

Department of Computer Science & Engineering UIET

# Sant Baba Bhag Singh University

2020

#### **ABOUT THE DEPARTMENT**

The Department of Computer Science and Engineering focuses not only on the theoretical aspects but emphasize the overall development of the students. There are Special Interest Groups among the faculty who are focused in their research domains like Data Mining and Big Data Analytics, Wireless & Mobile Computing, Security & Trust Computing, Wireless Sensor Networks & IOT, Soft Computing, Image Processing, Machine Learning and Data Analytics, Natural Language Processing, Cloud Computing and Social Networking, Network Security, Service Oriented Architecture and Theoretical Computer Sciences. The departments many strength include its high faculty to student ratio, state of the art facilities, strong focus on teaching learning balanced with leading-edge research and emphasis on leadership, service and ethics. The efficacy of the Teaching-Learning process is reflected in the consistently excellent results being achieved every year. To augment professional competence, the department supports outside talents to gain more inputs, organizes hackathons, seminars, workshops, industrial visits and expert lectures not only to offer a new dimension to the learning process but also infuse leadership qualities in the budding engineers.

#### SALIENT FEATURES OF THE DEPARTMENT

- 1. Provides a learning environment strongly focused on collaborative and interdisciplinary research under the guidance of experienced and qualified faculty. Majority of the faculty members are doctorates.
- 2. The teaching programme, here, is devised keeping in view the significance of Industry-Academia interaction enabling the students to face the global competitiveness with effective communication skills.
- 3. The CSE Department regularly organizes conferences, hackathons, seminars, student symposia, shortterm training program. This provides a wide range of opportunities for faculty and students to bring out their potential and innovative skills in a variety of fields.
- 4. The department has well equipped computing laboratories and a rich repository of software covering a wide spectrum of applications. The department in collaboration with IIT has setup Virtual lab for remote experiments. Besides this, in NEPTEL and MOOC courses both for its students and faculty.
- 5. Digital Library with access to journals and video lectures of eminent professors.

#### M.TECH (MASTERS IN TECHNOLOGY) PART TIME

Educational qualification matters a lot in gaining success. Along with academic qualification, technical skills are also required. Candidates possessing higher degree will be given preference. Master of Technology (M.Tech) is the higher specialized course in the field of engineering. The duration of this course is 3 years. M.Tech provides you the insight and deep knowledge of the subjects that you have studied in your B.Tech course.

#### VISION

Empower every student to be innovative, creative and acquire skills in Computer Science & Engineering to enrich society and achieve a happy, successful and meaningful life.

#### MISSION

Our mission is to provide a high-quality undergraduate and post graduate education in Computer Science & Engineering that provides all-round growth of an individual by creating futuristic environment that fosters critical thinking, dynamism and innovation to transform them into globally competitive professionals and empowering the youth in rural communities with computer education.

#### ELIGIBILITY CRITERIA

- For postgraduate engineering programme (M.Tech), students are admitted after they have obtained at least a college level Bachelor's degree in Technology (B.Tech) in related field.
- Candidates having M.Sc degree in Science/Mathematics/Statistics/Computer Applications or equivalent can also apply for M.Tech.
- MCA candidates are also eligible to apply for specializations available in areas of computer science engineering.

## DURATION

3 Years

#### **CAREER PATHWAY**

Teaching career is always open for M.Tech students. After holding master's degree, they can apply in any prestigious engineering institution for the post of professor.

#### Government job

The aspirants can find many opportunities in public sector. Many public sector firms recruit candidates with M.Tech in Computer Science Engineering. Some of these companies are ONGC, ISRO, BHEL, ECIL, DRDL, SAIL, etc. The candidates can also appear for various competitive exams like public sector bank tests, UPSC, SSC, etc. The aspirants who are interested in teaching can take up jobs in various government colleges.

#### Private Sector Jobs

There are huge openings in private sector for candidates of computer science engineering. The candidates can find opening in companies like Infosys, TCS, IBM, Wipro, HCL, Accenture, etc. The candidates can find many job opportunities abroad as well.

#### Higher Studies

This pathway prepares students for Doctorate studies.

#### Entrepreneurship

To set up new ventures

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Post-G	raduate Programme Outcomes (PO)
At the	end of Programme/Degree mentioned above, the post graduates will be able to
	Apply the scientific knowledge gained from the study of computer science and
	engineering for developing research projects, writing research papers, understanding
	the need of patents and copyrights.
PO1	( Research knowledge)
	Concrete solution to research problems in the field of computer science and
PO2	engineering using analytical and reasoning tools (Problem Solving)
102	engineering using analytical and reasoning tools.(1100)em 501ving)
	Innovate solutions through research and technological knowledge to address societal
PO3	and environmental challenges. (Innovative Solutions)
	Strengthen and focus on finding quality solution to complex problems through
PO4	systematic research and development. (Research Skills)
101	
PO5	Use case tools and techniques to formulate solution to engineering, research, medical
	and agriculture problems with reduced plagiarism. (Modern Tools usage)
PO6	Achieve desired goals through effective team leadership skills, ( Collaborative and
	Multidisciplinary skills)
	Develop and plan project delivery on time, in scope and with in the budget by
PO7	applying the concepts of engineering and management.
	(Project Management and Finance)
DOQ	Understand and implement human values and professional othics for the welfare of
PUð	Understand and implement numan values and professional ethics for the wehare of the society (Social Desponsibilities and Ethical practices)
	Professional communication skill plays major role in building relationships trust
POQ	and halps one to understand better and to present his views across table in an
10)	effective manner (Communication)
P10	Ensure life-long learning to keep oneself updated and to better understand current
	scenario. ( Life-long learning)
	Effective research and development is possible through independent thinking and
P11	learning skills. (Independent and Reflective Learning)

Post -G The Gr	<u>Post -Graduate Programme Educational Objective (PEO)</u> The Graduate/Postgraduate will be					
PEO1.	Contributing to research and development through the knowledge gained during study of specializations in Computer Science & Engineering.					
PEO2.	Developing innovative solutions to complex problems using research ethics and Intellectual property rights.					
PEO3	Demonstrating human values and professional ethics while working collaboratively on multidisciplinary projects.					
PEO4	Pursuing career in life long learning or generating employments by setting of startups for the welfare and well being of rural youth.					

Post Graduate Programme Specific Outcomes (PSO)					
PSO1.	Analyze and understand the need of research and development, Intellectual property rights, patents and plagiarism checking tools.				
PSO2.	Ability to understand the need of human values and professional ethics while publishing research papers, writing and developing research projects, research grants, books and dissertations.				
PSO3	Pursue a career in software development, entrepreneurship, database administration, network and cyber security, artificial intelligence, machine learning, higher studies, teaching or quality testing using available CASE tools.				



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NOTE- Students can opt for MOOC courses with certification with due information to Head of Computer Science & Engineering Department. A student can choose MOOC courses with 4 credits, as an open elective but with prior approval.



# Course Scheme, M.Tech Computer Science & Engineering

# **General Course Structure**

Course Code and Definition				
Course Code	Definition			
PC	Program Core			
PE	Program Elective			
OE	Open Elective			
Audit	Audit Courses			



#### SEMESTER I Scheme for M. Tech. 1<sup>st</sup> Year

#### I. Theory Subjects

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PC	CSE501	Artificial Intelligence	4:0:0	4:0:0	4	4
			techniques				
2		MAT524	Research	3:0:0	3:0:0	3	3
			Methodology and IPR				
3	PE		Professional Elective-I	4:0:0	4:0:0	4	4
4	Audit**	CSEAxxx		2:0:0	2:0:0	2	0

#### II. Practical Subjects

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PE lab		Professional Elective	0:0:2	0:0:2	2	1
			Lab				

#### **III. Professional Elective-I**

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PE	CSE507	Advanced Distributed System	4:0:0	4:0:0	4	4
2	PE	CSE509	Network Technology and Security	4:0:0	4:0:0	4	4
3	PE	CSE511	Adhoc Networking	4:0:0	4:0:0	4	4

#### III. Professional Elective-I Lab

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PE	CSE519	Advanced Distributed System Lab	0:0:2	0:0:2	2	1
2	PE	CSE521	Network Technology and Security Lab	0:0:2	0:0:2	2	1
3	PE	CSE523	Adhoc Networking Lab	0:0:2	0:0:2	2	1

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PE	CSE525	Data Mining and Data	0:0:2	0:0:2	2	1
			Warehouse Technology				
			Lab				
2	PE	CSE527	Cloud computing	0:0:2	0:0:2	2	1
			Technology Lab				
2	DE	CSE520	Advanced Parallel	0:0:2	0:0:2	2	1
3	rE	CSE529	Computing Lab				

**IV. Professional Elective-II Lab** 

Total Contact Hours= 15 Total Credits Hours= 12

#### SEMESTER II Scheme for M. Tech. 2<sup>nd</sup> Semester

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PC	CSE503	Data Structure Programming	4:0:0	4:0:0	4	4
2	PE		Professional Elective-II	4:0:0	4:0:0	4	4
3	Audit**	CSEAxxx		2:0:0	2:0:0	2	0

#### **II. Practical Subjects**

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PC lab	CSE505	Data Structure	0:0:2	0:0:2	2	1
			Programming Lab				

#### III. Professional Elective-II

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PE	CSE513	Data Mining and Data				
			Warehouse	4:0:0	4:0:0	4	4
			Technology				
2	PE	CSE515	Cloud computing	4.0.0	4.0.0	1	1
			Technology	4.0.0	4.0.0	+	4
2	DE	CSE517	Advanced Parallel	4.0.0	4.0.0	4	4
5	ГĽ		Computing	4.0.0	4.0.0	4	4

Total Contact Hours =	12	
Total Credits Hours =	9	

#### SEMESTER III

#### Scheme for M. Tech. 3<sup>rd</sup> Semester I. Theory Subjects

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PC	MAT524	Mathematical foundation of Computer science	4:0:0	4:0:0	4	4
2	PE		Professional Elective-III	4:0:0	4:0:0	4	4

#### **II. Practical Subjects**

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PE lab		Professional Elective	0:0:2	0:0:2	2	1
			Lab				
2		CSE508	Mini project with	0:0:2	0:0:2	2	1
			seminar				

#### **III. Professional Elective-III**

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PE	CSE510	Database Design and Management System	4:0:0	4:0:0	4	4
2	PE	CSE512	Big Data Analytics	4:0:0	4:0:0	4	4
3	PE	CSE514	Natural Language Processing	4:0:0	4:0:0	4	4

#### **IV. Professional Elective-III Lab**

Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
PE	CSE522	Database Design and	0:0:2	0:0:2	2	1
		Wanagement System lab				-
PE	CSE524	Big Data Analytics lab	0:0:2	0:0:2	2	1
PE	CSE526	Natural Language Processing lab	0:0:2	0:0:2	2	1
	Type PE PE PE	TypeSubject CodePECSE522PECSE524PECSE526	TypeSubject CodeSubject NamePECSE522Database Design and Management System labPECSE524Big Data Analytics labPECSE526Natural Language Processing lab	TypeSubject CodeSubject NameContact Hours (L:T:P)PECSE522Database Design and Management System lab0:0:2PECSE524Big Data Analytics lab0:0:2PECSE526Natural Language Processing lab0:0:2	TypeSubject CodeSubject NameContact Hours (L:T:P)Credits (L:T:P)PECSE522Database Design and Management System lab0:0:20:0:2PECSE524Big Data Analytics lab0:0:20:0:2PECSE526Natural Language Processing lab0:0:20:0:2	TypeSubject CodeSubject NameContact Hours (L:T:P)Credits (L:T:P)Total Contact HoursPECSE522Database Design and Management System lab0:0:20:0:22PECSE524Big Data Analytics lab0:0:20:0:22PECSE526Natural Language Processing lab0:0:20:0:22

#### V. Professional Elective-IV Lab

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PE	CSE528	Machine Learning using Python lab	0:0:2	0:0:2	2	1
2	PE	CSE530	Image processing using Matlab	0:0:2	0:0:2	2	1
3	PE	CSE532	Advanced Software Engineering lab	0:0:2	0:0:2	2	1

Total Contact Hours = 12 Total Credits Hours = 10

#### SEMESTER IV

#### Scheme for M. Tech. 4<sup>th</sup> Semester I. Theory Subjects

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PC	CSE504	Soft Computing Technologies	4:0:0	4:0:0	4	4
2	PE		Professional Elective- IV	4:0:0	4:0:0	4	4
3	PE		Professional Elective-V	4:0:0	4:0:0	4	4

#### **II. Practical Subjects**

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PC lab	CSE506	Soft Computing	0:0:2	0:0:1	2	1
			Technologies lab				

#### **III. Professional Elective-IV**

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PE	CSE516	Machine Learning using Python	4:0:0	4:0:0	4	4
2	PE	CSE518	Image processing using Matlab	4:0:0	4:0:0	4	4
3	PE	CSE520	Advanced Software Engineering	4:0:0	4:0:0	4	4

#### **IV. Professional Elective-V**

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	PE	CSE603	Mobile Computing	4:0:0	4:0:0	4	4
		CSE003	concepts and technology				
2	PE	CSE605	Cryptography and	4:0:0	4:0:0	4	4
		CSE005	Information security				
3	PE	CSE607	Block Chain architecture	4:0:0	4:0:0	4	4
		CSE007	design and use cases				
4	PE	CSE609	Speech Signal Processing	4:0:0	4:0:0	4	4

Total Contact Hours = 14

Total Credits Hours = 13

#### SEMESTER V

Scheme for M	I. Tech. 5 <sup>th</sup>	Semester
<b>Theory Subje</b>	ects	

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	OE	Open Electiv	/e-I				
		CE611	Introduction to Rural Technology and Community Development	4:0:0	4:0:0	4	4
		ME 611	Industrial Safety Engineering	4:0:0	4:0:0	4	4
		ME 613	Concepts of Composite Materials	4:0:0	4:0:0	4	4
		ME615	Concepts of Renewable Energy Resources	4:0:0	4:0:0	4	4
		EE611	Electrical Installation and Safety	4:0:0	4:0:0	4	4
		COM223	<b>Business Analytics</b>	4:0:0	4:0:0	4	4
		CSE611	Introduction to Internet of things	4:0:0	4:0:0	4	4
		CSE613	Software Project Planning and Management	4:0:0	4:0:0	4	4

### II. Practical Subjects

	S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	1	PC lab	CSE601	Dissertation-I	0:0:20	0:0:10	20	10

Total Contact Hours = 24

Total Credit Hours = 14

#### SEMESTER VI

Scheme for M. Tech. 6<sup>th</sup> Semester I. Theory Subjects

S. No.	Туре	Subject Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Thesis	CSE602	Dissertation-II	0:0:32	0:0:16	32	16

Total Contact Hours = 32

Total Credits Hours = 16

\*\* Audit courses: COURSE CODE:

ENG001 English for Research Paper Writing EVS501 Disaster Management CSE001 Value Education LAW001 Constitutional Law EDU001 Pedagogy Studies

# COURSE SCHEME

#### COURSE SCHEME SUMMARY

Sem	L	Т	Р	Contact hrs/wk	Credits	РС	PE	OE	Add on/ Audit Courses	Project/ Trg/Seminar/ Term Paper
1	13	-	2	15	12	7	5		0	-
2	10	-	2	12	9	5	4		0	2(mini project with seminar)
3	8	-	4	12	10	5	5	0		)
4	12		2	14	13	5	8			
5	4	0	20	24	14	10	8	4	8	Dissertation-I- 10 Training (through MOOC Certification
6	1			32	16	AV-		SUN.		Dissertation-II 16
Total	47	0	30	109	80	74	22	4	0	28
	THE REPORT OF THE PARTY OF THE									

# First Semester

FRANKLE FORTE DELLOCATION (FRANK)

Course Code	CSE501
Course Title	Artificial Intelligence Techniques
Type of Course	PC
LTP	400
Credits	4
Course Prerequisites	Basic knowledge of discrete structure, knowledge representation,
	reasoning, planning etc.
Course Objectives	The objective of this course is to cover the advance topics in
	probability theory, uncertain reasoning and machine learning that are
	commonly used in modern artificial intelligence.
<b>Course Outcomes</b>	The learner will be able to-
(CO)	1. Explain what constitutes "Artificial" Intelligence and how to
	identify systems with Artificial Intelligence
	2. Explain how Artificial Intelligence enables capabilities that are
	beyond conventional technology, for example, chess- playing
	computers, self-driving cars, robotic vacuum cleaners.
	3. Use classical Artificial Intelligence techniques, such as search
	algorithms, mini-max algorithm, neural networks, tracking, and
	robot localization.
	4. Apply Artificial Intelligence techniques for problem solving.

#### UNIT I

#### Introduction

Basic Knowledge of Artificial Intelligence, Problem solving techniques, Knowledge representation, Planning, Prolog, LISP and Other AI Programming Languages, Learning and Neural Network.

#### UNIT II

#### **Introduction to Probability Theory**

Probability definitions, Bayes rule and its applications, Probabilistic Reasoning: Bayesian networks: representation and inference, Belief Propagation, MCMC algorithm, other methods, sample applications

#### **Probabilistic Reasoning over Time**

Hidden Markov Models, Dynamic Bayesian networks, Utility theory, Decision networks

#### UNIT III

#### **Making Complex Decisions**

Decision-Making: basics of utility theory, decision theory, sequential decision problems, elementary **20** | P a g e

game theory, Partially observable Markov decision problems (POMDPs), sample applications

#### UNIT IV

#### Learning from Observations

Inductive\_learning, decision trees, ensemble learning, Statistical Learning: Complete data, Hidden nodes (EM method), Instance based learning, Neural networks, Reinforcement Learning: Passive and active, sample applications

RECOM	RECOMMENDED BOOKS					
Sr. no.	Name	AUTHOR(S)	PUBLISHER			
1	Artificial Intelligence: A Modern	S. Russell and P.	Prentice-Hall, Third			
	Approach	Norvig	Edition.			
2	Introduction to Artificial	Eugene Charniak,	Addison Wesley.			
	Intelligence	Drew McDermott	The second se			
3	AI-Structures and Strategies for	George Lugar	4 <sup>th</sup> edition Pearson			
	Complex Problem Solving		Educations			
4	Artificial Intelligence: an	Robert J. Schalkolf	McGraw Hill.			
	Engineering approach					
5	Decision Support Systems and	Efraim Turban Jay	PHI			
6	Intelligent Systems	E.Aronson				
6	Artificial Intelligence – Strategies,	Christopher Thornton	New Age			
10	Applications, and Models through	and Benedict du	International			
	Search	Boulay	<b>Publications</b>			



Course Code	MAT524			
Course Title	Research Methodology and IPR			
Type of Course	Audit			
LTP	300			
Credits	3			
<b>Course Prerequisites</b>	Basic knowledge of mathematical concepts			
Course Objectives	ives The course aims at equipping students with an understanding of the			
	research process, tools and techniques in order to facilitate			
	managerial decision making.			
<b>Course Outcomes</b>	The learner will be able to-			
(CO)	1. Understand the need of research.			
	2. Analyze the importance of literature review in problem			
	formulation.			
	3. Differentiate between primary and secondary source of data.			
	4. Prepare research proposal and draft thesis report.			
	5. Explain Trademark, copyright, patents and Intellectual property			
	rights.			

#### Unit –I

An Introduction to Research: Meaning, Definition, Objectives and Process; Research Problem: Selection of Problem, Understanding Problem, Necessity of Defined Problem; Review of Literature in Research. Research Design: Meaning, Types –Descriptive, Diagnostic, Exploratory and Experimental.

#### Unit –II

**Sources Of Data:** Primary And Secondary; Data Collection Methods; Questionnaire Designing: Construction, Types And Developing A Good Questionnaire. Sampling Design and Techniques, Scaling Techniques, Meaning, Types, Data Processing Operations, Editing, Coding, Classification, Tabulation. Research Proposal/Synopsis Writing.

#### Unit-III

**Reporting and Thesis Writing**- Structure and Components of scientific report- types of reporttechnical report and thesis- significance- different steps in preparation- layout, structure and language of typical reports-illustrations and tables- Bibilography, referencing and footnotes-Oral presentation- Planning, Preparation-practice- making presentations.

#### **Unit-IV**

Intellectual property Rights and Patent law- Introduction of IPR, History of Patent
Protection, Patents, Trademarks, Copyrights, History of Indian patent Act, Indian Patent act
1970, Overview of Patent search, its advantages. Patent drafting requirement, Patent Filling
procedure in India, Plagiarism, Citation and Acknowledgement.
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RECOMM	IENDED BOOKS		
Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Business Research Methods	D R. Cooper, & P.S,Schindler	Tata McGraw Hill
2	An Applied Orientation	N. Malhotra, and S.,Dash, Marketing Research	Pearson Education
3	Research Methodology: Methods & Techniques	C.R,Kothari	New Age International Publishers
4	SPSS Explained	Hiolton, Brownlow McMurray,Cozens	Tata McGraw Hill
5	Business Research Methods	Willian G.Zikmund	Thomson South- Western Learning
6	SPSS for Windows Step by Step	Darren George & Paul Mallery	Pearson Education
7	Marketing Research	Churchill & Israel	Cengage Learning
8	Marketing Research: Text & Cases	RajendraNargundka	Tata McGraw Hill
9	Business Research Methodology	Srivastava and Rego	Tata Mc Graw Hill
10	Essentials of Marketing Research	Zikmund	Cengage Learning

Course Code	CSE507		
Course Title	Advanced Distributed Systems		
Type of Course	PE		
LTP	400		
Credits	4		
<b>Course Prerequisites</b>	Students are expected to know and understand the fundamentals of		
	operating systems, to be able to program in both Java and C/C++ in		
	a Unix environment.		
Course Objectives	To list the principles underlying the functioning of distributed		
	systems, describe the problems and challenges associated with these		
	principles, To recognize how the principles are applied in		
	contemporary distributed systems, explain how they affect the		
	software design, and be able to identify features and design decisions		
	that may cause problems; To build distributed system software using		
	basic OS mechanisms as well as higher-level		
	middleware and languages.		
<b>Course Outcomes</b>	The learner will be able to-		
(CO)	1. Understand the basic principles of distributed systems.		
	2. Describe the problems and challenges associated with		
	functioning of distributed systems.		
	3. Explain how these problems affect the software design		
	4. Build distributed system software.		

#### UNIT I

#### **SYLLABUS**

**Characterization of Distributed Systems:** Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models-Introduction, Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication, Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.

#### UNIT II

**Operating System Support:** Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture, case study- SUN network file systems. Name Services-Introduction, Name Services and the Domain Name System, Case study of the Global Name Service, Case study of the X.500 Directory Service.

#### UNIT III

**Peer to Peer Systems:** Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies- Pastry, Tapestry, Application case studies- Squirrel, Ocean **24** | P a g e

Store. Time and Global States - Introduction, Clocks, events and Process states, Synchronizing

Physical clocks, logical time and logical clocks, global states, distributed debugging. Coordination and Agreement - Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

#### **UNIT IV**

**Transactions and Concurrency control:** Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control, Distributed Transactions- Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery, Replication- Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

**Security**: Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies- Kerberos, TLS, 802.11 Wi-Fi. Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, Other consistency models, CORBA case study - Introduction, CORBA RMI, CORBA Services.

RECOMMENDED BOOKS					
Name	AUTHOR(S)	PUBLISHER			
Distributed Systems Concepts and	G Coulouris, J	Pearson Education:			
Design	Dollimore and T	New Delhi			
Al Same S   S a la	Kindberg				
Distributed Sytems :An	Sukumar Ghosh	CRC press			
algorithmic approach					
Distributed Systems: Principles	Andrew	Pearson			
and Paradigms	S.Tanenbaum	A DAY AND			
the second se	North Control of Contr				
Modeling Distributed Systems	Fokkink, Wan	Springer			
C. C. Stranger, C. Stranger, C. Stranger, Stra		and the second second			



Course Code	CSE509
Course Title	Network Technology and Security
Type of Course	PC
LTP	400
Credits	4
<b>Course Prerequisites</b>	Basic knowledge of Computer Networks
Course Objectives	This course is intended to provide an understanding of various
(CO)	security techniques that should be implemented across Network to
	protect data and information. This includes various encryption and
	decryption techniques.
Course Outcome	The learner will be able to-
(CO)	1. Understand basic protocols of Ipv6
	2. Explain the need of security techniques across network to protect
	data and information.
	3. Describe encryption and decryption techniques
15	4. Design a secured network

**Syllabus** 

#### Unit-I

**Introduction to Ipv6:** Basic Protocol, extensions and options, support for QoS, security, neighbour discovery, auto configuration, routing, Application Programming Interface for IPV6.

#### Unit-II

Security Trends- Attacks and services, Classical crypto systems, different types of ciphers, Basic Number theory, Congruence's, Chinese Remainder theorem.

#### Unit-III

Simple DES- Differential cryptanalysis, DES- Modes of operation, Triple DES, AES, RC4, Attacks, Factoring.

**Discrete Logarithms-** Diffie-Hellman key exchange, EIG key cryptosystems, hash functions, secure hash, birthday attacks, MDS, DSA, unwanted traffic: denial of service attacks.

#### **Unit-IV**

Authentication Applications- Kerberoes, X.509, PKI, Electronic mail security, PGP security, web security, SSL, TLS, SET.

**Cryptography-** Plain text and cipher test, substitution techniques, polygram, Hill Cipher, Transposition techniques, Encryption and Decryption, Symmetric and asymmetric key, Steganography, key range and key size, Possible types of attack.

RECOMMENDED BOOKS			
Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Cryptography and Network security- principles and Practices	William Stallings	Prentice Hall of India pvt. Ltd., New delhi
2	Cryptography and Network security	Atul Kahate	Tata Mc-Graw Hill
3	Computer Networks	A.S. Tanebaum	Pearson

Course Code	CSE511
Course Title	Ad-Hoc Networking
Type of Course	PE
LTP	400
Credits	4
<b>Course Prerequisites</b>	Computer networks
<b>Course Objectives</b>	This subject provides the knowledge of Adhoc network and
	sensors
<b>Course Outcomes</b>	The learner will be able to-
(CO)	1. Understand MAC protocols.
	2. Classify routing protocols.
	3. Identify issues in adhoc transport layer.
	4. Describe Sensor Network architecture.
	5. Explain issues in WSN routing.
	6. Explain IEEE 802.11s Architecture

#### UNIT I

#### Ad-Hoc MAC

Introduction, Issues in Ad-Hoc Wireless Networks. MAC Protocols, Issues, Classifications of MAC protocols, Multi channel MAC& Power control MAC protocol.

#### UNIT II

#### **Ad-Hoc Network Routing & TCP**

Issue, Classifications of routing protocols, Hierarchical and Power aware. Multicast routing, Classifications, Tree based, Mesh based. Ad Hoc Transport Layer Issues. TCP Over Ad Hoc, Feedback based, TCP with explicit link, TCP-BuS, Ad Hoc TCP, and Split TCP.

#### UNIT III WSN -

#### MAC

Introduction, Sensor Network Architecture, Data dissemination, Gathering. MAC Protocols, self-organizing, Hybrid TDMA/FDMA and CSMA based MAC.

#### WSN Routing, Localization & QOS

Issues in WSN routing, OLSR, AODV. Localization, Indoor and Sensor Network Localization. QoS in WSN.

#### UNIT IV

#### Mesh Networks

Necessity for Mesh Networks, MAC enhancements, IEEE 802.11s Architecture, Opportunistic routing, Self configuration and Auto configuration, Capacity Models, Fairness, Heterogeneous Mesh Networks, Vehicular Mesh Networks

RECOMMENDED BOOKS			
Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Ad Hoc Wireless Networks – Architectures and Protocols	C.Siva Ram Murthy and B.Smanoj	Pearson Education.
2	Wireless Sensor Networks	Feng Zhao and Leonidas Guibas,	Morgan Kaufman Publishers.
3	Ad Hoc Mobile Wireless Networks	C.K.Toh	Pearson Education.
4	Wireless Mesh Networking	Thomas Krag and SebastinBuettrich	O'Reilly Publishers.

Course Code	CSE519
Course Title	Advanced Distributed System Lab
Type of Course	PE
LTP	0 0 2
Credits	1
Course Prerequisites	Basic knowledge of Distributed Networks
Course Objectives	<ul> <li>Basic concepts of middleware, states of art middleware technology and middleware services like RMI, CORBA,DCOM and EJB.</li> <li>To understand scheduling in distributed operating systems, fault tolerance, real-time distributed systems, and designing of distributed file systems.</li> </ul>
Course Outcome (CO)	<ol> <li>The learner will be able to-</li> <li>Understand the client server based program</li> <li>Implement Mutual Exclusion algorithms</li> <li>Demonstrate process or code migration</li> </ol>

#### List of Practical's

- 1. To study Client Server based program using RPC.
- 2. To study Client Server based program using RMI.
- 3. To Study Implementation of Clock Synchronization (logical/physical).
- 4. To Study Implementation of Election algorithm.
- 5. To study Implementation of Mutual Exclusion algorithms.
- 6. To write Program multi-threaded client/server processes.
- 7. To write Program to demonstrate process/code migration.
- 8. Write a distributed application using EJB.
- 9. Write a program using CORBA to demonstrate object brokering.

Course Code	CSE521
Course Title	Network Technology and Security lab
Type of Course	PE
L T P	0 0 2
Credits	1
<b>Course Prerequisites</b>	Basic Knowledge of Computer Networks and Security Techniques
Course Objectives	Learners will be able to understand concepts used in network design and the need to secure data travelling across the network.
Course Outcome (CO)	<ul><li>The learner will be able to-</li><li>1. Understand the concepts of confidentiality, availability and integrity (CIA) in context of information assurance.</li></ul>
	<ol> <li>Handle configuring host and network level technical security controls to include host firewalls, user access controls, intrusion detection, prevention and encryption at all levels</li> </ol>
	3. Describe the hardware, software and services that comprise an enterprise network.
	4. Articulate integration of components to form a network solution

#### List of Practical's

- 1) Specifications, familiarizations of Networking Components and devices.
  - 1.1) Specifications of Laptop and Computer
  - 1.2) Familiarizations of Networking components and devices, LAN Adapter, HUB, Switches
- 2) Transmission Media and Tools, and Preparing Cables
  - 2.1) Coaxial Cables, UTP Cable
  - 2.2) Preparing Straight cables and Cross cables
- 3) Study of Topology and TCP/IP protocol
  - 3.1) Study of LAN Topology & Creation using N/W devices, Cables & Computers
  - 3.2) Configuration of TCP/IP Protocol in Windows & Linux
- 4) Addressing, File, Printer Sharing.
  - 4.1) Implementation of File & Printer Sharing.
  - 4.2) Designing & implementation of class A, B, C Networks
- 5) Subnet Planning, FTP Server, TCP/UDP
  - 5.1) Subnet planning and implementation
  - 5.2) Installation of FTP Server & Client

6) Network Security: Network Concepts, Threats in Networks, Network Security Controls.

- 7) Web Security: Web Security Requirements, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure Electronic Transaction (SET).
- 8) Electronic Mail Security: Threats to E-Mail, Requirements and Solutions, Encryption for Secure E- Mail, Secure E-Mail System.
- 9) Firewalls: Firewalls- Types, Comparison of Firewall Types, Firewall Configurations.

Course Code	CSE523
Course Title	Ad-hoc Networking lab
Type of Course	PE
LTP	0 0 2
Credits	1
<b>Course Prerequisites</b>	Basic concepts of Computer Networks, Wireless Networks
Course Objectives	This course enables students to design and implement a network
	using available tools.
<b>Course Outcome (CO)</b>	The learner will be able to-
	1. Understand devices and equipments needed in installation of
	network
	2. Describe configuration and installation of active directory.
	3. Design a peer to peer Adhoc Wireless Network
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List of Practicals

- 1) Study of Devices and Equipments for The installation of a Network
- 2) To know how to install a Server Operating system. How to configure it. Installing Active Directory.
- 3) Dynamic IP addressing and Static

4) Testing the LAN by pinging. The use of the PING command

- 5) Making a peer to peer Adhoc Wireless Network
- 6) Exposure to Network simulator2(NS2) : Simulation Commands ,Drawing a Network Topology, Simulate the transmission of ping messages over a network topology

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Course Code	CSE525
Course Title	Data Mining and Data Warehouse Technology Lab
Type of Course	PE
LTP	002
Credits	1
<b>Course Prerequisites</b>	Basic concepts of Computer Networks, Wireless Networks
Course Objectives	This course enables students to design and implement a network
	using available tools.
<b>Course Outcome (CO)</b>	The learner will be able to-
	1. Understand building of Data Warehouse
	2. Describe classification of data sets
	3. Perform clustering on data sets

**List of Practicals** 

- 1) Build Data Warehouse and Explore WEKA
- 2) Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets.
- 3) Demonstrate performing classification on data sets.
- 4) Demonstrate performing clustering on data sets.
- 5) Demonstrate performing Regression on data sets
- 6) Beyond the Syllabus -Simple Project on Data Preprocessing

Course Code	CSE527
Course Title	Cloud Computing Technology lab
Type of Course	PE
LTP	0 0 2
Credits	1
<b>Course Prerequisites</b>	Basic concepts of Computer Networks, Wireless Networks
Course Objectives	This course enables students to design and implement a network
(CO)	using available tools.
<b>Course Outcome (CO)</b>	The learner will be able to-
	1. Create spreadsheets and notes on Google drive.
	2. Define and implement virtualization using different types of
	hypervisors,
	3. Install and configure Hadoop
SYLLABUS	

#### List of Practical's

- 1. Working of Goggle Drive to make spreadsheet and notes.
- 2. Installation and Configuration of Justcloud.
- 3. Working in Cloud9 to demonstrate different language.
- 4. Working in Codenvy to demonstrate Provisioning and Scaling of a website.
- 5. Installation and Configuration of Hadoop/Eucalyptus
- 6. Working and installation of Google App Engine

Course Code	CSE529
Course Title	Parallel Computing Lab
Type of Course	PE
LTP	002
Credits	1
<b>Course Prerequisites</b>	Basic concepts of Parallel computing, Distributed system
Course Objectives	This course enables students to design and implement a network
	using available tools.
<b>Course Outcome</b>	The learner will be able to-
(CO)	1. Write a single instruction multiple data parallel program
	2. Design and implement a network

#### **List of Practical's**

- 1. To practice the first parallel construct in OpenMP that creates a parallel region in a C++ code. It is a parallel version of Hello World.
- To practice how to write a SPMD (Single Instruction Multiple Data) paralle program in OpenMP. The lab computes the sum of a billion numbers.
- 3. To create a parallel program using OpenMP to calculate PI.
- 4. To create an OpenMP program to calculate them and elbrot set.
# Second Semester

Course Code	CSE503		
Course Title	Data Structure Programming		
Type of Course	PC		
LTP	400		
Credits	4		
Course Prerequisites	Computer algorithms, C/C++, basics of data structures		
Course Objectives	This course work provides the fundamental design, analysis, and		
	implementation of basic data structures, basic concepts in the		
	specification and analysis of programs, principles for good program		
	design, especially the uses of data abstraction, significance of		
	algorithms in the computer field, various aspects of algorithm		
	development, and qualities of a good solution.		
Course Outcomes	The learner will be able to :		
(CO)	1. Describe how arrays, records, linked structures, stacks, queues, trees,		
	and graphs are represented in memory and used by algorithms		
100	2. Describe common applications for arrays, records, linked structures,		
100.00	stacks, queues, trees, and graphs		
11 600	3. Demonstrate different methods for traversing trees		
1000	4. Discuss the computational efficiency of the principal algorithms for		
	sorting, searching, and hashing		

**SYLLABUS** 

# UNIT I

Introduction: Time and Space analysis of Algorithms - Order Notations. Linear Data Structure, ADT concept, Linear List ADT

**Linear Data Structures** - Sequential representations - Arrays and Lists, Stacks, Queues and Dequeues, strings, Application. Linear Data Structures, Link Representation - Linear linked lists, circularly linked lists. Doubly linked lists, application.

**Recursion** - Design of recursive algorithms, Tail Recursion, When not to use recursion, Removal of recursion Linear Data Structure

#### UNIT II

Non-linear Data Structure: Trees - Binary Trees, Traversals and Threads, Binary Search Trees, Insertion and Deletion algorithms, Height-balanced and weight-balanced trees, B-trees, B+ - trees, Application of trees;

Array & Linked List: Array representation, Linked representation, Vector representation, singly linked lists -insertion, deletion, search operations, doubly linked lists-insertion, deletion operations, circular lists, Representation of single, two dimensional arrays, Sparse matrices and their representation.

Stack and Queues: ADTs, array and linked list representations, infix to postfix conversion using

stack, implementation of recursion, Circular queue-insertion and deletion, De-queue ADT, array and linked list representations, Priority queue ADT

# UNIT III

**Trees , Graphs & File Structures**: Ordinary and Binary trees terminology, Properties of Binary trees, Binary tree ADT, representations, recursive and non recursive traversals, threaded binary trees, implementation using Heaps, Insertion into a Max Heap, Deletion from a Max Heap.

**Graphs**- Graphs terminology, Graph ADT, representations, graph traversals/search methods- DFS and BFS, Applications of Graphs-Minimum cost spanning tree using Kruskal's algorithm, Dijkstra's algorithm for Single Source Shortest Path Problem.

**File Structures** - Sequential and Direct Access. Relative Files, Indexed Files - B+ tree as index. Multi-indexed Files, Inverted Files, Hashed Files.

#### UNIT IV

**Search Trees**- Binary search tree-Binary search tree ADT ,insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition and examples only, B-Trees-definition, insertion and searching operations, Comparison of Search trees. Text compression-Huffman coding and decoding, Pattern matching-KMP algorithm.

**Searching & Sorting:** Linear and binary search methods, Hashing-Hash functions, Collision Resolution methods-Open Addressing, Chaining, Hash-Set, Hash-table. Sorting –Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, comparison of sorting methods.

RECOMMENDED BOOKS				
Sr. no.	Name	AUTHOR(S)	PUBLISHER	
1	Data structures, Algorithms and Applications in Java	S. Sahni	Universities Press	
2	Data structures and Algorithms in Java	Adam Drozdek	Cengage learning	
3	Data Structures, Algorithms and Applications in C++	Sartaj Sahni	Tata McGraw Hill	
4	Data Structures using C and C++	Tenenbaum, Augenstein,	Prentice Hall of	
		&Langsam	India	



Course Code	CSE505	
Course Title	Data Structure Programming Lab	
Type of Course	PC	
LTP	0 0 2	
Credits	1	
Course Prerequisites	Any high level programming language, basics of data	
	structure	
Course Objectives	This course helps the students to understand the various	
	advance topics of data structure and its implementation.	
Course Outcomes (CO)	The learner will be able to-	
	1. Implement various operations in arrays	
	2. Implement various operation in stack and queue	
	3. Implement sorting algorithms	

#### List of Practical's

- 1. Array: Implement various operations in Arrays
- 2. **Linked List:** Implement Insertion and Deletion algorithms of single ended and double ended linked list
- 3. **Stack:** Implement Insertion and Deletion operation in Stack
- 4. Queue, Deques & Circular Queues: Implement Insertion and Deletion algorithm
- 5. **Min Heap:** Implement Insertion and Deletion algorithms
- 6. **AVL Tree:** Implement Insertion and Deletion algorithms with appropriate rotations
- 7. **B-Tree:** Implement Insertion and Deletion algorithms
- 8. **Quick Sort:** Implement quick sort algorithms
- 9. Greedy algorithm: Implement greedy algorithm
- 10. Knapsack using Dynamic Programming

RECOMMENDED BOOKS				
Sr. no.	Name	AUTHOR(S)	PUBLISHER	
1	Datastructures,AlgorithmsandApplications in Java	S. Sahni	Universities Press	
2	Data structures and Algorithms in Java	Adam Drozdek	Cengage learning	
3	Data Structures, Algorithms and Applications in C++	Sartaj Sahni	Tata McGraw Hill	
4	Data Structures using C and C++	Tenenbaum, Augenstein, &Langsam	Prentice Hall of India	

Course Code	CSE513	
Course Title	Data Mining and Data Warehouse Technology	
Type of Course	PE	
LTP	400	
Credits	4	
<b>Course Prerequisites</b>	Database Management System	
Course Objectives	Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining. They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply. They will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior	
Course Outcome (CO)	<ul> <li>The learner will be able to-</li> <li>1. Identify the problem</li> <li>2. Understand models and algorithms in data warehousing and dat mining</li> <li>3. Choose relevant models and algorithms</li> <li>4. Apply and analyze the behavior of the algorithms.</li> </ul>	

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#### UNIT I

**Data Warehousing:** Need for Data Warehousing, Paradigm Shift, Operational and Informational Data Stores, Data Warehouse Characteristics, Architecture for a Data Warehouse Data Warehouse Sourcing, Acquisition, Cleanup and Transformation tools, Metadata, Access Tools, Data Marts.

OLAP Tools: Need for OLAP, Multidimensional Versus Multi relational OLAP, Categorization of OLAP tools, OLAP operations, Identifying Facts and Dimensions, Designing Fact Tables, Designing Dimension Tables

Building a Data Warehouse: Data Warehouse Schemas. Steps for the Design and Construction of Data Warehouses.

#### UNIT II

**Data Mining:** Introduction: Motivation, Knowledge Discovery Process, Kind of Data, Data Mining Functionalities, Interesting Patterns, Classification of Data Mining Systems, Major issues. Data Preparation: Pre-process, Data Cleaning, Data Integration and Transformation, Data Reduction.

#### UNIT III

.Mining Frequent patterns, Associations and Correlations: Market Basket Analysis, Frequent Itemsets. Decision Tree: Basics, Building a Decision Tree.

#### UNIT IV

**Clustering:** Clustering in Grouping, Classical Partitioning Methods: k-Means and k-Medoids Agglomerative Hierarchical Clustering, and Divisive Hierarchical Clustering. Classification-**40** | P a g e Supervised and Unsupervised classification techniques, Neural Network approach, K-nearest neighbourhood.

RECOMMENDED BOOKS				
Sr. no.	Name	AUTHOR(S)	PUBLISHER	
1	Data Warehousing, Data Mining & OLAP	A. Berson, S.J. Smith	Tata McGraw-Hill	
2	Data Mining Concepts and Techniques	J Han, M. Kamber and J. Pei	Elsevier India	
3	Data mining Applications with R	Zhao Y., Cen Y.	Elsevier India	
4	Data Mining – Concepts and Techniques	Jiawei Han &Micheline Kamber	Elsevier India	



Course Code	CSE515	
Course Title	Cloud Computing Technology	
Type of Course	PE	
LTP	400	
Credits	4	
<b>Course Prerequisites</b>	Knowledge of networking, server technology etc.	
Course Objectives	This course work provides the complete understanding of Cloud	
	System architecture, its implementation techniques and its various	
	applications in the field of computer science.	
<b>Course Outcome (CO)</b>	The learner will be able to-	
	1. Understand the importance of cloud computing	
	2. List characteristics of cloud computing	
	3. Describe different types of cloud	
	4. Explain architecture of cloud computing	
SYLLABUS		

#### UNIT-I

Cloud Computing Basics, History of Cloud Computing, Importance, Characteristics of Cloud Computing, Benefits and challenges to Cloud architecture.

#### UNIT-II

Types of Cloud: Public Cloud, Private Cloud, Hybrid and Community Cloud. Differences between public and private cloud, Status of Cloud Computing in India, Cloud Service Models, Role of virtualization in enabling the cloud; Differences between Grid computing and cloud computing, differences between grid computing and utility computing, Cloud Computing security concerns and proposed security model for future cloud computing.

## UNIT-III

Cloud Computing- Logical architecture, Developing Holistics Cloud Computing Reference Models- Seven step model of migrating to cloud.

Virtualization types, Virtual Machine Life Cycle, Virtualization applications, Pitfalls of Virtualization, CPU Virtualization.

#### **UNIT-IV**

Case Study of Cloud Computing, Cloud Computing Risks. Cloud Tools, Cloud Applications, Future Trends, Mobile cloud, Jungle Computing, Big Data –Features and applications.

RECOMMENDED BOOKS				
Sr. no.	Name	AUTHOR(S)	PUBLISHER	
1	Cloud Computing Bible	Sosinsky B	Wiley India	
2	Cloud Computing : Principles and Paradigm	Buyya R., Broberg J., Goscinski A.	John Wiley & Sons	
3	Cloud Computing – A practical Approach	Velte T., Velte A., Elsenpeter R.	Tata McGrawHill.	
4	Cloud Computing and SOA Convergence in Enterprise	Linthicium D.	Pearson Education India.	

Course Code	CSE517		
Course Title	Advanced Parallel Computing		
Type of Course	PE		
LTP	400		
Credits	4		
<b>Course Prerequisites</b>	Basic knowledge of Computer System Architecture		
<b>Course Objectives</b>	Students become familiar with parallel computer architecture and		
	algorithms.		
<b>Course Outcome (CO)</b>	The learner will be able to-		
	1. Understand basic terms used in parallel computing		
	2. Classify parallel computers		
	3. Describe parallel computer architecture		
	4. Analyze parallel algorithms		
SYLLABUS			

#### UNIT-I

**Introduction to Parallel Computing:** Basic concepts about program/process/ thread, Concurrent Execution, Parallel Execution, granularity, Potential of Parallelism; Need of Parallel Computation; Levels of parallel processing; Parallel processing Vs. Parallel computing; Dataflow Computing concept; Applications of parallel processing-Scientific Applications / Image processing, Engineering Application, Database query / Answering applications, AI Applications, Mathematical simulations and modeling

**Classification of Parallel Computers:** Types of Classification; Flynn's/ Handler classification; UMA / NUMA /COMA; Loosely coupled / tightly coupled; Classification based grain size and Instruction level parallelism.

## UNIT-II

**Interconnection Network:** Need of Interconnection Network; Concept Bandwidth Nod degree diameter bisection bandwidth, In degree and Out degree; Static and Dynamic Interconnection network; Omega, Parallel Shifter, Bens, permutation, hypercube, butterfly; Shuffle exchange Network

**Parallel Computer Architecture:** Introduction to various computer architecture; Pipeline processing; Vector / Array processing; VLIW and Super scalar architecture; Associative architecture -Multithreaded architecture.

#### UNIT-III

#### Parallel Algorithm & Parallel Programming

**Parallel Algorithm:** Introduction to Parallel Algorithms; Analysis of Parallel Algorithms; Different models of computation- Combinational circuit, Permutation Circuit, Sorting circuit, Matrix computation.

**PRAM Algorithms:** Message passage programming -Shared memory, Message passing libraries, Data Parallel programming; Data Structures for parallel algorithms-Link list, Arrays pointers, Hypercube network.

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**Parallel Programming:** Introduction to Parallel Programming; Types of parallel programming - Programming based on message passing, data parallelism, Programming for shared memory systems, Example programs for parallel systems.

#### UNIT- IV

#### **Advanced Topics**

**Operating System for Parallel Computers:** Basic issues of Operating Systems for Parallel Computers; Process Management; Resource Management; Memory management; I/O Management; Inter-Processor Communication; Vectorisation Compiler

**Performance Evaluation:** Introduction to performance evaluation; Metric of Parallel overhead; Law Speedup; Measurement Tools

Recent Trends: Multi-component CPU; Apex architecture IA 64; Hyperthreading

RECOMMENDED BOOKS				
Sr. no.	Name	AUTHOR(S)	PUBLISHER	
1	Advanced Computer Architecture: Parallelism, Scalability, Programmability	Hwang, K	Tata McGraw Hills	
2	Introduction to Parallel Processing	Sasikumar M., Shikhare, D., Ravi Prakash	Prentice Hall of India private limited, New Delhi	
3	Computer Architecture and Parallel Processing	Hwang, K., Briggs, F. A.	McGraw Hill	





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Course Code	CSE502	
Course Title	Mathematical Foundation of Computer Science	
Type of Course	PC	
LTP	400	
Credits	4	
<b>Course Prerequisites</b>	Basic concepts of Computer Networks, Wireless Networks	
Course Objectives	This course enables students to design and implement a network	
	using available tools.	
<b>Course Outcome (CO)</b>	The learner will be able to-	
	1. Understand Mathematical logic and Truth tables	
	2. Describe Set Theory	
	3. Explain algebraic structures with examples and properties.	
	4. Solve combinations and permutations.	
1	5. Design graphs using graph theory.	
4 <sup>10</sup> .	SYLLABUS	

#### List of Practical's

#### UNIT-I

Mathematical Logic : Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms.

#### UNIT-II

Predicates : Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

#### UNIT-III

Set Theory : Properties of binary Relations, equivalence, compatibility and partial ordering relations, Hasse diagram. Functions: Inverse Function Comports of functions, recursive Functions, Lattice and its Properties, Pigeon hole principles and its application.

#### UNIT-IV

Algebraic structures : Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

#### UNIT-V

Elementary Combinatorics: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion.

#### UNIT-VI

Recurrence Relation : Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating funds. Characteristics roots solution of In homogeneous Recurrence Relation.

#### UNIT-VII

Graph Theory : Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs

# UNIT-VIII

Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers

RECOM	RECOMMENDED BOOKS				
Sr. no.	Name	AUTHOR(S)	PUBLISHER		
1	Discrete and Combinational Mathematics- An Applied Introduction-5th Edition	Ralph. P.Grimaldi	PHI/Pearson Education		
2	Discrete Mathematical Structures with applications to computer science	J.P. Trembly and P. Manohar	TMH, New York, 1997		
3	Discrete Mathematics and its Applications	Kenneth H. Rosen, Fifth Edition	TMH, New York, 1997		

Course Code	-CSE508	
Course Title	Mini Project with Seminar	
Type of Course	PC	
LTP	0 0 2	
Credits	1	
<b>Course Prerequisites</b>	Basic knowledge of Software Engineering	
Course Objectives	This course focuses on implementation of various real time projects	
<b>Course Outcome (CO)</b>	The learner will be able to-	
	1. Understand different aspects of problem.	
	2. Describe the problem statement by doing thorough Literature	
	survey	
	3. Design solution to the problem	
	4. Analyze and present seminar report along with a project in the	
101	area of study.	

Seminar is a course requirement wherein under the guidance of a faculty member a student is expected to do an in depth study in a specialized area by doing literature survey, understanding different aspects of the problem and arriving at a status report in that area. It should provide insights into research methodology in the field, as well as an introduction to the meaning of research. While doing a seminar, the student is expected to learn investigation methodologies, study relevant research papers, correlate work of various authors/researchers critically, study concepts, techniques, prevailing results etc., analyze it and present a seminar report along with a project in the area of study. It is mandatory to give a seminar presentation and show the running project before a panel constituted for the purpose. The grading is done on the basis of the depth of the work done, understanding of the problem, report and presentation by the student concerned. Students will submit their report for seminar. Report which is to about 10-20 pages which should be based work done.



Course Code	CSE510		
Course Title	Database Design & Management system		
Type of Course	PC		
LTP	400		
Credits	4		
Course Prerequisites	Basic knowledge of Database and relational database management system		
Course Objectives	This course is intended to provide an understanding of the current theory and practice of database management systems, a solid technical overview of database management systems. In addition to technical concerns, more general issues are emphasized. These include data independence, integrity, security, recovery, performance, database design principles and database administration		
Course Outcome (CO)	The learner will be able to-		
	<ol> <li>Explain the features of database management systems and Relational database.</li> <li>Analyze the existing design of a database schema using ER diagrams and apply concepts of normalization to design an optimal database.</li> <li>Identify the need of Concurrent transactions and locking and explain their types, advantages and disadvantages</li> <li>Formulate query, using SQL, solutions to a broad range of query and data update problems.</li> <li>Explain Spatial and Multimedia databases</li> </ol>		

#### UNIT I

**Introduction :**Introduction to DBMS, RDBMS, Types of DBMS and their advantages and disadvantages, Types of relational query language, E-R Diagram, Keys, Normalization, Query optimization

**Transaction Processing and Concurrency Control:** Transaction Management, Concurrency Control and Serializability; Recoverability and Strictness; Two-phase locking, Multiple Granularity, Timestamp based Protocol.

Database protection in RDBMS –Integrity, Availability

#### UNITII

**Distributed Databases:** Basic concepts, structure, trade-offs Methods of data distribution – fragmentation, replication, design & advance concepts of DDBMS like Two-phase commit protocol, distributed transaction, distributed concurrency control, distributed deadlock handling.

**Introduction to object oriented databases**: Object Oriented Data model, Object Oriented Database Management System, Object Query Language, Object Oriented Relational Database Management System and its concepts.

#### UNIT III

**Data warehousing Concepts:** Architecture, Dataflows, Tools & Technologies, Data Marts, Data Mining & Online Analytical Processing.

#### UNIT IV

**Emerging Database Technologies:** Spatial & Multimedia databases, Mobile Computing & Mobile Databases

**New Topics and Applications:** (a) Information Retrieval (b) Bioinformatics (c) Incomplete and Uncertain Databases (d) Non-relational Databases, (e) Data Stream Management

RECOM	RECOMMENDED BOOKS		
Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Advanced database management system	Rini Chakrabarti, ShilbhadraDasgupta	Wiley India Pvt. Ltd.
2	Distributed Databases	Ozsu and Valduriez	Pearson Education
3	Advanced Database Management System	VaishaliP.Yadav	Pearson Education India
4	Database System Concepts	Abraham Silberschatz, Henry F. Korth, S. Sudarshan	Tata McGraw-Hill
5	Database Management Systems	Raghu Ramakrishnan	Mc-Graw Hill



Course Code	CSE512		
Course Title	Big Data Analytics		
Type of Course	PE		
LTP	400		
Credits	4		
Course Prerequisites	Knowledge of Database Management System.		
Course Objectives	To understand big data analytics as the next wave for businesses		
	looking for competitive advantage, To understand the financial value		
	of big data analytics, To explore tools and practices for working with		
	big data, To understand how big data analytics can leverage into a		
	key component, To understand how to mine the data, To learn about		
	stream computing, To know about the research that requires the		
	integration of large amounts of data.		
Course Outcome (CO)	The learner will be able to-		
	1. Identify the characteristics of datasets and compare the trivial data and		
	big data for various applications.		
100	2. Onderstand and apply Hadoop architecture and associated comp		
201.00	3 Select and implement computing environment Hadoon Hive that a		
10000	suitable for the applications under consideration.		
10000	4 Recognize and implement Hadoop ecosystem components YARN		
518	HIVE and PIG.		
10 A	SYLLABUS		

#### Unit-I

**INTRODUCTION TO BIG DATA:** Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.

#### Unit-II

**INTRODUCTION HADOOP:** Big Data – Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

#### **Unit-III**

**HADOOP ARCHITECTURE:** Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands, Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

#### **Unit-IV**

**HADOOP ECOSYSTEM, YARN, HIVE & PIG:** Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New Features NameNode High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN. Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Map Reduce Scripts, Advance Indexing – PIG

# **Text/Reference Books**

Sr. No.	NAME	AUTHOS(S)	PUBLISHER
	Big Data Analytics: Turning Big Data		WILEY AND S AS
1	Into Big Money	Frank J Ohlhorst	<b>Business Series</b>
		Boris lublinsky, Kevin t.	Wiley, ISBN:
		Smith, Alexey	9788126551071,
2	"Professional Hadoop Solutions"	Yakubovich,	2015.
		Chris Eaton, Dirk deroos	
3	"Understanding Big data"	et al.	
	Big Data, Black Book(covers Hadoop 2,		
	Mapreduce, Hive, Yarn, Pig, R And		WILEY INDIA
4	Data Visualization	DT Editorial Services	PVT.LTD

Course Code	CSE514		
Course Title	Natural Language Processing		
Type of Course	PC		
LTP	400		
Credits	4		
Course Prerequisites	To be a knowledge of Grammar Rules and Artificial Intelligence		
	concepts		
Course Objectives	NLP attempts to interact with humans and human texts via language.		
	Problems in the domain include analyzing texts to discover structures		
	and to make decisions. Translating from one language to another.		
	Interacting with humans in dialogue systems or cooperative tasks.		
Course Orate and			
Course Outcome	I ne learner will be able to-		
(CO)	1. The student will apply core computer science concepts and algorithms, such as dynamic programming		
	2. The student will apply the methods to new NLP problems and will be		
	able to apply the methods to problems outside NLP.		
	3. The student will be familiar with some of the NLP literature and will		
100	read and suggest improvements to published work. The student will see		
100.00	where opportunities for research await and prepare to conduct research		
11 along 1	in NLP or related fields.		
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#### UNIT-I

Basics of NLP: Introduction, Application of Natural Language, Various areas of NLP

**Understanding NLP Models:** Identifying the task, selecting a Model, Building and training a Model, Verifying the Model, Using the Model.

**Understanding Part of Speech or Text Processing:** Tokenization, Sentence segmentation or Splitting, Normalization.

## UNIT-II

**POS Tagging:** Introduction, Word Classes, Rule Based POS, Stochastic POS, Markov assumption, Markov chain, HMM Tagging, Issues of Ambiguity, Multiple tags, Multiple words and unknown words.

**Words and Word Forms** : Morphology fundamentals; Morphological Diversity of Indian Languages; Morphology Paradigms; Finite State Machine Based Morphology; Automatic Morphology Learning; Shallow Parsing; Named Entities; Maximum Entropy Models; Random Fields.

#### UNIT-III

Semantics: Introduction, Semantical Analysis, Lexical Semantics.

Machine Translation: Introduction, Different methods of MT.

Speech Processing: Issues in Speech Recognition, the Sound Structure of Language,

Signal Processing, Speech Recognition, Prosody and Intonation.

#### **UNIT-IV**

**Structures:** Theories of Parsing, Parsing Algorithms; Robust and Scalable Parsing on Noisy Text as in Web documents; Hybrid of Rule Based and Probabilistic Parsing; Scope Ambiguity and Attachment Ambiguity resolution.

#### **Text/Reference Books:**

S. No	Name		Author(S)	Publisher
1.	Speech and	Language	D. Jurafsky and J. Martin	Pearson Education
	Processing			
2.	Natural	Language	James Allen	Pearson Education
	Understanding			
3.	Natural Language pr	ocessing: A	Bharati A., Chaitanya V and	Prentice Hall of
	Paninian Perspective		Sangal R,	India

Course Code	CSE522	
Course Title	Database Design and Management System Lab	
Type of Course	PE	
LTP	004	
Credits	2	
<b>Course Prerequisites</b>	Database management system	
<b>Course Objectives</b>	This course offers a good understanding of emerging database	
(CO)	technologies and prepares students to be in a position to design databases	
	in variety of technologies.	
<b>Course Outcome</b>	The learner will be able to-	
(CO)	1. Formulate and analyze problem statement	
	2. Identify the need of design and normalization	
	3. Design a database using ER diagrams and integrity constraints	
100 million -	4. Implement a database which ensures data security norms	
41		

Students are required to develop a project using concepts of database using following concepts:

- Basic SQL
- ER Modeling
- Database Design and Normalization.

The students are also required to submit the synopsis during semester and final report at the end of semester. The evaluation will be done on the basis of project submitted.

Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Advanced database	RiniChakrabarti,	Wiley India Pvt. Ltd.
10	management system	Shilbhadra Das Gupta	1000
2	Database System Concepts	Abraham Silberschatz,	Tata McGraw-Hill
100	6-C N 16-	Henry F. Korth, S.	1902
		Sudarshan	55.54
*3	Database Management Systems	Raghu Ramakrishnan	Mc-Graw Hill
100	And the second states	the second state of the second	

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Course Code	CSE524	
Course Title	Big Data Analytics Lab	
Type of Course	PE	
LTP	0 0 2	
Credits	1	
Course Prerequisites	Basic knowledge of Computer System Architecture	
Course Objectives	<ul> <li>&gt; Optimize business decisions and create competitive advantage with Big Data analytics.</li> <li>&gt; Imparting the architectural concepts of Hadoop and introducing map reduce paradigm</li> <li>&gt; Introducing Java concepts required for developing map reduce programs</li> <li>&gt; Derive business benefit from unstructured data</li> <li>&gt; Introduce programming tools PIG &amp; HIVE in Hadoop echo system.</li> <li>&gt; Developing Big Data applications for streaming data using Apache Spark</li> </ul>	
Course Outcome (CO)	<ul> <li>The learner will be able to-</li> <li>Optimize business decisions</li> <li>Understand the architectural concepts of Hadoop and map reduce</li> <li>Implement java concepts required for map reduce programs</li> <li>Apply PIG and HIVE in Hadoop echo sysem.</li> <li>Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media application</li> </ul>	

## List of Practical's

- 1. (i)Perform setting up and Installing Hadoop in its two operating modes:
  - Pseudo distributed,
  - ➢ Fully distributed.
  - (ii) Use web based tools to monitor your Hadoop setup.
- 2. (i) Implement the following file management tasks in Hadoop: Adding files and directories
  - Retrieving files
  - Deleting files
  - ii) Benchmark and stress test an Apache Hadoop cluster

- 3. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.
  - ➤ Find the number of occurrence of each word appearing in the input file(s)
  - Performing a MapReduce Job for word search count (look for specific keywords in a file)
- 4. Stop word elimination problem:
  - ➢ Input:
  - o A large textual file containing one sentence per line
  - o A small file containing a set of stop words (One stop word per line)
    - > Output:

o A textual file containing the same sentences of the large input file without the words appearing in the small file.

Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data. 5. Write a Pig Latin scripts for finding TF-IDF value for book dataset (A corpus of eBooks available at: Project Gutenberg)

6. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes.

7. Install, Deploy & configure Apache Spark Cluster. Run apache spark applications using Scala.



Course Code	CSE526	
Course Title	Natural Language Processing Lab	
Type of Course	PE	
LTP	0 0 2	
Credits	1	
<b>Course Prerequisites</b>	Basic concepts of Theory of Computation and Data mining	
Course Objectives	This course objective is to introduce students with basics of NLP	
	which will empower them for developing advanced NLP tools and	
	solve practical problems in field.	
Course Outcome	The learner will be able to-	
(CO)	1. Analyze and understand basics of NLP	
	2. Develop advanced NLP tools	
	3. Design solutions to practical problems in the field of NLP	

FORMULA REFTERMENTERING (1997)

# Analyzing Text with the Natural Language Toolkit

- 1)Processing Raw Text
- 2) Categorizing and Tagging words.
- 4) Reduce noise from the text
- 4)) Learn to classify text
- 5) Analyze sentence structure
- 6) Extract information from text
- 7)Building Feature based grammar
- 8) Import and visualize data
- 9) Analyze Structured data

Instructors can use Data mining tools for this course.

Course Code	CSE528	
Course Title	Machine Learning using python Lab	
Type of Course	PE	
LTP	002	
Credits	1	
<b>Course Prerequisites</b>	Basic concepts of Theory of Computation and Data mining	
Course Objectives	This course objective is to introduce students with goals and	
	applications of Machine learning tools	
Course Outcomes	The learner will be able to-	
(CO)	1. Identify solution for a problem using machine learning techniques	
	2. Solve the problem using identified machine learning technique.	
	3. Apply Dimensionality reduction techniques.	
	4. Design application using python.	

#### **List of Practicals**

- 1. Python program to add two numbers
- 2. Python Program for factorial of a number
- 3. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
- For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm output a description of the set of all hypotheses consistent with the training examples.
- 5. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge toclassify a new sample.
- 6. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.
- 7. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
- 8. Assuming a set of documents that need to be classifier

Course Code	CSE530	
Course Title	Image Processing using Matlab Lab	
Type of Course	PE	
LTP	0 0 2	
Credits	1	
<b>Course Prerequisites</b>	Basic concepts of Theory of Computation and Data mining	
Course Objectives	This course objective is to introduce students with basics of NLP	
	which will empower them for developing advanced NLP tools and	
	solve practical problems in field.	
<b>Course Outcomes</b>	The learner will be able to:	
(CO)	1. Understand the need for simulation/implementation for the	
	verification of mathematical functions.	
	2. Understand the main features of the MATLAB/SCILAB program	
	development environment to enable their usage in the higher	
	learning.	
100	3. Implement simple mathematical functions/equations in numerical	
100 A	computing environment such as MATLAB/SCILAB.	
6.6	4. Interpret and visualize simple mathematical functions and	
	operations there on using plots/display	

# List of experiments

1. Learning and implementing basic MATLAB commands- Read and Display an image, adding, subtracting, multiplying images, adding a colorbar, image resizing, image rotation, extracting pixel values, edge detection, .

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- 2. Write a program in matlab to Read and display the image from file
- 3. Write a function in matlab that will take a color image as input and will return a grayscale image.
- 4. Write a program in MATLAB to plot line through 2 points
- 5. Write a program to Display histogram of an image using MATLAB library function
- 6. Write a program in Matlab that will take a grayscaleor an RGB image as input and will return a binary image as output
- 7. Write a Matlab program to complement colors of a gray scale image

COLUMN STREET

8. Write a Program to dilate an image

of the late

- 9. Write a Program to perform erosion of an image
- 10. Write a program in matlab to display the red, green and blue color planes of a color image

Course Code	CSE532	
Course Title	Advanced Software Engineering Lab	
Type of Course	PE	
LTP	002	
Credits	1	
<b>Course Prerequisites</b>	Basic concepts of Theory of Computation and Data mining	
Course Objectives	This course objective is to introduce students with basics of CASE	
	tools which will empower them for developing solutions to various	
	problem statements using software development life cycle.	
<b>Course Outcomes</b>	The learner will be able to-	
(CO)	1. Study and use CASE tools.	
	2. Develop and design software requirement specification for an	
	identified problem statement.	
	3. Check feasibility of the identified solution and draft project plan	
	using Gantt Chart	
100	4. Calculate complexity and develop UML diagrams for the	
10.0	identified problem statement .	

From the given below list of projects choose any one to perform the experiments given below-

#### **Experiments:**

- 1. Study and Usage of an Design Phase CASE tool (Smart Draw, Visual Paradigm)
- 2. Develop Problem Statements and Understand Software Requirement Specifications with Case Study.
- 3. Develop an IEEE standard SRS document for the given project.
- 4. Study and Usage of software to draft a project plan (Gantt Chart)
- 5. Identify Use Cases and develop Use Case model.
- 6. Identify Conceptual Classes and develop an UML Class diagram.
- 7. Identify business activities and develop an UML Activity diagram
- 8. Draw State Chart Diagram.
- 9. Using the identified scenarios find the interaction between objects and represent those using interaction diagram.
- 10. Draw the Sequence diagrams and Collaboration Diagram.
- 11. Draw Component diagram.
- 12. Draw Deployment diagram.
- 13. Study and Usage of software to track the progress of a project and develop risk management.
  - 14. Develop Mini-Projects using UML.

#### LIST OF PROJECTS:-

- 1. Hospital Management system.
- 2. Airport Check-in System.
- 3. Exam Registration.
- 4. Stock maintenance system.
- 5. Course Management system.
- 6. Railway Reservation System.
- 7. Human Resource management system.
- 8. Credit card processing.
- 9. Tour management system.
- 10. Restaurant system.
- 11. Car Rental system.
- 12. Virtual Classroom.
- 13. Hotel Management System.
- 14. Bank ATM System.
- 15. Online Shopping.
- 16. Library Management System.
- 17. Online Examination System.
- 18. Online Mobile Recharge.
- 19. Ordering Book System
- 20. Shop Management System.

FORTE SALUES

# Fourth Semester

FORMULE EXCEPTE DELECTION (POPE)

Course Code	CSE516	
Course Title	Machine Learning with python	
Type of Course	PE	
LTP	400	
Credits	4	
<b>Course Prerequisites</b>	Discrete mathematics	
Course Objectives	To learn the concept of how to learn patterns and concepts	
	from data without being explicitly programmed in various	
	IOT nodes.	
	To design and analyse various machine learning algorithms	
St	and techniques with a modern outlook focusing on recent	
	advances.	
	To explore supervised and unsupervised learning paradigms	
Strange of Strange	of machine learning.	
1 States and the	To explore Deep learning technique and various feature	
	extraction strategies.	
Course Outcome (CO)	The learner will be able to-	
Strand Land	1. Identify and Understand goals and applications of Machine	
	Learning.	
	2. Design and analyze various machine learning techniques	
State of the second second	and computing environment that are suitable for the	
I I I I I I - I	applications under consideration.	
and the second s	3. Understand and explore supervised and unsupervised	
A A A MALE AND A MALE AND A	learning paradigms of machine learning	
In Read of the State of the	4. Explore deep learning techniques and various feature	
	extraction strategies.	
SYLLABUS		

# UNIT I

Introduction- Basic concepts, Terms- Artificial Intelligence, Data Science, Big Data and Machine learning, machine learning problems, types of learning, designing a learning system, Goals and applications of machine learning, difference between machine learning, artificial intelligence and deep learning.

# UNIT II

**Supervised learning-** Types of Supervised learning- Linear Regression, Nearest Neighbor, Decision Trees, Support Vector Machine (SVM), Classification.

Unsupervised learning- Clustering. K-means, Hierarchical Clustering, Principle component analysis.

# UNIT III

**Training Machine learning algorithms for classification-** Artificial Neural Network, Data Preprocessing for machine learning in python.

**Python-** Introduction, data types and variables, functions, iterations, operators. **64** | P a g e

# UNIT IV

**Reinforcement learning** – Types, differences between supervised and reinforcement learning, Practical applications of reinforcement learning.

**Decision Tree Learning-** Introduction, Learning recursive rules, applications.

RECOMMENDED BOOKS			
Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Pattern Recognition	Bishop, C.	Berlin: Springer-Verlag.
•			
2	Elements of Statistical	Hastie, Tibshirani, and	Springer
	Learning	Friedman	
3	Machine Learning	Tom Mitchell	Mc-Graw Hill

Course Code	CSE 518	
Course Title	Image Processing using Matlab	
Type of Course	PE	
LTP	400	
Credits	4	
<b>Course Prerequisites</b>	Sufficient background in Probability and knowledge of computer	
	algorithms	
<b>Course Objectives</b>	This course will explore the algorithms and techniques involved in	
(CO)	Digital Image Processing using computational tools. The course will	
	comprise of comprehensive understanding of digital imagery and	
	digital image processing	
Course Outcome	The learner will be able to-	
(CO)	1. Understand the need for image transforms different types of	
	image transforms and their properties.	
	2. Develop any image processing application.	
	3. Understand the rapid advances in machine vision.	
	4. Learn different techniques employed for the enhancement of	
	images.	
SYLLABUS		

# UNIT-I

**Introduction to Image Processing:** Definition, Examples of Fields that use Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System.

**Digital Image Fundamentals**: Image Sensing, and Acquisition, Image Sampling and Quantization, Basic Relationship between Pixels, Distance Measures, Linear and Non-linear Operations.

# UNIT-II

**Image Enhancement in Spatial Domain**: Basic Gray Level Transformations, Histogram Processing, Enhancements using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing, Spatial Filters, Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

**Image Restoration** : Noise Models, Restoration in the Presence of Noise Only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering, Geometric Mean Filter, Geometric Transformations.

# UNIT-3

**Color Image Processing:** Color Models, Pseudo color Image Processing, Basics of Full Color Image Processing. Color Transformations, Smoothing and Sharpening. Color Segmentation.

**Unit 4: Image Compression**: Image Compression Models, Huffman coding, Golomb Coding, Arithmetic coding, LZW coding, Run Length coding, Bit-Plane coding, Block Transform coding, wavelet coding.

Image Segmentation: Point Detection, Line Detection and Edge Detection, Edge Linking and

Boundary Detection, Thresholding, Region Based Segmentation

# **RECOMMENDED BOOKS**

Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Digital Image Processing	Gonzalez and Woods	Addison Wesley
2	Digital Image Processing and Pattern	Pakhera Malay K	РНІ
3	Digital Image Processing	Jayaraman and Veerakumara	Mc-Graw Hill
4	Computer Vision A Modern Approach	Forsyth and Ponce	Pearson Education

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Course Code	CSE520	
Course Title	Advanced Software Engineering	
Type of Course	PE	
LTP	400	
Credits	4	
<b>Course Prerequisites</b>	Basics of software principles and software engineering	
<b>Course Objectives</b>	The advanced software engineering curriculum prepares students for	
(CO)	a career in reliable, economical software development.	
Course Outcome	The learner will be able to-	
(CO)	<ol> <li>Define various software application domains and remember different process models that are used in software development.</li> <li>Explain the need of software specifications. Moreover, they can classify different types of software requirements and their gathering techniques.</li> </ol>	
	<ol> <li>Convert the requirements model into the design model and demonstrate use of software and user interface design principles.</li> <li>Distinguish between SCM and SQA and can also able to classify different testing strategies and statics.</li> </ol>	

#### UNIT I

**Introduction:** Life cycle models, Requirement Analysis and specification, Formal requirements specification.

#### UNIT II

**Fundamental issues in software design**: Goodness of design, cohesions, coupling. Functionoriented design: structured analysis and design. Overview of object –oriented concepts.

Unified Modeling Language (UML), Unified design process. User interface design. Coding standards and guidelines. Code walkthrough and reviews.

#### **UNIT III**

Unit testing, Black box and white box testing. Integration and system testing. Software quality and reliability.

SEI CMM and ISO 9001. PSP and Six Sigma. Clean room technique.

# UNIT IV

Software maintenance issues and techniques, Software Reengineering, Software reuse. Client-Server software development.

Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Software Engineering	I. Sommerville	Addison-Wesley P
2	The Mythical Man-Month	F. Brooks	Addison-Wesley
3	Schaum's Outline of Software	D. Gustafson	McGraw-Hill
	Engineering		

Course Code	CSE603	
Course Title	Mobile Computing	
Type of Course	PE	
LTP	400	
Credits	4	
<b>Course Prerequisites</b>	Discrete mathematics	
<b>Course Objectives</b>	To understand learning models and learning algorithms	
<b>Course Outcomes</b>	The learner will be able to-	
(CO)	1. Understand the architecture and applications of mobile computing	
	2. Analyze Network aspects and security issues in GSM and GPRS	
	3. Describe challenges during data dissemination	
	4. Explain Middleware services	

#### **Syllabus**

#### UNIT-I

Mobile Computing Architecture: Internet – The ubiquitous network; Schematic representation of mobile computing environment; The Three-Tier mobile computing architecture; Design considerations for mobile computing; Mobile computing through Internet; Making existing applications mobile-enabled.

#### UNIT-II

Mobile Communications: Introduction; The GSM architecture; Call routing in GSM; Network aspects in GSM; GSM frequency allocation; Authentication and security; GPRS system architecture and routing.

Mobility Management: Mobility management; Location Management Principles and Techniques; Location Management Case studies: PCS, Mobile IP.

#### UNIT-III

Data Dissemination and Management: Challenges; Data Dissemination; Mobile Data Caching; Mobile Cache Maintenance Schemes; Mobile Web Caching; Case studies.

Mobile Middleware: Introduction; Adaption: The spectrum of adaption, Resource monitoring, Characterizing adaption strategies, Odyssey-An application aware adaption architecture, Sample Odyssey application; Mobile Agents: Agent architectures, Migration strategies, Communication strategies.

#### **UNIT-IV**

Service Discovery Middleware: Middleware services: Universally unique identifiers, Standardization, Textual Descriptions, Interfaces for standardization; Discovery and Advertisement Protocols: Unicast discovery, Multicast discovery and advertisement.

RECOMMENDED BOOKS			
Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Mobile Computing – Technology,	Asoke K Talukder and	TMH Publication, New
	Applications and Service Creation	Roopa R. Yavagal	Delhi, 2006
2	Fundamentals of Mobile and Pervasive	Frank Adelstein	TMH Publication, New
	Computing		Delhi, 2005

Course Code	CSE605	
Course Title	Cryptography and Information Security	
Type of Course	PE	
LTP	400	
Credits	4	
<b>Course Prerequisites</b>	Basic knowledge of computer networks, error correction and	
	detection.	
Course Objectives	To make students familiar with information security, critical concepts	
	of information security, Enumerate the phases of the security systems	
100	development life cycle. Describe the information security roles of	
	professionals within an organization	
Course Outcome	The learner will be able to-	
(CO)	1. Understand critical concepts of information security.	
11 A.M.	2. Enumerate the phases of the security systems development life	
100 - 36	cycle.	
ALP - P	3. Describe the information security roles of professionals with in an	
17.0-01	organization	
101 -1/	4. Develop counter measures to provide a threat free system	

Unit 1: Introduction: Information Security: Introduction, History of Information security, What is Security, CNSS Security Model, Components of Information System, Balancing Information Security and Access, Approaches to Information Security Implementation, The Security Systems Development Life Cycle.

Unit 2: Symmetric Key/Asymmetric Key Cryptography: Concepts and Techniques, symmetric and asymmetric key cryptography, steganography, Symmetric key Ciphers: DES structure, DES Analysis, Security of DES, variants of DES, Block cipher modes of operation, AES structure, Analysis of AES, Key distribution. Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Analysis of RSA, Diffie-Hellman Key exchange.

Unit 3: Message Authentication and Hash Functions: Authentication requirements and functions, MAC and Hash Functions, MAC Algorithms: Secure Hash Algorithm, Whirlpool, HMAC, Digital signatures, X.509, Kerberos.

**Unit 4: Security at layers**(Network, Transport, Application):IPSec, Secure Socket Layer(SSL), Transport Layer Security(TLS), Secure Electronic Transaction(SET), Pretty Good Privacy(PGP), S/MIME .

**Intruders, Virus and Firewalls:** Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls.
RECOMMENDED BOOKS			
Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Principles of Information Security	Michel. E Wittman, Herbert J.Mattord	CENGAGE Learning
2	Cryptography and Network Security- Principles and Practices	Williams Stallings	PHI
3	Cryptography and Network Security	B.A Forouzan	Mc-Graw Hill
4	Computer Networks	Tanenbaum	Pearson Education

Course Code	CSE607
Course Title	Block Chain Architecture design and use cases
Type of Course	PE
LTP	400
Credits	4
Course Prerequisites	This course has no prerequisite other than knowledge of probability and statistics, and programming skills.
Course Objectives	The objective of this course is to teach students the architecture of blockchain. By taking this course, the students are expected to understand the basic algorithms, and be able to apply these techniques to financial service, supply chain.
Course Outcome (CO)	<ul> <li>The learner will be able to-</li> <li>1. Understand the basic architecture of blockchain.</li> <li>2. Understand theory of bitcoin.</li> <li>3. Describe components of blockchain.</li> <li>4. Explain applications of blockchain in financial service, supply chain.</li> </ul>

### Unit-I

Introduction to Blockchain – I (Basics, History, Architecture, Conceptualization), Bitcoin basics.

### Unit-II

Consensus in Bitcoin – I (The Basics, PoW and Beyond, The Miners), Permissioned Blockchain (Basics, Consensus)

### Unit-III

Blockchain for Enterprise – Overview, Blockchain Components and Concepts, Hyperledger Fabric – Transaction Flow, Hyperledger Fabric Details. Fabric – Membership and Identity Management

### Unit-IV

Blockchain Use Cases. Blockchain in Financial Service(Payments and Secure Trading, Compliance and Mortgage, Financial Trade). Blockchain in Supply Chain

Blockchain in Other Industries. Blockchain in Government (Advantages, Use Cases, Digital Identity)

REC	RECOMMENDED BOOKS			
Sr.	Name	AUTHOR(S)	PUBLISHER	
no.				
1	Mastering Bitcoin: Unlocking	Andreas Antonopoulos		
	Digital Cryptocurrencies			
2	Blockchain	Melanie Swa, O'Reilly		
3	Zero to Blockchain , An IBM	Bob Dill, David Smits	https://www.redbooks.ibm.co	
	Redbooks course		m/Redbooks.nsf/RedbookAbs	
			tracts/crse0401.html	

Course Code	CSE609
Course Title	Speech Processing
Type of Course	PE
LTP	400
Credits	4
Course Prerequisites	This course has no prerequisite other than knowledge of probability and statistics, and programming skills.
Course Objectives	The objective of this course is to teach students the key algorithms in speech processing. By taking this course, the students are expected to understand the basic algorithms, and be able to apply these techniques to various speech applications.
Course Outcome (CO)	<ul> <li>The learner will be able to-</li> <li>1. Record, analyze, characterize, modify, and synthesize signals.</li> <li>2. Use speech analysis and synthesis technologies, explain how they work, and discuss their strengths and limitations.</li> <li>3. Design, execute, interpret, and evaluate simple studies that utilize speech processing methods.</li> <li>4. Present and discuss research, both orally and in writing, to other students and scientists.</li> <li>5. Locate, interpret, and synthesize scientific literature</li> </ul>

### UNIT I

### **Speech Processing Basic Concepts**

Speech Fundamentals: Articulatory Phonetics, Production and Classification of Speech Sounds; Acoustic Phonetics, acoustics of speech production; Review of Digital Signal Processing concepts; Short-Time Fourier Transform, Filter-Bank and LPC Methods.

### **Speech Analysis**

Features, Feature Extraction and Pattern Comparison Techniques: Speech distortion measures, mathematical and perceptual, Log Spectral Distance, Cepstral Distances, Weighted Cepstral Distances and Filtering, Likelihood Distortions, Spectral Distortion using a Warped Frequency Scale, LPC, PLP and MFCC Coefficients, Time Alignment and Normalization, Dynamic Time Warping, Multiple Time, Alignment Paths.

### UNIT II

### Speech Modeling

Hidden Markov Models: Markov Processes, HMMs - Evaluation, Optimal State Sequence,

### UNIT III

### **Speech Synthesis:**

Text-to-Speech Synthesis: Concatenative and waveform synthesis methods, subword units for TTS, intelligibility and naturalness, role of prosody, Basic Speech Generation Techniques: Formant synthesis, basic diphone synthesis; signal processing for synthesis. Intonation

and F0 control, Applications and present status.

### UNIT IV

### **Advanced Techniques for Speech Recognition Systems**

Introduction and review of speech recognition components, Large vocabulary speech recognition search & generation of multiple hypotheses, Lattices, confusion networks & confidence estimation, Discriminative training, Feature Selection and Extraction: PCA, LDA, Audio segmentation and speaker clustering, Adaptation & Robustness: MAP, linear transforms, MLLR, noise robustness, Speech Recognition system examples and applications.

RECOM	RECOMMENDED BOOKS			
Sr. no.	Name	AUTHOR(S)	PUBLISHER	
1	Fundamentals of Speech Recognition	Lawrence Rabiner and Bijng-Hwang Juang	Pearson Education.	
2	Speech and Language Processing – An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition	Daniel Jurafsky and James H Martin	Pearson Education	
3	The Scientist and Engineer's Guide to Digital Signal Processing	Steven W. Smith	California Technical Publishing	
4	Discrete-Time Speech Signal Processing – Principles and Practice	Thomas F Quatieri	Pearson Education	
5	Speech Recognition	Claudio Becchetti and LucioPrinaRicotti	John Wiley and Sons.	
6	Speech and audio signal processing", processing and perception of speech and music	Ben gold and Nelson Morgan	Wiley- India Edition.	

# Fifth Semester

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Course Code	CSE601	
Course Title	Dissertation-I	
Type of Course	PC	
LTP	400	
Credits	4	
<b>Course Prerequisites</b>	Research Methodology and IPR	
<b>Course Objectives</b>	<b>ves</b> The main objective behind this course is to identify research gaps	
	and formulate a problem, after thorough literature review.	
<b>Course Outcome</b>	The learner will be able to-	
(CO)	1. Understand the need of problem formulation after literature	
	review.	
	2. Review the format of writing research paper and thesis report	
	3. Identify the dissertation goal and Research question	
10	4. Design a research paper with no plagiarism	

**DISSERTATION-I:** Students are expected to have expertise in your selected area including a solid understanding of the literature in your field before you delve into solving a specific research problem within that field. In the master's research you present an idea along with a preliminary plan for your research and convince the faculty that the proposed research is worthy of a dissertation. This document can't be a static one. It has to be updated regularly to track the dissertation .This Paper should be of 20-30 pages. It includes the following elements:

- 1) Abstract
- 2) Introduction
- 3) Brief overview of Literature
- 4) Problem Statement
- 5) Dissertation Goal
- 6) Research Questions
- 7) References
- 8) Appendix (if needed)

### **Guidelines for Dissertation-I**

- Give a survey of the basic facts and theories in the field of research.
- Give an account of the recent work done by other researchers, and what important
- questions still remain unanswered.
- Show what ideas you have for new research to find the answers to some of these questions.
- Give details of
  - the new information you will seek,
  - the materials to be used,
  - the equipment needed,
  - o the observations and measurements to be made,
  - how the data will be analysed.

## Sixth

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## Semester

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Course Code	CSE602
Course Title	Dissertation-II
Type of Course	PC
LTP	0 0 32
Credits	16
<b>Course Prerequisites</b>	Dissertation-I
Course Objectives	The objective of this course is to successfully complete Dissertation
	with report, research paper with results in UGC approved journal and
	implementation of work under research
Course Outcome	The learner will be able to-
(CO)	1. Prepare detailed dissertation report for pre-submission and final
	submission
	2. Comprehend and present the synopsis
	3. Submit detailed report in front of the examination board

### **DISSERTATION-II:**

In Dissertation, the students are required to do the research work related to their field. It involves two steps pre-submission & Final Submission of dissertation. In Pre-submission, every student will submit the synopsis on the selected topic and give the synopsis presentation also. In Final submission, every student will submit the detailed report on the selected topics and will present the findings of the report in front of the examination board.

(i) Each M.Tech candidate shall be allotted a dissertation supervisor.

(ii) Topic should be allotted to the student in third semester.

(iii) Report may be divided into the number of chapters as required. Format of the report is as follows:

### • Introduction

- **Review of Literature**
- Methodology
- Results
- Conclusion

The First Chapter should give:

- the general background of your work,
- a review of the work done by other people,
- the objective of your own work,
- the reasons why your work is interesting and useful.

The Middle Chapters should give detailed information about your work so that other people could repeat what you have done, or could do further work starting where your work finished. In these chapters you should

- explain the theory,
- describe exactly how you did the work,
- give the results you obtained.

### The Last Chapter should:

- state the conclusions you have drawn from your work,
- compare your conclusions with the opinions of other people (Are your conclusions the same or different?),
- suggest what new work should be done to answer questions raised by your work and extend our knowledge further.

Evaluation of the dissertation will be done by the Supervisor, Nominee and External expert.





Course Code	CE 611
Course Title	Introduction To Rural Technology & Community Development
Type of Course	OE
LTP	300
Credits	3
<b>Course Prerequisites</b>	Community Development
<b>Course Objectives</b>	The objective of this course is to make students aware of the various
	elements of rural technology and community development.
<b>Course Outcome</b>	The learner will be able to-
(CO)	

### UNIT-I

### SYLLABUS

### Data analysis and measures of central tendency

Meaning nature scope and limitations of statistics, collection of statistical data, classification, tabulation and diagrammatic representation of data, measures of central tendency : statistical averages means, media and mode.

### UNIT-II

### Data Information and Knowledge

Concept of information, need of information(professional education, research), qualities of information, value of information, difference between data and information, properties of the needed information, information and management, planning organizing, Coordinating and controlling

### UNIT-III

### **Concept of Marketing**

Difference between marketing selling and retailing, marketing mix, market segmentation, marketing planning, strategy and approaches; modern concept of marketing

### **Community Development**

Concept, definition, meaning, need, history, principles objectives and scope. Community building: coming age, regenerating community, community model

### UNIT-IV

### **Consensus Organizing model**

What's behind building healthy communities, participatory democracy? The role of various NGOs in community development. The role of business and government in community development initiatives, how to form a non profit corporation fund raising and grant writing.

RECOMPLETED BOOKS			
Sr. no.	Name	Author(s)	Publisher
1	Encouraging community	Biddle William	Mcgraw hill
	development	wishart	1000
2	Sustainable rural technology	M.S Virdi	Daya publishing house
3	Rural technology	Punia RD Roy	Satyaparkashan
4	Rural education and technology	S.B Verma, S.K	Deep and deep
		Jiloka	publication

### **RECOMMENDED BOOKS**

Course Code	ME611	
Course Title	Industrial Safety Engineering	
Type of Course	OE	
LTP	300	
Credits	3	
Course Prerequisites	This course has no prerequisite other than knowledge of business	
	process and data mining techniques	
Course Objectives	The student will be able to identify and solve complex engineering principles.	
Course Outcomes (CO)	<ul> <li>The learner will be able to-</li> <li>1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics</li> </ul>	
13	2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
155-11	3. Communicate effectively with a range of audiences	
	4. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
	5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	

**SYLLABUS** 

### UNIT-I

Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.

E.R., 10

### UNIT-II

Fundamentals of maintenance engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.

### UNIT-III

Wear and Corrosion and their prevention: Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity

lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.

### UNIT-IV

Fault tracing: Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment's like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine tools and their general causes.

### UNIT-V

Periodic and preventive maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance.

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RECOMMENDED BOOKS			
Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Maintenance Engineering Handbook	Higgins & Morrow	Da Information Services
2	Maintenance Engineering	H. P. Garg	S. Chand and Company
3	Pump-hydraulic Compressors	Audels	Mcgrew Hill Publication
4	Foundation Engineering Handbook	Winterkorn, Hans	Chapman & Hall London

STRUCT FORTE STUDIES AND A

Course Code	ME613
Course Title	Concepts of Composite Materials
Type of Course	OE
LTP	300
Credits	3
<b>Course Prerequisites</b>	Basics of Engineering mechanics
Course Objectives	1. Ability to solve mechanics of composite materials problems using
	classical methods Assignments: Weekly problem sets are assigned.
	2. Ability to do research and present on an advanced material topic
15	Assignment: Students submit a research paper and present it in class
Course Outcomes (CO)	The learner will be able to-
20.00	1. Understand types, manufacturing processes, and applications of
17 Sec	composite materials
111534	2. Analyze problems on macromechanical behavior of lamina
EA-	3. Analyze problems on micromechanical behavior of lamina
110-11	4. Analyze problems on macromechanical behavior of laminate
1) L	5. Analyze problems on bending, buckling, and vibration of
S	laminated plates and beams
11 fee 3 01	6. Obtain laminate behavior using a computer program
	7. Perform literature search on a selected advanced material topic
L BEAR CIT	and giving class presentation
8.1 101	

### UNIT-I

**INTRODUCTION**: Definition – Classification and characteristics of Composite materials. Advantages and application of composites. Functional requirements of reinforcement and matrix. Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.

11.10

### UNIT – II

**REINFORCEMENTS**: Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Isostrain and Isostress conditions.

### UNIT – III

**Manufacturing of Metal Matrix Composites:** Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.

### UNIT-IV

**Manufacturing of Polymer Matrix Composites:** Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Properties and applications.

### UNIT – V

**Strength:** Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first play failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.

RECOMMENDED BOOKS				
Sr. no.	Name	AUTHOR(S)	PUBLISHER	
1	Material Science and Technology – Vol 13 – Composites	R.W.Cahn	VCH, West Germany	
2	Materials Science and Engineering, An introduction	WD Callister, Jr., Adapted by R. Balasubramaniam	John Wiley & Sons, NY, Indian edition, 2007	
3	Hand Book of Composite Materials		ed-Lubin.	
4	Composite Materials	K.K.Chawla	1	
5	Composite Materials Science and Applications	Deborah D.L. Chung	a free of the	
6	Composite Materials Design and Applications	Danial Gay, Suong V. Hoa, and Stephen W. Tasi	19//	



Course Code	ME615
Course Title	Concepts of Renewable Energy Resources
type of Course	OE
LTP	300
Credits	3
<b>Course Prerequisites</b>	Energy resources
Course Objectives	The class will explore society's present needs and future energy demands, examine conventional energy sources and systems, including fossil fuels and nuclear energy, and then focus on alternate, renewable energy sources such as solar, biomass (conversions), wind power, geothermal, and hydro.
Course Outcome (CO)	The learner will be able to-

### UNIT-I

**Principles of solar radiation:** Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

### UNIT-II:

**Solar energy collection:** Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

**Solar energy storage and applications:** Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

### UNIT-III:

Wind energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

**Bio-mass:** Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.

### UNIT-IV:

**Geothermal energy**: Resources, types of wells, methods of harnessing the energy, potential in India.

**Ocean energy:** OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

**Direct energy conversion:** Need for DEC, Carnot cycle, limitations, principles of DEC

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Recommended Books			
S.No.	Name	Author(s)	Publisher
1	Non-Conventional Energy Sources	G.D. Rai	Khanna Publishers
2	Renewable Energy Resources	Twidell&Wier	CRC Press( Taylor & Francis)
3	Renewable energy resources	Tiwari and Ghosal	Narosa.
4	Renewable Energy Technologies	K Mittal	Wheeler



Course Code	EE611	
Course Title	Electrical Installation and safety	
Type of Course	OE	
LTP	300	
Credits	3	
<b>Course Prerequisites</b>	Electrical energy	
Course Objectives	1. Understand Electrical wing, residential building electrification	
(CO)	electrification of commercial installation, electrification of factory	
	unit installation	
45	2. Protection against electric shock, safety measures and prevention	
100	of accidents	
Course Outcomes	The learner will be able to	
17 Same	1. Acquire the knowledge of different types wires and wiring	
1152	systems, electric supply act.	
BAST.	2. Explain the importance of earthing, rating of wires and cables,	
170-11	procedures for residential, commercial electrification	

### UNIT-I

Electrical wings with IE rules- Introduction, defines types of wires, different types of wiring system, comparison of different types of wiring, different types and specifications of wiring materials, accessories and wiring tools; prepare I.E. rules for wiring, including Electricity supply acct 2003 & 2005;

### UNIT-II

### **Residential Building Electrification-**

General rules, guidelines for wiring of residential installation and positioning of equipments. Principles of circuit design in lightning and power circuits, Procedures for deigning the circuits and deciding the number of circuits; Method of drawing the single line diagram, selection of type of wiring and rating of wires and cables; Load circulations and selection of size of conductor; Selection of rating of main switch, distribution board

### UNIT-III

### **Electrification of commercial installation**

Concept of commercial installation; differentiate between electrification of residential and commercial installation; fundamental consideration for planning of an electrical installation system for commercial building; Load calculations & selection of size of service connection and nature of supply.

### UNIT-IV

Protection against electric shocks- Electric shock,-general, protection against direct contact, protection against indirect contact, protection of goods in case of installation fault, Implementation of the TT system, Implementation of the TN system, elements of IP code and their meanings, IK code definition.

RECOMMENDED BOOKS			
Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Estimating and Costing	Dr. S.L. Uppal	New Age International (p) Limited, New Delhi
2	Electrical Design Estimating and costing	K.B. Raina & S.K. Battacharya	New Age International (p) Limited, New Delhi



Course Code	COM223
Course Title	Business Analytics
Type of Course	OE
LTP	300
Credits	3
Course Prerequisites	This course has no prerequisite other than knowledge of business process and data mining techniques
Course Objectives	The student will be able to-
(CO)	1. Understand the role of business analytics within an organization.
	2. Analyze data using statistical and data mining techniques and
	understand relationships between the underlying business processes of
100	an organization.
100	3. To gain an understanding of how managers use business analytics
20.00	to formulate and solve business problems and to support managerial
17 Sec	decision making.
0.02	4. To become familiar with processes needed to develop, report, and
RA-ST.	analyze business data
170-11	5. Use decision-making tools/Operations research techniques.
11 from T	6 Mange business process using analytical and management tools
S	7 Analyze and solve problems from different industries such as
11 June 13 (31	7. Analyze and solve problems from different industries such as
	manufacturing, service, retail, software, banking and minance, sports,
Course Outcomes	At the and of the course
Course Outcomes	At the end of the course-
N: 1 (0)	1. Students will demonstrate knowledge of data analytics.
	2. Students will demonstrate the ability of think critically in making
3) 00 - O V	decisions based on data and deep analytics.
1.	3. Students will demonstrate the ability to use technical skills in
	predicative and prescriptive modeling to support business decision-
20.00	making.
	4. Students will demonstrate the ability to translate data into clear,
	actionable insights.

### UNIT-I

Business analytics: Overview of Business analytics, Scope of Business analytics, Business Analytics Process, Relationship of Business Analytics Process and 920deling92ion, competitive advantages of Business Analytics. Statistical Tools: Statistical Notation, Descriptive Statistical methods, Review of probability distribution and data 920deling, sampling and estimation methods overview.

### UNIT-II

Trendiness and Regression Analysis: Modelling Relationships and Trends in Data, simple Linear Regression. Important Resources, Business Analytics Personnel, Data and models for Business analytics, problem solving, Visualizing and Exploring Data, Business Analytics Technology. 92 | P a g e

### UNIT-III

Organization Structures of Business analytics, Team management, Management Issues, Designing Information Policy, Outsourcing, Ensuring Data Quality, Measuring contribution of Business analytics, Managing Changes. Descriptive Analytics, predictive analytics, predicative Modelling, Predictive analytics analysis, Data Mining, Data Mining Methodologies, Prescriptive analytics and its step in the business analytics Process, Prescriptive Modelling, nonlinear Optimization.

### UNIT-IV

Forecasting Techniques: Qualitative and Judgmental Forecasting, Statistical Forecasting Models, Forecasting Models for Stationary Time Series, Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression Forecasting with Casual Variables, Selecting Appropriate Forecasting Models. Monte Carlo Simulation and Risk Analysis: Monte Carle Simulation Using Analytic Solver Platform, New-Product Development Model, Newsvendor Model, Overbooking Model, Cash Budget Model.

### **UNIT-V**

Decision Analysis: Formulating Decision Problems, Decision Strategies with the without Outcome Probabilities, Decision Trees, The Value of Information, Utility and Decision Making.

### UNIT-VI

Recent Trends in : Embedded and collaborative business intelligence, Visual data recovery, Data Storytelling and Data journalism.

RECOMMENDED BOOKS			
Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Business analytics Principles,	Marc J.	Pearson FT Press
	Concepts, and Applications	Schniederjans, Dara	10 M
Sec.		G. Schniederjans,	1100
	We want to be a set	Christopher M.	11 11
1.0	Discourse of the second	Starkey	A STATISTICS OF THE OWNER
2	Business Analytics	James Evans	Pearson Education

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Course Code	CSE611-13
Course Title	Internet of Things
Type of Course	OE
LTP	300
Credits	3
Course Prerequisites	This course has no prerequisite other than knowledge of business
	process and data mining techniques
Course Objectives	1. Understand the role of internet in e –commerce
(CO)	
Course Outcomes	At the end of the course-
	<ol> <li>Students will demonstrate knowledge of data analytics.</li> <li>Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.</li> <li>Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decisionmaking.</li> <li>Students will demonstrate the ability to translate data into clear, actionable insights.</li> </ol>

### **UNIT-I**

Introduction to IoT Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs

### **UNIT-II**

IoT & M2M Machine to Machine, Difference between IoT and M2M, Software define Network, Network & Communication aspects Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination

### **UNIT-III**

Challenges in IoT Design challenges, Development challenges, Security challenges, Other challenges Domain specific applications of IoT Home automation, Industry applications, Surveillance applications, Other IoT applications

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### UNIT-IV

Developing IoTs Introduction to Python, Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform, Implementing IoT concepts with python

RECOMMENDED BOOKS			
Sr. no.	Name	AUTHOR(S)	PUBLISHER
1	Designing the Internet of things	Adrian McEwen and Hakim Cassimally	Amazon
2	The Internet of Things – The Next Industrial Revolution Has Begun: How IoT, big data, predictive analytics, machine learning and AI will change our lives forever	Magnus Unemyr	Potscapes.com



Course Code	CSE613	
Course Title	Software Project Planning & Management	
Type of Course	OE	
LTP	300	
Credits	3	
<b>Course Prerequisites</b>	Software Engineering	
Course Objectives	Student learn to select and apply software metrics and project management techniques for process modeling, planning, estimation, process metrics and risk management; perform software verification and validation using inspections, design and execution of system test cases.	
Course Outcome	The learner will be able to-	
(CO)	<ol> <li>Understand stepwise project planning, contract management and project evaluation techniques.</li> <li>Perform strategic and technical assessment of the project under evaluation.</li> <li>Analyze cash flow and risk evaluation involved in the project</li> <li>Comprehend schedule of the project using network planning models.</li> <li>Identify and analyze hazards involved in the project</li> <li>Schedule, organize and monitor teams for effective project management</li> </ol>	

### UNIT-I

### **Software Project Management**

Project Definition, Contract Management, Activities covered By Software Project Management, Overview of Project Planning, Stepwise Project Planning.

### **Project Evaluation**

Strategic Assessment, Technical Assessment, Cost Benefit Analysis –Cash Flow Forecasting, Cost Benefit Evaluation Techniques, Risk Evaluation.

### **Activity Planning**

Objectives, Project Schedule, Sequencing and Scheduling Activities –Network Planning Models, Forward Pass, Backward Pass, Activity Float, Shortening Project Duration, Activity on Arrow Networks, Risk Management, Nature Of Risk, Types Of Risk, Managing Risk, Hazard Identification, Hazard Analysis, Risk Planning And Control

### UNIT-II

### **Monitoring And Control**

Creating Framework, Collecting Data, Visualizing Progress, Cost Monitoring, Earned Value, Prioritizing Monitoring, Getting Project Back To Target, Change Control, Managing Contracts, Introduction, Types Of Contract, Stages In Contract Placement, Typical Terms Of A Contract, Contract Management, Acceptance.

### **Managing People And Organizing Teams**

Introduction, Understanding Behavior, Organizational Behaviour: A Background, Selecting The  $96 \mid P \mid g \mid g \mid e$ 

Right Person For The Job, Instruction In The Best Methods, Motivation, The Oldham, Hackman Job Characteristics Model, Working In Groups, Becoming A Team, Decision Making, Leadership, Organizational Structures, Stress, Health And Safety, Case Studies.

### UNIT-III

### **Software Metrics**

Measurement in software engineering, objectives & scope of software metrics, quality models & measurement & models

### **Empirical Investigation**

Principles Of Investigation, Procedures For Experiments, Types Of Experimental Designs, Nested Vs Crossed Designs.

### Software-Metrics Data Collection & Analysis

Defining Data, Faults, Collecting, Storing & Extracting Data, Analyzing results of experiments, Examples of simple analysis techniques, Measuring internal& external product attributes.

### UNIT-IV

### Software Reliability & Process Predictions

Reliability Theory, Software Reliability Problem, Measuring Productivity, Teams, Tools, And Methods, Making Process Predictions, Cost Estimation: Problems And Approaches, Models Of Effort And Cost, Dealing With Problems Of Current Estimation Methods.

### Planning A Measurement Program

Metrics Plans, Developing Goals, Questions, And Metrics, Mapping Measures To Activities, Assessment Tools, Measurers, Analysts, And Audience

RECOMMENDED BOOKS			
Sr. no.	Name	Author(s)	Publisher
1	Software Project Management	Bob Hughes, Mike Cotterell	Third Edition, Tata McGraw Hill, 2004
2	Software Project Management in Practice	Jalote	Pearson Education
3	Software Metrics And Project Management	Madhuvanti Joshi Teje	Vision Publications

## AUDIT

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### COURSES

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Course Code	ENG001	
Course Title	ENGLISH FOR RESEARCH PAPER WRITING	
Type of Course	Audit Course	
LTP	200	
Credits	0	
Course Prerequisites	Nil	
Course Objectives	1. Understand that how to improve your writing skills and level of readability	
	2. Learn about what to write in each section	
	3. Understand the skills needed when writing a Title	
	4. Ensure the good quality of paper at very first-time submission	
Course Outcome	The learner will be able to-	
(CO)	1. Develop writing skills by analyzing model texts	
	2. Expand academic vocabulary	
	3. Consolidate more advanced aspects of English grammar relevant to wri-	
45	ting research papers	
	4. Consolidate language functions found in research papers	
6.6	5. Compare various practices and conventions used in writing research	
	papers across a range of disciplines.	
Syllabus		

### UNIT-I

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

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### **UNIT-II**

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction

### **UNIT-III**

Review of the Literature, Methods, Results, Discussion, Conclusions, the Final Check.

### UNIT-IV

Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature

### UNIT-V

Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, and skills are needed when writing the Conclusions.

### UNIT-VI

Useful phrases, how to ensure paper is as good as it could possibly be the first- time submission.

RECOMMENDED BOOKS			
Sr. no.	Name	Author(s)	Publisher
1	Writing for Science	Goldbort R (2006	Yale University Press
			(available on Google
			Books)
2	How to Write and Publish a Scientific Paper	Day R (2006)	Cambridge University Press
3	Handbook of Writing for the Mathematical Sciences	Highman N (1998)	SIAM. Highman'sbook
4	English for Writing Research Papers	Adrian Wallwork	Springer New York Dordrecht Heidelberg London, 2011

Course Code	EVS501	
Course Title	DISASTER MANAGEMENT	
Type of Course	Audit Course	
LTP	200	
Credits	0	
<b>Course Prerequisites</b>	Nil	
Course Objectives	<ol> <li>Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.</li> <li>Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives</li> <li>Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.</li> <li>Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work</li> </ol>	
Course Outcome (CO)	<ul> <li>The learner will be able to-</li> <li>1. Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.</li> <li>2. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.</li> <li>3. Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.</li> <li>4. Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in</li> </ul>	

### UNIT-I

**Introduction Disaster**: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.

### **UNIT-II**

**Repercussions of Disasters and Hazards**: Economic Damage, Loss Of Human And Animal Life, Destruction Of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.

### UNIT-III

**Disaster Prone Areas In India Study Of Seismic Zones:** Areas Prone To Floods And Droughts, **101** | P a g Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases And Epidemics

### UNIT-IV

**Disaster Preparedness And Management Preparedness:** Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.

### UNIT-V

Risk Assessment Disaster Risk: Concept And Elements, Disaster Risk Reduction, Global And National Disaster Risk Situation. Techniques Of Risk Assessment, Global Co-Operation In Risk Assessment And Warning, People's Participation In Risk Assessment. Strategies for Survival.

### UNIT-VI

Disaster Mitigation Meaning, Concept And Strategies Of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation And Non-Structural Mitigation, Programs Of Disaster Mitigation In India.

RECOMMENDED BOOKS			
Sr. no.	Name	Author(s)	Publisher
1	Disaster Management in India: Perspectives, issues and strategies	R. Nishith, Singh AK	New Royal book Company.
2	Disaster Mitigation Experiences And Reflections	Sahni, Pardeep et al. (Eds.)	Prentice Hall Of India, New Delhi
3	Disaster Administration And Management Text And Case Studies	Goel S. L.	Deep &Deep Publication Pvt. Ltd., New Delhi

Course Code	CSE001	
Course Title	VALUE EDUCATION	
Type of Course	Audit Course	
LTP	200	
Credits	0	
<b>Course Prerequisites</b>	Nil	
<b>Course Objectives (CO)</b>	1. To get knowledge of self-development	
	2. Learn the importance of Human values	
110-1	3. Developing the overall personality	
Course Output	The student will be able to	
6.60	1. Understand value of education and self-development	
	2. Imbibe good values in students	
1.80.1	3. Let the should know about the importance of character	
CVI I ADIIC		

### UNIT-I

- Values and self-development –Social values and individual attitudes. Work ethics, Indian vision of humanism.
- Moral and non- moral valuation. Standards and principles.
- Value judgements

### UNIT-II

- Importance of cultivation of values.
- Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness.
- > Honesty, Humanity. Power of faith, National Unity.
- > Patriotism. Love for nature, Discipline

### **UNIT-III**

- Personality and Behavior Development Soul and Scientific attitude. Positive Thinking. Integrity and discipline.
- Punctuality, Love and Kindness.
- > Avoid fault Thinking.
- Free from anger, Dignity of labour.
- Universal brotherhood and religious tolerance.
- ➤ True friendship.
- ➢ Happiness Vs suffering, love for truth.
- ➢ Aware of self-destructive habits.
- Association and Cooperation.
- Doing best for saving nature

### UNIT-IV

- > Character and Competence –Holy books vs Blind faith.
- ➢ Self-management and Good health.
- Science of reincarnation.
- > Equality, Nonviolence, Humility, Role of Women.
- All religions and same message.
- Mind your Mind, Self-control.
- Honesty, Studying effectively

### **RECOMMENDED BOOKS**

Sr. no.	Name	Author(s)	Publisher
1	Values and Ethics for	Chakroborty, S.K.	Oxford University
	organizations Theory and practice	12	Press, New Delhi



Course Code	CSEA505
Course Title	CONSTITUTIONAL LAW
Type of Course	LAW001
LTP	200
Credits	0
Course Prerequisites	Nil
<b>Course Objectives</b>	1. Understand the premises informing the twin themes of liberty and
<b>CO</b> ) freedom from a civil rights perspective.	
10	2. To address the growth of Indian opinion regarding modern Indian
	intellectuals' constitutional role and entitlement to civil and economic
50 M	rights as well as the emergence of nationhood in the early years of
10000	Indian nationalism
A CAPITAL OF	3. To address the role of socialism in India after the commencement
	of the Bolshevik Revolution in 1917 and its impact on the initial
The second	drafting of the Indian Constitution
Course Output	The student will be able to
Dimentil	1. Discuss the growth of the demand for civil rights in India for the
	hulk of Indians before the arrival of Gandhi in Indian politics
	2. Discuss the intellectual origins of the framework of argument that
	2. Discuss the interfectual origins of the framework of argument that
	informed the conceptualization of social reforms leading to revolution
	in India.
10 A	3. Discuss the circumstances surrounding the foundation of the
10 m m	Congress Socialist Party [CSP] under the leadership of Jawaharlal
	Nehru and the eventual failure of the proposal of direct elections
	through adult suffrage in the Indian Constitution.
	4. Discuss the passage of the Hindu Code Bill of 1956.

### UNIT-I

- > History of Making of the Indian Constitution:
- > History
  - Drafting Committee, (Composition & Working)

### UNIT-II

- Philosophy of the Indian Constitution:
- Preamble Salient Features

### UNIT-III

- > Contours of Constitutional Rights & Duties:
- Fundamental Rights
- ➢ Right to Equality

- ➢ Right to Freedom
- Right against Exploitation
- Right to Freedom of Religion
- Cultural and Educational Rights
- Right to Constitutional Remedies
- Directive Principles of State Policy
- ➢ Fundamental Duties.

### UNIT-IV

Organs of Governance:

- > Parliament
- Composition
- Qualifications and Disqualifications
- Powers and Functions
- ➢ Executive
- President
- ➢ Governor
- Council of Ministers
- > Judiciary, Appointment and Transfer of Judges, Qualifications
- Powers and Functions

### UNIT-V

Local Administration:

- District's Administration head: Role and Importance,
- Municipalities: Introduction, Mayor and role of Elected Representative,
- > CEO of Municipal Corporation.
- > Pachayati raj: Introduction, PRI: ZilaPachayat.
- Elected officials and their roles, CEO ZilaPachayat: Position and role.
- Block level: Organizational Hierarchy (Different departments),
- Village level: Role of Elected and Appointed officials,
- Importance of grass root democracy

### UNIT-VI

**Election Commission:** 

- > Election Commission: Role and Functioning.
- > Chief Election Commissioner and Election Commissioners.
- > State Election Commission: Role and Functioning.
- ➤ Institute and Bodies for the welfare of SC/ST/OBC and women.

RECOMMENDED BOOKS			
Sr. no.	Name	Author(s)	Publisher
1	The Constitution of India, 1950 (Bare Act)		Government Publication.
2	Dr. B. R. Ambedkar framing of Indian Constitution	Dr. S. N. Busi	1st Edition, 2015
3	Indian Constitution Law	M. P. Jain	7th Edn., Lexis Nexis, 2014
4	Introduction to the Constitution of India	D.D. Basu	Lexis Nexis, 2015


Course Code	EDU001		
Course Title	PEDAGOGY STUDIES		
Type of Course	Audit Course		
LTP	400		
Credits	4		
<b>Course Prerequisites</b>	Nil		
<b>Course Objectives</b>	1. Review existing evidence on the review topic to inform		
	programme design and policy making undertaken by the DFID, other		
a2	agencies and researchers.		
100	2. Identify critical evidence gaps to guide the development.		
<b>Course Outcome (CO)</b>	The student will be able to understand:		
17 18 1	1. What pedagogical practices are being used by teachers in formal		
11152	and informal classrooms in developing countries?		
BAS I	2 What is the evidence on the effectiveness of these pedagogical		
110-11	practices, in what conditions, and with what population of learners?		
Plan I/	3. How can teacher education (curriculum and practicum) and the		
STATISTICS.	school curriculum and guidance materials best support effective		
11 fee 3 () /	pedagogy?		

## **SYLLABUS**

#### **UNIT-I**

Introduction and Methodology:

- > Aims and rationale, Policy background, Conceptual framework and terminology
- > Theories of learning, Curriculum, Teacher education.
- Conceptual framework, Research questions.
- Overview of methodology and Searching.

## **UNIT-II**

Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries.

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Curriculum, Teacher education.

#### **UNIT-III**

- Evidence on the effectiveness of pedagogical practices
- > Methodology for the in depth stage: quality assessment of included studies.
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?
- ➤ Theory of change.
- Strength and nature of the body of evidence for effective pedagogical practices.

- > Pedagogic theory and pedagogical approaches.
- > Teachers' attitudes and beliefs and Pedagogic strategies.

## **UNIT-IV**

- > Professional development: alignment with classroom practices and follow-up support
- Peer support
- > Support from the head teacher and the community.
- Curriculum and assessment
- > Barriers to learning: limited resources and large class sizes

## UNIT-V

Research gaps and future directions

- Research design
- ➢ Contexts
- Pedagogy
- Teacher education
- Curriculum and assessment
- Dissemination and research impact

# **RECOMMENDED BOOKS**

RECOMMENDED DOORS				
Sr. no.	Name	Author(s)	Publisher	
1	Classroom interaction in Kenyan primary schools, Compare	Ackers J, Hardman F (2001)	hand	
2	Curricular reform in schools: The importance of evaluation	Agrawal M (2004)	Journal of Curriculum Studies, 36 (3): 361-379	
3	Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report	Akyeampong K (2003)	London: DFID	
4	Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count?	Akyeampong K, Lussier K, Pryor J, Westbrook J (2013)	International Journal Educational Development, 33 (3): 272–282	
5	Culture and pedagogy: International comparisons in primary education	Alexander RJ (2001)	Oxford and Boston: Blackwell	