
Explora	tory Data	Analysis and the Data Science	Process - Basic tools (plots, graphs a	and summary				
statistics) of EDA	, Philosophy of EDA. The Data S	Science Process, Case Stu	dy: Real Direc	ct (online real				
estate fir	m). Three	e Basic Machine Learning Algori	thms - Linear Regression						
		MODULE	-3		10 Hrs.				
k-Neares	st, Neigh	bors (k-NN), k-means. One M	Iore Machine Learning	Algorithm a	nd Usage in				
Applicat	ions - M	otivating application: Filtering	Spam. Why Linear Regi	ression and k-	NN are poor				
choices	for Filteri	ing Spam, Naive Bayes and why	it works for Filtering Sp	oam, Data Wra	angling: APIs				
and other tools for scrapping the Web.									
		MODULE	-4		10 Hrs				
Recomm	Recommendation Systems: Building a User-Facing Data Product - Algorithmic ingredients of a								
Recomm	nendation	Engine, Dimensionality Redu	uction, Singular Value	Decomposition	on, Principal				
Compon	ent Anal	ysis, Exercise: build your own	recommendation system.	Data Visualiz	zation - Data				
Visualiz	ation Hist	cory, What Is Data Science, Redu	x?, A Sample of Data Vis	ualization Proj	ects				

Prescribed Text Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Doing Data Science,	Cathy O"Neil and		O'Reilly	2019
	Straight Talk from The Frontline.	Rachel Schutt			

Reference Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Mining of Massive	Jure Leskovek,	3th	Tata McGraw-Hill	2004
	Datasets	Anand Rajaraman			
		and Jeffery Ullman			
2	Machine Learning:	Kevin P. Murphy.	5th	Narosa publishing	2013
	A Probabilistic			house	
	Perspective				

MOOC Course:

l.No	Course Name	Course offered by	Year	URL
1	Data Science for	Swayam	2021	https://onlinecourses.nptel.ac.in/noc21_c
	Engineers			s69/preview
2	Generative AI for	coursera	2022	https://www.coursera.org/specializations
	Data Scientists			/generative-ai-for-data-scientists
	Specialization			

Proposed Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	Three tests conducted for 20 marks each and reduced to 10 marks	30
AAT	Students must provide demonstrations on Linear Exploratory Data Analysis, Linear Regression, k-Nearest Neighbors (k-NN), k-means clustering, and Naive Bayes using the R language.	20
	Total	50

Course Outcomes		Program Outcomes [POs]												
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												2	
CO2	3												2	
CO3			3										2	
CO4					2								2	

Course Title	Service	Service Oriented Architecture							
Course Code	211S752	(L-T-P)C	(3-0-0) 3						
Exam	3 Hrs.	Hours/Week	3						
SEE	50 Marks	Total Hours	40						

Course Outcomes: At the end of the course, student will be able to:

#	Course Outcomes	Mapping to PO's	Mapping to PSO's
1	Describe MEP"s, Coordination, Orchestration and Choreography in Web Services, their protocols and service layers	1	-
2	Describe Addressing issues, Policies related to web services	2	-
3	Apply basic WS-BPEL language constructs	3	-
4	Analyze the security aspects related to web services	2	_

Module - 110 HrsIntroduction of SOA, Evolution of SOA: Fundamental SOA, Common Characteristics of Contemporary
SOA, Common Tangible Benefits of SOA, An SOA Timeline (from XML to Web Services to SOA), The
Continuing Evolution of SOA (Standards Organizations and Contributing Vendors).10 Hrs

Web Services and Primitive SOA: The Web Services Framework, Services (as Web services), Service Descriptions (with WSDL), and Messaging (with SOAP).

Module - 2	10 Hrs
Web Services and Contemporary SOA-1: Message Exchange Patterns, Service Activity, Co	ordination,
Atomic Transactions, Business Activities.	
Web Services and Contemporary SOA-2: Orchestration, Choreography, Addressing, Reliable M	Aessaging,
Correlation.	
Module - 3	10 Hrs
Web Services and Contemporary SOA-3: Polices, Metadata Exchange, Security, Notific	cation and
Eventing.	
Principles of Service-Orientation: Services-Orientation and the Enterprise, Anatomy of	a Service-
Oriented Architecture, Common Principles of Service-Orientation, How Service Orientation	Principles
InterRelate, Service-Orientation and Object-Orientation, Native Web Service Support for	r Service-
Orientation Principles.	
Module - 4	10 Hrs
Service Layers: Service-Orientation and Contemporary SOA, Service Layer Abstraction, A	Application
Service Layer, Business Service Layer, Orchestration Service Layer, Service Layer Con	nfiguration
Scenarios.	

Business Process Design: WS-BPEL Language Basics, WS-Coordination Overview, Service-Oriented Business Process Design, WS-Addressing Language Basics, WS-Reliable Messaging Language Basics.

Prescribed Text Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Service-Oriented	Thomas Erl	5	Pearson	2018
	Architecture – Concepts,			Education	
	Technology, and Design				

Reference Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Understanding	Eric Newcomer,	5	Pearson Education	2019
	SOA with Web	Greg Lomow			
	Services,,				

MOOC Course:

Sl.No	Course Name	Course offered by	Year	URL
1	Service-Oriented	Coursera	2019	https://www.coursera.org/learn/service-
	Architecture			oriented-architecture

Proposed Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks					
Internals	Three tests conducted for 20 marks each and reduced to 10 marks	30					
AAT	Students must provide demonstrations on The Web Services Framework,						
	Services (as Web services), Service Descriptions (with WSDL), Messaging						
	(with SOAP).						
	Total	50					

Course Outcomes		Program Outcomes [POs]												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2		3												
CO3			3											
CO4		2												

Course Title	Robotic Process Automation								
Course Code	2118753	(L-T-P)C	(3-0-0) 3						
Exam	3 Hrs.	Hours/Week	3						
SEE	50 Marks	Total Hours	40						

Course Objective: Students will be able to Deploy and control Bots with UiPath Orchestrator **Course outcomes:** At the end of course, student will be able to:

#	Course Outcomes	Mapping to PO's	Mapping to PSO's
1	Understand RPA and Learn UiPath programming techniques to deploy robot configurations and explore data extraction techniques	1	-
2	Describe the different types of variables, Control Flow and data manipulation techniques	2	-
3	Use about integrations with various popular applications such as SAP and MS Office	3,4	
4	Debug a programmed robot including logging and exception handling ,Maintain code version and source control	3,5,9	2

MODULE-1

10 Hrs.

What is Robotic Process Automation: What is Robotic Process Automation? Scope and techniques of automation Robotic process automation, About UiPath, The future of automation.

Record and Play: Record and Play, UiPath stack, Downloading and installing UiPath Studio, Learning UiPath Studio.

MODULE-2	10 Hrs.				
Sequence, Flowchart, and Control Flow: Sequence, Flowchart, and Control Flow, Sequencing the					
workflow, Activities, Control flow, various types of loops, and decision making, Step-by-step example					
using Sequence and Flowchart, Step-by-step example, using Sequence and Control flow.					
Data Manipulation: Data Manipulation, Variables and scope, Collections, Arguments - Purpose and					
use, Data table usage with examples, Clipboard management, File operation with step-by-step	example.				
MODULE-3	10 Hrs.				
Taking Control of the Controls: Taking Control of the Controls, Finding and attaching wi	ndows,				
Finding the control, Techniques for waiting for a control, Act on controls - mouse and ke	yboard				
activities, Working with Unexplored, Handling events, Revisit recorder, Screen Scraping,					
Tame that Application with Plugins and Extensions: Tame that Application with Plugins and					
Extensions, Terminal plugin, SAP automation, Java plugin					

MODULE-4 10 Hrs

Handling User Events and Assistant Bots: Handling User Events and Assistant Bots, What are assistant bots? Monitoring system event triggers, Monitoring image and element triggers, Launching an assistant bot on a keyboard event.

Exception Handling, Debugging, and Logging: Exception Handling, Debugging, and Logging, Exception handling

Managing and Maintaining the Code: Managing and Maintaining the Code, Project organization.

Prescribed Text Books:

Sl.No	Book Title			Authors	Edition	Publisher	Year
1	Learning F	Robotic	Process	Alok Mani	7th	Packtpub	2018.
	Automation:	Create	Software	Tripathi			
	robots and	automate	business				
	processes with	the leadin	g RPA				
	tool – UiPath						

Reference Books:

Sl.No	Book Title		Authors		Edition	Publisher	Year
1	Learning Service		Tim Woodruff		7^{th}	Packtpub	2018.
2	Service Automation by	Now	Ashish Srivastava	Rudra	6th	Packtpub	2017

MOOC Course:

Sl.No	Course Name	Course offered by	Year	URL
1	Robotic	NPTEL	2019	https://nptel.ac.in/courses/112101098
	Automation			

Course Outcomes	Program Outcomes (Pos)													
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2		3												
CO3			3	3										
CO4			3		3				3					2

		Web programming	
Course Code	210EIS71	(L-T-P)C	(3-0-0) 3
Exam	3 Hrs.	Hours/Week	3
SEE	50 Marks	Total Hours	40

Course Objective: Students will be able to develop web applications.

Course outcomes: At the end of course, student will be able to:

#	Course Outcomes	Mapping to PO's	Mapping to PSO's		
1	Understand the fundamentals of world wide web and web programming languages such as HTML, XHTML, Java script .	1	-		
2	Apply the different scripting languages for dynamic web page development.	2	-		
3	Knowledge in server-side programming languages and database management systems with their web applications	1			
4	Design and develop web solutions for real time applications.	5,9,10	2		
MODULE-1					

Fundamentals of Web: A Brief Introduction to the Internet, The World Wide Web, Web Browsers, Web Servers, Uniform Resource Locators, Multipurpose Internet Mail Extensions, H TTP, Security.

XHTML: Origins and Evolution of HTML and XHTML, Basic Syntax, Standard XHTML Document Structure, Basic Text Markup, Images, Hypertext Tables, Forms, The Audio Element, The Video Element, Syntactic Difference between HTML and XHTML.

MODULE-2

10 Hrs.

Cascading Style Sheets: Sheets, Style Specification Formats, Selector Forms, Property Value Forms, Font Properties, List Properties, Colour, Alignment of Text, The Box Model, Background Images, The and <div> Tags, Conflict Resolution.

The Basics of JavaScript: Overview of JavaScript, Object Orientation and JavaScript, General Syntactic Characteristics, Primitives, Operations, and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation, and Modification, Arrays, Functions, Constructors, Pattern Matching Using Regular Expressions, Errors in Scripts.

MODULE-3

10 Hrs.

JavaScript and XHTML Documents: The JavaScript Execution Environment, The Document Object Model, Element Access in JavaScript, Events and Event Handling, Handling Events from Body Elements, Handling Events from Button Elements, Handling Events from The Text Box and Password Elements Dynamic Documents with JavaScript: Introduction, Positioning Elements, Moving Elements, Element Visibility, Changing Colours and Fonts.

Introduction to XML: Introduction, uses of XML, The Syntax of XML, Displaying Raw XML Documents, Displaying XML Documents with CSS.

M	DD	JLE-	4

Introduction to PHP: Origins and Uses of PHP, Overview of PHP, General Syntactic Ccharacteristics, Primitives, Operations and Expressions, Output, Control Statements, Arrays, Functions, Pattern Matching.

Database Access Through the Web: Relational Databases, An introduction to Structured Query Language (Review), Architectures for Database Access, The MySQL Database System, Database Access with PHP and MySQL.

Prescribed Text Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Programming the World Wide	Robert W.	8 th	Pearson	2014
	Web	Sebesta		Education.	

Reference Books:

SI.No	Book Title	Authors	Edition	Publisher	Year
1	Web Programming Building	Chris Bates	3rd	Wiley India	2014
	Internet Applications				
2	Open Source Web	James Lee, Brent		Pearson	2013
	Development with LAMP	Ware		Education	

E Books:

SI.No	Book Title	Authors	Edition	Publisher	Year
1	Programming the	Robert W. Sebesta	8 th	Pearson Education.	2014
	World Wide Web				

MOOC Course:

Sl.No	Course Name	Course offered by	Year	URL
1	Modern Application Development	IIT Madras	2022	https://www.shiksha.com/online- courses/modern-application-development- course-nptel812

Proposed Assessment Plan (for 50 marks of CIE):

ТооІ	Remarks	Marks
Internals	Three tests conducted for 20 marks each and	30
	reduced to 10 marks	
AAT	Web Page Design and Development	20
	50	

Course Outcomes		Program Outcomes [POs]												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2		3												
CO3	3													
CO4					3				3	3				2

Course Title	Java Programming					
Course Code	210EIS72	(L-T-P)C	(3-0-0) 3			
Exam	3 Hrs.	Hours/Week	3			
SEE	50 Marks	Total Hours	40			

Course Objective: Apply the principles of data science for solving real time problems. **Course outcomes**: At the end of course, student will be able to:

#	Course Outcomes	Mapping to	Mapping to
		PO's	PSO's
1.	Comprehend the fundamental concepts Object Oriented	1,2	1
	Programming		
2.	Apply Object Oriented constructs for program development	2	1
3.	Analyze a java program for identifying bugs	2,3	1
4.	Analyze demonstrations showcasing the effective handling of	5	1
	exceptions, as well as understand the implementation of		
	inheritance in Java packages.		
	MODULE-1	•	10 Hrs

Object Oriented Concepts and Java: Concepts of Object-Oriented programming language: Object, Class, Message passing, inheritance, encapsulation, and polymorphism Difference between OOP and other conventional programming – advantages and disadvantages of OOP. Introduction to Java: Java and Java Applications, Java Development Kit(JDK), The Byte Code, The Java Buzzwords, Simple Java Programs using Control Statements and Blocks of code, Lexical Issues. Data Types, Variables, and Arrays The primitive Types, Integers, Floating-Point Types, Characters, Booleans, Variables, Type conversion and Casting, Arrays, Strings.

conversion and Casting, Arrays, Strings.	
MODULE-2	10 Hrs.
Operators: Arithmetic, Bitwise, Relational, Boolean Logical, Assignment Operator, The "?	' Operator,
Operator Precedence. Program Control Statements: Input characters from the Keyword, if	statement,
Nested ifs, if-else-if Ladder, Switch Statement, Nested switch statements, for Loop, Enhanced	d for Loop,
While Loop, do-while Loop, use break, Use continue, Nested Loops.	
MODULE-3	10 Hrs.
	DC

Introducing Classes, Objects and Methods: Class Fundamentals, Declaring Objects, Object Reference Variables, Methods, Constructors, the "This" keyword, Garbage collection, Overloading Methods, and constructors, Argument Passing, Returning Objects, Access Control, Nested and Inner Classes.

MODULE-410 HrsInheritance, Packages, and Interfaces: Inheritance Basics, Using Super, Multilevel Hierarchy, When
Constructors are called, Method Overriding, Abstract Classes. Packages, Access Protection, Importing
Packages, Interfaces Exception Handling: Exception-Handling Fundamentals, Exception Types,
Uncaught Exceptions, Using try and Catch, Multiple catch Clauses, throw, Java"s Built-in Exceptions,
Customized exceptions.

Prescribed Text Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Java the Complete Reference	Herbert Schildt	9 th	Tata McGraw Hill	2021
2	Programming with JAVA	Bala Guruswamy	7th	Pearson	2021

Reference Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Introduction to JAVA	Y. Daniel Liang	9 th	Pearson	2019
	Programming			Education,2019	

E Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Java the Complete Reference	Herbert Schildt	9 th	Tata McGraw Hill	2021
2	Programming with JAVA	Bala Guruswamy	7th	Pearson	2021

MOOC Course:

Sl.No	Course Name	Course offered by	Year	URL
1	Programming In Java	Swayam	2021	https://onlinecourses.nptel.ac.in/noc22_cs 47/preview

Proposed Assessment Plan (for 50 marks of CIE):

Tool	Remarks	Marks		
Internals:	Three tests conducted for 20 marks each and reduced to 10 marks	30		
AAT:	AAT: The student must present a demonstration of one program from the following			
	list.			
	Total	50		

Laboratory plan:

Lab Program	Program Details
1.	Write a Java Program that grades multiple-choice tests. Suppose there are 'm' students and 'n' Questions, and the answers are stored in a two-dimensional array. Each row records a student"s answers to the questions. The answer key is stored in a one- dimensional array. The program grades the test and displays the result.
2	Write a Java program to count the number of occurrences of each letter in a string regardless of case.
3	Write a Java program that ignores non-alphanumeric characters in checking whether a string is a palindrome.
4	Create a java program to make a calculator using switch case to do arithmetic operations.
5	Write a java program to demonstrate handling of Array Index Out Of Bounds Exception and Arithmetic Exception.

Course Outcomes		Program Outcomes [POs]												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3											2	
CO2		3											2	
CO3		3	3										2	
CO4					2								2	

Cou	Course Title Internet of things								
Course Code 21OEIS73 (L-T-P)C (3-0-0)3									
Exa	m	3 Hrs.	Hours/Week		3				
SEE	SEE50 MarksTotal Hours40								
Cou Cou	Course Objective: Students will be able to develop IOT applications.								
#	# Course Outcomes Mapping Mapping to POs to PSOs								
1	Understand Architecture	the fundamentals a e, Design Principles	and applications of IoT, and Standards	its	1	-			
2	Apply progr	ramming skills to de	sign IoT applications		3	-			
3	Appraise th communication	2	2						
4	Design and Implement applications of IoT and make 5, 10 presentation in team								
	MODULE-1 10Hrs								
Intro Thin Mod Com IoT Auto &Lit	Introduction to Internet of Things: Definition and characteristics of IoT, Physical design of IoT, Things in IoT, IoT Protocols, Logical Design, IoT functional blocks, IoT communication Models, IoT communication API''s, IoT enabling Technologies Wireless sensor networks, Cloud Computing, Big Data Analytics, Communication protocols, embedded systems. IoT levels and deployment template Domain specific IoTs, - IoT levels, Introduction, Home Automation; Cities; Environment; Energy; Retail; Logistics; Agriculture; Industry; Health &Lifestyle.								
		MOI	DULE-2			10Hrs			
IoT and M2M IoT System management with NETCONF-YANG Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT- Software defined networking, network function virtualization Need for IoT Systems management; SNMP; Network Operator Requirements; NETCONF; IoT platform Design Methodology - IoT Design Methodology; Introduction; Case Study on IoT System for Weather Monitoring,									
	MODULE-3 10Hrs								
IoT Linu IoT RDS	MODULE-310HrsIoT Physical Devices and End points - What is an IoT device; Exemplary Device- Raspberry Pi, Linux on Raspberry Pi, Raspberry Pi Interfaces, Other IoT devices.IoT Physical Servers & Cloud Offerings: Amazon Web Services for IoT, AmazonS3, Amazon RDS.								

MODULE-4

Case studies illustrating IoT Design: Introduction to IOT Design, Home Automation, Smart Lighting, Home Intrusion Detection, Cities, Smart Parking.

Data Analytics for IOT- Apache Hadoop, Using Hadoop Map Reduce for Batch Data Analysis.

Prescribed Text Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Internet of Things	Arshdeep Bahga		Universities	2015
	- A Hands on	and Vijay		Press	
	Approach	Madisetti			

Reference Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	The Internet of	Olivier Hersent,	2nd		2012
	Things: Key	David Boswarthick,			
	Applications and	Omar Elloumi,			
	Protocols				
2	Internet of Things:	Vijay Madisetti,	1st		2014
	A Hands-On	ArshdeepBahga			
	Approach Vijay				
	Madisetti				

MOOC Course:

Name	offered by	Year	URL
Design for	IISC	2017	https://nptel.ac.in/courses/108/108/108108098/
Internet of	Bangalore		
things			
]	Name Design for Internet of things	NameCourseDesign forIISCInternet ofBangalorethingsInternet	NameOffered byItemDesign forIISC2017Internet of thingsBangalore1

E-Book:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Internet of Things	Arshdeep Bahga		Universities	2015
	- A Hands on	and Vijay Madisetti		Press	
	Approach				

Proposed Assessment Plan (for 50 marks of CIE):

Tool	Remarks	Marks
Internals	Three tests conducted for 20 marks each and	30
	reduced to 10 marks	
AAT	Project on Real time IOT Applications	20
	50	

Course Outcomes		Program Outcomes [POs]												
COs	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2			2											
СОЗ		2												3
CO4					3					3				3

Course Title		Data Science	
Course Code	210EIS74	(L-T-P)C	(3-0-0) 3
Exam	3 Hrs.	Hours/Week	3
SEE	50 Marks	Total Hours	40

Course Objective: Apply the principles of data science for solving real time problems. **Course outcomes**: At the end of course, student will be able to:

	#	Course Outcomes	Mapping	Mapping to					
			to PO's	PSO's					
	1.	Understanding of techniques for data acquisition, cleaning,	1	1					
		transformation, and storage.							
	2.	Describe various Data Science process like statistical modeling,	1	1					
		Exploratory data analysis, Data visualization.							
	3.	Apply various feature selection algorithms for effective decision	3,5	1					
		making.							
	4.	Develop effective visualization for the given data using R	5	1					
		MODULE-1		10 Hrs.					
n	ntroduction: What is Data Science? Big Data and Data Science hype - and getting past the h								
	now? – l	Datafication, Current landscape of perspectives, Skill sets needed. S	tatistical Infe	rence -					
	Populati	ons and samples, Statistical modelling, probability distributions, fitti	ng a model.						

MODULE-2	10 Hrs.
Exploratory Data Analysis and the Data Science Process - Basic tools (plots, graphs an	d summary
statistics) of EDA, Philosophy of EDA. The Data Science Process, Case Study: RealDirect	(online real
estate firm). Three Basic Machine Learning Algorithms - Linear Regression	

MODULE-3 10 H	Irs.
k-Nearest, Neighbors (k-NN), k-means. One More Machine Learning Algorithm and Usa	ige in
Applications - Motivating application: Filtering Spam. Why Linear Regression and k-NN are	e poor
choices for Filtering Spam, Naive Bayes and why it works for Filtering Spam, Data Wrangling:	APIs
and other tools for scrapping the Web.	

MODULE-410 HrsFeature Generation and Feature Selection Motivating Application: user (customer) retention, Feature
Generation Feature Selection algorithms, Filters; Wrappers; Decision Trees, Random Forests. Data
Visualization - Data Visualization History, What Is Data Science, Redux?, A Sample of Data
Visualization Projects

Prescribed Text Books:

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Doing Data Science, Straight	Cathy O"Neil and		O'Reilly	2019
	Talk from The Frontline.	Rachel Schutt			

<u>E Book</u>

Sl.No	Book Title	Authors	Edition	Publisher	Year
1	Doing Data Science, Straight	Cathy O"Neil and		O'Reilly	2019
	Talk from The Frontline.	Rachel Schutt			

MOOC Course:

Sl.No	Course Name	Course	Year	URL
		offered by		
1	Data Science for	NPTEL	2021	https://onlinecourses.nptel.ac.in/noc21_cs69/pr
	Engineers			eview
2	Generative AI for	courser	2022	https://www.coursera.org/specializations/gener
	Data Scientists			ative-ai-for-data-scientists
	Specialization			

Proposed Assessment Plan (for 50 marks of CIE):

Tool	Remarks	Marks
Internals :	Three tests conducted for 20 marks each and reduced to 10 marks	30
AAT	Students must provide demonstrations on Linear Exploratory Data Analysis, Linear Regression, k-Nearest Neighbors (k-NN), k-means clustering, and Naive Bayes using the R language.	20
	Total	50

Course Outcomes		Program Outcomes [POs]												
COs	РО 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3												2	
CO2	3												2	
CO3			3		2								2	
CO4					2								2	

Course	Course Title RESEARCH METHODOLOGY & INTELLECTUAL PROPERTY RIGHTS							
Course	e Code	21RMIP	L-T-P		(0-2-0) AUDIT			
CIE		100 marks	Hours/Week		2			
SEE	SEE - Total Hours 28							
Cours	e Objective	: Understand research methodol	ogy, design, data colle	ction, and a	nalysis techniques	S		
and ga	un knowledg	ge of Intellectual Property Rights	s (IPR) with a focus of tection procedures	i patents, de	signs, trademarks,	,		
Course	e outcomes:	At the end of course, student w	ill be able to:					
ш		Course Outcomes		Mapping	to Mapping			
#		Course Outcomes		PO's	to PSO's			
1.	Acquire re reviews	esearch skills and conduct compr	ehensive literature	8,10, 12	-			
2.	Apply rese	earch design knowledge to creat	e prototype	4, 8, 3,10, 12	-			
3.	Evaluate r design	methods for data collection, anal	ysis, and sampling	4, 8, 10, 12	-			
4.	Understar registration related to	nd global and Indian patent sc on requirements, infringements o trademarks,copyrights, and de	enarios, as well as and protection signs	8, 10, 12	-			
		MODULE-:	1		07 H	lrs.		
Resea Ethics	rch Method	ology: Introduction, Meaning of	f Research, Objectives	of Researc	h, Types ofResear	rch,		
Functi	ons and Att	tributes. Impact of Title and Ke	evwords on Citations.		r Redding. Citatie	/113.		
Knowl	edge flow th	nrough Citations, Acknowledgme	nts.					
		MODULE-	2		07 H	lrs.		
Resea	rch Design:	Need for Research Design, Impo	ortant Concepts Relate	d to Resea	rch Design:			
Depen	ident and	Independent Variables, Extr	aneous Variable, V	ariable, Co	ommon Control,	, Ia ali		
Design	unded Relati	Randomized Design Latin Squar	e Design and Factoria	ntroduction I Design	to Randomized Bi	OCK		
DC3181		MODULE-	3	Designi	07 H	lrs.		
Metho	od of Data	Collection: Primary and Seco	ondary Data Collectio	on. Samplin	g Design: Samp	ling		
fundaı	mentals, Me	easurement, and Scaling Tech	niques, Criteria of Se	electing a S	Sampling Procedu	ure,		
Chara	cteristics of	a Good Sample Design, and	Types of Sample De	sign. Data	Analysis: Testing	; of		
Hypot	heses: Null	Hypothesis, Alternative Hypoth	nesis, Type I and Typ	e II Errors.	Procedure for			
Hypot	hesis Testing	g: Mean, Variance, and Chi-squar	re Test.					
		MODULE-	4		07 H	-Irs		
Introd	uction to IP	K: Different forms of IPK, Kole of	TIPK IN Research and [vevelopmen	t. Patents: Princip	oles		
What	is a Decige	2 Essential Requirements for a	ns in muia, Procedure Registrable Design		ng a Patent. Desi	igu:		
Design	is a Design	: Essential requirements 101 d	Registration and Dr	ntection of	Trademarks Rig	n a shte		
Confei	rred hv Red	vistration of Trademarks Infrin	gements Convrights	: Characteri	stics of Convrig	hts		
Rights	Conferred	by Registration of Copyrights.	Registration of Copyr	ights, Infrin	gements. Remed	lies		
agains	t Infringeme	ent of Copyrights.	<u> </u>					

Prescribed Text Books:

SI.No	Book Title	Authors	Edition	Publisher	Year
1	Engineering Research Methodology	Dipankar Deb, Rajeeb Dey, Valentina E, Balas	-	Springer	2019
2	Intellectual Property	Prof. Rupinder Tewari Ms. Mamta Bhardwa	-	Professor Gurpal Singh Sandhu Honorary Director	2021

Reference Books:

SI.No	Book Title	Authors	Edition	Publisher	Year
1	Research methodology: Methods and techniques	Kothari C R	-	New Age International	2004
2	Intellectual Property Rights	Pandey N, Dharni K.	8th	PHI Learning Pvt. Ltd	2014 Jul 30

E Books:

SI.No	Book Title	Authors	Edition	Publisher	Year
1	Engineering Research Methodology	Dipankar Deb, Rajeeb Dey, Valentina E, Balas	-	Springer	2019

MOOC Course:

SI.No	Course Name	Course offered by	Year	URL
1	Research	National Institute of	2024	https://onlinecourses.swayam2.
	Methodology and	Technical Teachers		ac.in/ntr24_ed08/preview
	IPR	Training and		
		Research, Chennai.		

Proposed Assessment Plan (for 50 marks of CIE):

Tool	Remarks	Marks
AAT	 Students select a research topic and perform a literature review, identifying existing knowledge, synthesizing prior art, and compiling relevant citations leading to publishing a survey paper. Students develop research proposals, including the formulation of research hypotheses. Students collect primary or secondary data, design a sampling procedure, and perform dataanalysis using statistical techniques. Students analyze real-world case study/studies for legal issues and propose solution/s toinfringement cases. 	50
	Total	50

Course Outcomes					Pro	gram C	outcom	es [POs]					
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	3	-	2	-	3		
CO2	-	-	3	3	-	-	-	3	-	2	-	3		
CO3	-	-	-	3	-	-	-	3	-	2	-	3		
CO4	-	-	-	-	-	-	-	3	-	2	-	3		

Cour	rse Title	MAIN PROJECT WORK PHASE - 2					
Cour	rse Code	21IS801		L-T-P		(0-0-8) 4	
Exar	n	3 Hrs.	Hours	s/Week		8	
CIE		50 Marks		SEE	4	50 Marks	
Cour	rse Outcomes: At	the end of course, student will be able to:					
#		Course Outcomes		Mappi	ing	Mapping	
				to PC)s	to PSOs	
1	Implement the de	esign with appropriate techniques, resources and conter	nporary	35		12	
	tools			5,5		1,2	
2	Communicate ef	fectively with team members and mentors, make presen	ntations	0 10 11	12	r	
	and prepare tech	nical document		9,10,11	,12	2	
3	Use ethical practices in all endeavors 8 -						
4	4 Share the responsibilities for carrying out the project & playing individual roles						
appropriately							
The	The project teams will implement the project started in their seventh semester						

The project work is to be evaluated in three stages:

Stage I (30M) - First internal evaluation shall be taken up during this phase. This includes presentation on fine tuning of SRS & Design carried out in seventh semester.

Stage II (20 M) - Mid phase evaluation shall be taken up during this phase. This includes presentation, intermediate project demonstration, draft copy of the paper

Stage III (50 M) – Final project Demo, report submission and details of technical paper publication.

The evaluation of the project stages shall be carried out by the evaluation committee comprising of project guide & other faculty members. The committee will be constituted by the project coordinator in consultation with the Head of the department. *For Multidisciplinary projects guides will be allotted from each concerned branch*.

Course	Program outcome															
Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
C01			3		3								2	2		
CO2									3	3	3	3		2		
CO3								3								
CO4									3					2		

Course Title	Re	esearch/Industry Internshi	p III
Course Code	21INT3	(L-T-P)C	(0-0-24) 12
Exam	3 Hrs.	Weeks	14-16 weeks
CIE	100 Marks	Total Hours	

Course Objective: It involves a short theoretical or experimental research project supervised by a researcher/ To bridge the gap between the theoretical knowledge obtained in the classrooms and the practical skills required in the actual workplace

Course outcomes: At the end of course, student will be able to:

_												
	#		Course Outcomes Mapping to PO's									
	1	Get exposure to real world job environment and gain practical 1,2,3,4,5,10,12										
		experience										
	2	Generating technical paper/s and publish in refereed journal/s 1,2,8,9,10,12										
		and conferences										
	Guidelines for Research Internship III											
	Pu	rpose	It involves a short theoretical or experimental research project supervised by a									
		•	researcher.									
			Planning and scheduling.									
	Skills acquired		• Documentation.									
			Critical thinking.									
		1	• Data collection.									
			• Data analysis.									
			• Appreciating and practicing the ethical values.									

Expected	
Outcomes	• Generating technical paper/s and publish in refereed journal/s.

o ni e s	•	Possibility of acquiring an intellectual ownership and patent	•

	•	Build a prototype for an idea on which the research was carried out.
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	• File patent/s.								
Selection	 In consultation with a researcher/ researchers working in MCE researchCentre A research institute Company's R and D department. 								
Team Size	Can be carried out either individually or in a team(Upto 5 students)								
Venue	Laboratory of collegeA research institute Company's R and D department.								
Supervision	Internship shall be carried out under the supervision of a faculty mentor* atthe department level For all students attending in-house internship, the attendance should be								
	maintained by the Faculty mentor								

	Diary										
Parameters	Report										
for	presentation skill										
Assessment	Technical Paper										
	Recommendation Letter from the guide										
	CIE (100 Marks)–The CIE marks shall be awarded by a committee* consisting										
	of the faculty mentor and two faculty members of the Department, one of whom										
	shall be the Guide (applicable for in-house interns). The schedule for evaluation										
	will be announced by chairman BOE at the end of these mester.										
	The Evaluation can be done in <i>phases as decided by the internal BOS</i> of the										
	department.										
	The contents of the report and the evaluation Rubrics will be set by the										
Evaluation	Department based on the assessment parameters										
	SEE (100 Marks)– Contribution to the internship and the performance of each										
	group member shall be assessed individually in semester end examination (SEE)										
	conducted at the department. Marks shall be awarded based on the evaluation of										
	the diary, report, presentation skill and viva voce										
*For interdisci	plinary internship its necessary to involve an expert from each discipline										
	Guidelines for Industry Internship III										
Durnoso	To bridge the gap between the theoretical knowledge obtained in the										
i ui pose	classrooms and the practical skills required in the actual workplace										
	Applying the theoretical knowledge in a practical scenario										
Skills	• Build confidence in applying the skills learnt										
acquired	• Documentation										
	Communication										
	Appreciating and practicing the ethical values										
Expected											
Outcomes	• Get exposure to a real world job environment and gain practical										
	experience										
	• Build confidence in applying the skills learnt.										
	Enhances Placement Opportunity										
Selection	Can select individually										
	• Can seek the help from the department										
Toom Size	Can be carried out either individually or in a team(not exceeding 5										
i cani Size	students).										
X 7	In a demain analific anomination										
v enue	In a domain specific organization										

Supervision	Internship shall be carried out under the supervision of a faculty mentor* atthe						
	department level. One faculty mentor can supervise a maximum of 20 students.						
Parameters	Diary						
for	Report						
Assessment	presentation skill						
	Recommendation Letter from the guide						
	CIE (100 Marks) - The CIE marks shall be awarded by a committee* consisting						
	of the faculty mentor and two faculty members of the Department, one of whom						
	shall be the Guide (applicable for in-house interns). The schedule for evaluation						
	will be announced by chairman BOE at the end of these mester.						
	The Evaluation can be done in <i>phases as decided by the internal BOS</i> of the department.						
	The contents of the report and the evaluation Rubrics will be set by the						
Evaluation	Department based on the assessment parameters						
	SEE (100 Marks)- Contribution to the internship and the performance of each group member shall be assessed individually in semester end examination (SEE) conducted at the department. Marks shall be awarded based on the evaluation of the diary, report, presentation skill and viva voce						
*For interdisciplinary internship its necessary to involve an expert from each discipline							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	-	3	-	3		
CO2	3	3	-	-	-	-	-	3	2	2	-	3		