DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Periyar Nagar, Vallam Thanjavur - 613 403, Tamil Nadu, India Phone: +91 - 4362 - 264600 Email: headcse@pmu.edu

Fax: +91- 4362 - 264660 Web: www.pmu.edu





CURRICULUM & SYLLABUS

FOR

B. TECH – COMPUTER SCIENCE AND ENGINEERING

(R 2018)

(Based on Outcome Based Education)

(I - VIII Semester)

PERIYAR MANIAMMAI INSTITUTE OF SCIENCE & TECHNOLOGY (Under Section 3 of UGC Act, 1956)

PERIYAR MANIAMMAI UNIVERSITY

Our University is committed to the following Vision, Mission and core values, which guide us in carrying out our Civil Engineering Department mission and realizing our vision:

INSTITUTION VISION

To be a University of global dynamism with excellence in knowledge and innovation ensuring social responsibility for creating an egalitarian society.

INSTITUTION MISSION

UM1 Offering well-balanced programmes with scholarly faculty and state-of-art facilities to impart high level of knowledge.

UM2	Providing	student	-	centered	education	and	foster	their	growth	in	critical	thinking,
	creativity,	entreprei	neı	ırship, pro	blem solvii	ng an	d collat	orativ	e work.			

UM3 Involving progressive and meaningful research with concern for sustainable development.

UM4 Enabling the students to acquire the skills for global competencies.

UM5 Inculcating Universal values, Self respect, Gender equality, Dignity and Ethics.

INSTITUTION CORE VALUES

- Student centric vocation
- Academic excellence
- Social Justice, equity, equality, diversity, empowerment, sustainability
- Skills and use of technology for global competency.
- Continual improvement
- Leadership qualities.
- Societal needs
- Learning, a life long process
- Team work
- Entrepreneurship for men and women
- Rural development
- Basic, Societal, and applied research on Energy, Environment, and Empowerment.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DEPARTMENT VISION

To Produce Intellectuals who can relate theory and practice, familiar with common themes and apply concepts of Computer Science and Engineering for Research and Societal development.

	DEPARTMENT MISSION
DM1	To offer UG, PG, Ph.D. programme with state of art facilities in the field of
	Computer Science and Engineering
DM2	To prepare the students become globally competent by enhancing their skills to work in
	To propule the statement second ground competent of emilients then shine to work in
	IT Industries and R & D organizations
DM3	To prepare the students with good ethical attitude and an ability to relate engineering
	issues to broader social context
DM4	To promote significant research in cutting edge Information Communication
1/1/14	To promote significant research in cutting edge information Communication
	technologies with environmental consciousness

Table: 1 Mapping of University Mission (UM) and Department Mission (DM)

	UM 1	UM 2	UM 3	UM 4	UM 5
DM 1	3	3	1	1	1
DM 2	2	3	2	3	1
DM 3	M 3 1 2		1	3	3
DM 4	1	1	3	1	1
	7	9	7	8	6
1-Low	1-Low 2-Medium		3-High		

Department Vision and Mission Definition Process

The development of vision and mission of the department is carried out as per the following steps.

Step: I	Consolidation of Feedback from the Employers, alumni and academia and industry
	experts
Step: II	Benchmarking with other Universities: Understanding the Vision and Mission
Step: III	Validation by the Board of studies and then Academic Council
Step: IV	Wide publicity in the department and institution

The University Vision is split up into small elements and verifies its compliance with Department Vision

UNIVERSITY VISION	DEPARTMENT VISION							
global dynamism	To create technocrats in the discipline of Computer							
	Science and Engineering							
excellence in knowledge and	Globally competent by acquiring skills in the							
innovation	respective discipline							
ensuring social responsibility	Relating engineering issues to societal context.							
Creating an egalitarian society.								

To accomplish the vision stated, well-structured mission is established with consultation with administrators, faculty members and other officials.

UNIVERSITY MISSION	DEPARTMENT MISSION
Well balanced programmes with scholarly faculty	\checkmark To offer programme with state of art
	facilities in the field of Computer Science
	and Engineering.
to impart high level of knowledge.	\checkmark To prepare the students become globally
Skills for global competencies.	competent by enhancing their skills to
	work in IT Industries and R & D
	organizations
Student - centered education and foster their	\checkmark To prepare the students with good ethical
growth in critical thinking, creativity, entrepreneurship, problem solving and	attitude and an ability to relate engineering
collaborative work. Inculcating Universal values,	issues to broader social context.
Self respect, Gender equality, Dignity and Ethics.	. To promote significant research in sutting
progressive and meaningful research	• To promote significant research in cutting
	edge Information Communication
	technologies with environmental
	consciousness.

Table: 1 Mapping of University Mission (UM) and Department Mission (DM)

	UM 1	UM 2	UM 3	UM 4	UM 5
DM 1	3	3	1	1	1
DM 2	2	3	2	3	1
DM 3	1	2	1	3	3
DM 4	1	1	3	1	1
	7	9	7	8	6

1-Low 2- Medium 3 – High

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

Based on the mission of the department, the programme educational objectives is formulated as

PEO1	Graduates will attain the expertise of analyzing and specifying the requirements for any									
	computing system as well as capable of modeling, designing, implementing and									
	verifying a computing system to meet specified requirements using contemporary tools									
PEO2	Graduates will possess diversified professional skills for successful career.									
PEO3	Graduates of the programme will have the competencies for communicating, planning,									
	coordinating, organizing, decision making and leading a team									
PEO4	Graduates of the programme will have knowledge of professional, interpersonal and									
	ethical responsibility and will contribute to society through active research.									

PEO PROCESS ESTABLISHMENT

The faculty of the Computer Science and Engineering department at our institution met on different occasions for discussion and a final work session to complete the steps of the process in order to draft the set of PEOs for Computer Science and Engineering Department to assess the graduates few years after graduation.



The framework for the review and revision of the PEOs at the departmental level involving all the faculty members comprised the following broad stages.

- 1. Using the key words and phrases extracted from the Mission Statement of the institution and department to identify attributes to gauge graduates.
- 2. Capturing the distinction between the educational objective and the student outcomes.
- 3. Formulating each objective to be measurable.

The program educational objectives for the computer science Engineering program describe accomplishments that graduates are expected to attain within five years after graduation. Graduates will have applied their expertise to contemporary problem solving, be engaged professionally, and have continued to learn and adapt, and have contributed to their organizations through leadership and teamwork.

	DM 1	DM 2	DM3	DM 4
PEO 1	3	3	2	3
PEO 2	2	3	1	1
PEO 3	2	3	2	3
PEO 4	2	2	3	1
	9	11	8	8
1.	- Low	2 –	Medium .	3-High

Mapping of Program Educational Objectives (PEOs) with Department Mission (DM)

The development of vision, mission and programme educational objectives is tuned in line with the global and national standards and it is assured that the department vision and mission will facilitate in meeting the vision and mission of the University.

The Program Educational Objectives shall cover both technical and professional aspects of the expected achieve-Achievement in terms of technical skills required in the profession for which the program prepares students

- Achievements in terms of professional, ethical, and Communicational aspects required by the profession for which the program prepares students (team work, ethical behavior, effective communication, etc.)
- Achievements in terms of management and leadership skills (project managers, directors, CTOs, CEOs, etc.)
- Achievements in terms of life-long learning and continuous education (certifications, conferences and workshops attendance, etc.)
- Achievements in terms of advanced and graduate studies pursuing (graduate studies, research careers, etc.)
- Other aspects could be considered when defining educational objectives such as the ability to engage in entrepreneurship activities

PROGRAMME OUTCOME (PO)

At the time of graduation, competency of the student is measured through the attainment of programme outcomes. The quantification of programme outcomes attainment is measured through the assessment of established course outcomes for each subject.

	PROGRAM OUTCOMES
PO 1	an ability to apply knowledge of computing and mathematics appropriate to the discipline.
PO 2	an ability to analyze a problem, interpret data, and define the computing system requirements which would be appropriate to the solution.
PO 3	an ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
PO 4	an ability to apply creativity in the design of systems which would help to investigate the complex problem and provide software solution.
PO 5	an ability to use the computing techniques, skills, and modern system tools necessary for practice as a CSE professional
PO 6	an ability to analyze the local and global impact of computing on individuals, organizations, and society
PO 7	an ability to develop and use the software systems within realistic constraints environmental, health and safety, manufacturability, and sustainability considerations
PO 8	an ability in an understanding of professional, ethical, legal, security and social issues and responsibilities
PO 9	an ability to function effectively on teams and individually to accomplish a common goal
PO 10	an ability to communicate effectively with a range of audiences by written and oral
PO 11	ability to plan, organize and follow best practices and standards so that the project is completed as successfully by meeting performance, quality at CMM level, budget and time
PO 12	an ability to engage in Lifelong learning and continuing professional development
	PROGRAM SPECIFIC OUTCOME
PSO1	ability to employ latest computer languages, environments and platforms for solving problems in the areas of emerging communication technologies.
PSO2	ability to use knowledge in data analytics and mining for industrial problems

GRADUATE ATTRIBUTES

- 1. **Knowledge base for Engineering:** Demonstrate competence in mathematics, natural sciences, engineering fundamentals and specialized engineering knowledge appropriate to the programme.
- 2. Analytical Skills: Identify, formulate, analyze and solve diverse engineering problems.
- 3. **Design:** Solution for complicated open–ended engineering problems and design the components with appropriate standards to meet specified needs with proper attention to public health, safety, environment and society.
- 4. **Experimental Investigation:** Technical skills to conduct investigation, interpretation of observed data and provide solution for multifaceted problems.
- 5. **Modern Engineering tools usage**: Acquire, select, manipulate relevant techniques, resources and advanced engineering ICT tools to operate simple to complex engineering activities.
- 6. **Impact of engineering on society:** Provide a product / project for use by the public towards their health, welfare, safety and legal issues to serve the society effectively.
- 7. **Environment and Sustainability:** Design eco-friendly and sustainable products in demonstrating the technology development to meet present and future needs.
- 8. **High Ethical Standards:** Practice ethical codes and standards endorsed by professional engineers.
- 9. Leadership and team work: Perform as an individual and as a leader in diverse teams and in multi-disciplinary scenarios.
- 10. **Communication Skills:** Professional communication with the society to comprehend and formulate reports, documentation, effective delivery of presentation and responsible to clear instructions.
- 11. Project management and Finance: Appropriate in incorporating finance and business practices including project, risk and change management in the practice of engineering by understanding their limitations.
- 12. **Life-long learners:** Update the technical needs in a challenging world in equipping themselves to maintain their competence.

Table: 3Mapping of Program Educational Objectives (PEOs) with Program Outcomes
(POs)

PO →	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO 2
PEO 1	3	2	2	1	1	2	1	0	1	0	2	1	3	3
PEO 2	1	3	2	3	2	1	1	2	0	2	1	1	3	2
PEO 3	0	1	3	2	3	2	2	1	1	2	1	2	1	1
PEO 4	0	1	2	2	0	1	3	1	1	1	1	1	1	1
	4	7	9	8	6	6	7	4	3	5	5	5	8	7

1 - Low 2 – Medium 3 - High

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA 12
PO1	3	2	2	1	1	2	1	1	1	2	2	1
PO2	2	2	3	2	1	2	1	1	2	1	1	2
PO3	2	2	2	3	3	1	2	1	1	2	1	2
PO4	2	2	3	3	1	2	1	1	2	2	1	2
PO5	2	1	3	2	3	3	3	2	2	3	1	2
PO6	3	2	2	1	1	2	1	1	1	2	2	1
PO7	2	2	1	1	2	3	2	3	2	1	2	2
PO8	2	1	1	2	1	3	2	2	2	3	1	2
PO 9	2	1	1	2	3	3	2	2	3	3	1	3
PO10	2	2	1	1	2	3	2	3	2	1	2	2
PO11	2	1	2	3	2	3	1	3	3	2	1	3
PO12	2	2	2	3	3	1	2	1	1	2	1	2
PSO1	2	1	2	2	1	3	2	2	2	3	1	2
PSO2	2	2	2	2	3	1	2	1	1	2	1	2

Table :4 Mapping of Program Outcomes (POs) with Graduate Attributes (GAs)

1- Slightly

oportive
oportive

3 - Highly related

PO PROCESS ESTABILSHMENT



CURRICULUM DEVELOPMENT

The Computer Science and engineering curriculum is drawn to define the role of computer engineer to meet the global challenges and equip them in implementing proven techniques and procedures to provide sustainable solutions for PRACTICAL problems of society. In addition to their technical competencies, students must possess engagement skills, sustained learning and adapting, leadership, teamwork with good command in the communication skills.

The faculty members have been allotted for developing the courses and its outcomes as given below. They in turn conducted frequent discussions with each other and with students in drafting the course content.

The curriculum development is ensured that students receive integrated, coherent learning experiences that contribute towards their personal, academic and professional learning and development.

Courses and topics were designed and developed within a framework which comprises a specified curriculum, specified assessment arrangements, and clearly identified educational aims and learning outcomes.

Faculty members assigned for course development

S.No	Course Name	Staff Incharge
1.	Signals & Systems	Ms.C.Narmadha
2.	Formal Language & Automata Theory	Mr.K.M.Arivuchelvan
3.	Database Management Systems	Ms.R.Poonguzhali
4.	Software Engineering	Mr.P.Dhava Kumar
5.	IT Workshop	Dr.A.E.Narayanan
6.	Web designing	Ms.S.P.Ramya
7.	Complier Design	Ms.S.Suseela
8.	Computer Networks	Ms.S.Suseela
9.	R Programming	Ms.R.Poonguzhali
10.	Cyber Security	Mr.P.Ilangovan
11.	Artificial Intelligence	Ms.T.Kavitha
12.	Graph Theory	Dr.A.E.Narayanan
13.	Data Communication	Dr.A.E.Narayanan
14.	Information Theory and Coding	Ms.S.P.Ramya
15.	Web and Internet Technology	Ms.S.P.Ramya
16.	Queuing Theory and Modelling	Ms.S.Suseela
17.	Distributed Systems	Ms.S.P.Ramya
18.	Cryptography and Network Security	Mr.P.Ilangovan
19.	Data Mining	Ms.T.Kavitha
20.	Optimization Techniques	Ms.S.P.Ramya
21.	Multi Agent Intelligent Systems	Ms.S.Suseela
22.	Image processing	Ms.T.Kavitha
23.	Theory of Computation	Mr.K.M.Arivuchelvan
24.	Context Aware Computing	Ms.S.Suseela
25.	Information Retrieval	Ms.R.Poonguzhali
26.	Cloud Computing	Mr.P.Dhava Kumar
27.	Fault Tolerant Computing	Mr.P.Ilangovan
28.	Computer Graphics	Ms.T.Kavitha
29.	Advanced Operating System	Mr.P.Dhava Kumar
30.	Storage Technologies	Mr.P.Ilangovan
31.	Virtualization	Mr.P.Ilangovan
32.	Machine Learning	Ms.R.Poonguzhali
33.	Adhoc and Sensor Networks	Ms.S.Suseela

34.	Embedded Systems	Mr.P.Dhava Kumar
35.	Fog Computing	Mr.P.Ilangovan
36.	Quantum Computing	Ms.R.Poonguzhali
37.	Parallel and Distributed algorithms	Mr.P.Dhava Kumar
38.	Electronic Design Automation	Mr.Rakesh
39.	Data Analytics	Dr.K.Lakshmi
40.	Speech and Natural Language Processing	Ms.R.Poonguzhali
41.	Business Intelligence	Mr.P.Ilangovan
42.	Soft Computing	Dr.K.Lakshmi
43.	Internet of Things	Ms.S.P.Ramya
44.	Real Time Systems	Ms.S.P.Ramya
45.	Digital Signal Processing	Ms.C.Narmadha
46.	Information Security	Mr.P.Ilangovan
47.	Data Visualization	Ms.R.Poonguzhali

Faculty members allotted to Common subjects

S.No	Subject Name	Responsible Staff
1	Economics for Engineers	Commerce Department
2	Biology	Biotechnology Department
3	Disaster Management	Civil Engineering Department

COURSE DEVELOPMENT

The following elements were developed by the faculty involved after interaction and discussions.



In aligning programme outcome and graduate attributes, course offered to the degree programme are finalized based on the standard template finalized by the university.

S.No	Category	Symbol
1.	Humanities and Social Sciences (HS), including Management;	HS
2.	Basic Sciences(BS) including Mathematics, Physics, Chemistry, Biology;	BS
3.	Engineering Sciences (ES), including Materials, Workshop, Drawing,	ES
	Basics of Electrical/Electronics/Mechanical/Computer Engineering,	
	Instrumentation;	
4.	Professional Subjects-Core (PC), relevant to the chosen	PC
	specialization/branch;	
5.	Professional Subjects – Electives (PE), relevant to the chosen	PE
	specialization/ branch;	
6.	Open Subjects- Electives (OE), from other technical and/or emerging	OE
	subject areas;	
7.	Project Work, Seminar and/or Internship in Industry or elsewhere	PW/PI
8.	Mandatory Courses (UGC Mandatory)	MC
9.	Non-credit Course	ELS
10.	NCC/NSS/YRC/RRC/Sports	

Distribution of Subjects to be included as per UGC and NAAC

SUMMARY OF CREDITS

Category	Ι	II	III	IV	V	VI	VII	VIII	Total	As suggested
										By
										AICTE *
										Model
										curriculum
HS	3		2	3		3			11	17.5
BS	9	10	4	4					27	20.5
ES	8	8	5						21	23
PC			9	15	18	10			52	22
PE					3	6	6		15	21
OE					3	3	3	6	15	22
PW/PI							6	6	12	18
MC								3	3	15
Total	20	18	20	22	24	22	15	15	156	159

* flexibility of +/- 20%

PRE REQUISITE MAPPING



<u>CURRICULUM</u> <u>Regulation 2018 Revision 1</u> SEMESTER I

AICTE	Sub. Code	Name of the Course	L	Т	Р	С	Η			
Abbr.										
BSC	XMA101	Calculus and Linear Algebra	3	1	0	4	4			
ESC	XCP102	Programming for Problem Solving	3	0	2	5	7			
HSMC	XGS103	English	2	0	1	3	4			
BSC	XAC104	Applied Chemistry for Engineers	3	1	1	5	6			
ESC	XWP105	Workshop Practices	1	0	2	3	5			
		Total	12	2	6	20	26			

SEMESTER II

AICTE	Sub Code	Name of the Course	T	т	D	C	н
Abbr.	Sub. Code		L	I	1	U	11
BSC	XMA201	Calculus, Ordinary Differential Equations And Complex Variables	3	1	0	4	4
UMAN-MC	XES202	Environmental Sciences	3	0	0	0	3
ESC	XBE203	Electrical And Electronics Engineering Systems	3	1	1	5	6
BSC	XAP204	Applied Physics for Engineers	3	1	2	6	7
ESC	XEG205	Engineering Graphics	2	0	1	3	4
		Total	14	3	4	18	24

SEMESTER III

AICTE Abbr.	Sub. Code	Name of the Course	L	Т	Р	С	Н
BSC	XPS301	Probability and Statistics	3	1	0	4	4
PCC/ESC	XCS302	Analog & Digital Electronic Circuits	3	0	2	5	7
PCC	XCS303	Data Structure & Algorithms	3	0	2	5	7
PCC	XCS304	Object Oriented Programming	2	0	2	4	6
HSMC	XUM305	Entrepreneurship Development	2	0	0	2	2
MC	XUM306	Constitution of India	3	0	0	0	3
PROJ	XCS307	In-Plant Training – I	-	-	-	0	
		Total	16	1	6	20	29

SEMESTER IV

AICTE Abbr.	Sub. Code	Name of the Course	L	Т	Р	С	Н
BSC	XCS401	Discrete Mathematics	3	1	0	4	4
HSMC	XUM402	Total Quality Management	3	0	0	3	3
PCC	XCS403	Computer Organization & Architecture	3	0	2	5	7
PCC	XCS404	Operating Systems	3	0	2	5	7
PCC	XCS405	Design and Analysis of Algorithms	3	0	2	5	7
		Total	15	1	6	22	28

SEMESTER V

AICTE Abbr.	Sub. Code	Name of the Course	L	Т	Р	С	Н
PCC	XCS501	Signals & Systems	3	0	0	3	3
PCC	XCS502	Formal Language & Automata Theory	3	0	0	3	3
PCC	XCS503	Database Management Systems	3	0	2	5	7
PCC	XCS504	Software Engineering	3	0	2	5	7
PCC	XCS505	IT Workshop	1	0	1	2	3
PEC	XCSE**	Elective-I	3	0	0	3	3
OE	X**OE*	Open Elective – I	3	0	0	3	3
PROJ	XCS508	In-Plant Training – II	-	-	-	0	
Minor Course	XCS509	Programming with Python (Minor Course)	1	0	0	0	1
		Total	20	0	5	24	30

SEMESTER VI

AICTE Abbr.	Sub. Code	Name of the Course	L	Т	Р	С	Н
PCC	XCS601	Complier Design	3	0	2	5	7
PCC	XCS602	Computer Networks	3	0	2	5	7
PEC	XCSE**	Elective- II	3	0	0	3	3
PEC	XCSE**	Elective- III	3	0	0	3	3
OE	X**OE*	Open Elective –II	3	0	0	3	3
HSMC	XUM606	Economics for Engineers	3	0	0	3	3
Minor Course	XCSM02	Web designing	1	0	0	0	1
		Total	19	0	4	22	27

SEMESTER VII

AICTE Abbr.	Sub. Code	Name of the Course	L	Т	Р	С	Н
OE	X**OE*	Open Elective –III	3	0	0	3	3
PEC	XCSE**	Elective-IV	3	0	0	3	3
PEC	XCSE**	Elective-V	3	0	0	3	3
BSC	XUM704	Biology	3	0	0	0	3
MC	XUM705	Disaster Management	3	0	0	0	3
PROJ	XCS706	Project Phase– I	0	0	6	6	12
PROJ	XCS707	In-plant Training – III	0	0	0	0	0
Minor Course	XCSM03	R Programming	1	0	0	0	1
		Total	16	0	7	15	28

SEMESTER VIII

AICTE Abbr.	Sub. Code	Name of the Course	L	Т	Р	С	Н
МС	XUM801	Cyber Security	3	0	0	3	3
OE	X**OE*	Open Elective -IV	3	0	0	3	3
OE	X**OE*	Open Elective -V	3	0	0	3	3
PROJ	XCS804	Project Work Phase – II	0	0	6	6	12
		Total	9	0	6	15	21

TOTAL CREDIT: 156 Total Hours: 213

LIST OF PROFESSIONAL ELECTIVES

[PEC-CSE]

The Professional Elective Courses are offered from the following Specialized Threads:

No.	Threads
I.	Theory and Algorithms
II.	Applications
III.	Data Science and Machine Intelligence
IV.	Systems

PROFESSIONAL ELECTIVES GROUP – I

V SEMESTER

Sub. Code	Name of the Course	L	Т	Р	С	Н
XCSE51	Artificial Intelligence	3	0	0	3	3
XCSE52	Graph Theory	3	0	0	3	3
XCSE53	Data Communication	3	0	0	3	3
XCSE54	Information Theory and Coding	3	0	0	3	3

PROFESSIONAL ELECTIVES GROUP – II

VI SEMESTER

Sub. Code	Name of the Course	L	Т	Р	С	Η
XCSE61	Web and Internet Technology	3	0	0	3	3
XCSE62	Queuing Theory and Modelling	3	0	0	3	3
XCSE63	Distributed Systems	3	0	0	3	3
XCSE64	Cryptography and Network Security	3	0	0	3	3

PROFESSIONAL ELECTIVES GROUP – III

VI SEMESTER

Sub. Code	Name of the Course	L	Т	Р	C	Н
XCSE65	Data Mining	3	0	0	3	3
XCSE66	Optimization Techniques	3	0	0	3	3
XCSE67	Multi Agent Intelligent Systems	3	0	0	3	3
XCSE68	Image processing	3	0	0	3	3
XCSE69	Context Aware Computing	3	0	0	3	3

PROFESSIONAL ELECTIVES GROUP – IV

Sub. Code	Name of the Course	L	Т	Р	С	Η
XCSE71	Information Retrieval	3	0	0	3	3
XCSE72	Cloud Computing	3	0	0	3	3
XCSE73	Fault Tolerant Computing	3	0	0	3	3
XCSE74	Computer Graphics	3	0	0	3	3
XCSE75	Advanced Operating System	3	0	0	3	3

VII SEMESTER

PROFESSIONAL ELECTIVES GROUP – V

VII SEMESTER

Sub. Code	Name of the Course	L	Т	Р	С	Н
XCSE76	Virtualization	3	0	0	3	3
XCSE77	Machine Learning	3	0	0	3	3
XCSE78	Adhoc and Sensor Networks	3	0	0	3	3
XCSE79	Embedded Systems	3	0	0	3	3
XCSE7A	Parallel and Distributed algorithms	3	0	0	3	3

PROFESSIONAL ELECTIVES GROUP – V VIII SEMESTER

Sub. Code	Name of the Course	L	Т	Р	C	Η
XCSE81	Big data Analytics	3	0	0	3	3
XCSE82	Soft Computing	3	0	0	3	3
XCSE83	Internet of Things	3	0	0	3	3
XCSE84	Operating System Concepts	3	0	0	3	3
XCSE85	Information Security	3	0	0	3	3

OPEN ELECTIVES

Sub. Code	Name of the Course	L	Т	Р	C	Н
XCSOE1	Web Designing	3	0	0	3	3
XCSOE2	Web Design II	3	0	0	3	3
XCSOE3	Digital Marketing	3	0	0	3	3
XCSOE4	Multimedia Design and Development	3	0	0	3	3

SYLLABUS

COL	JRS	E CODE	CODE XMA101				P	С	
COL	URSE NAME CALCULUS AND LINEAR ALGEBRA 3				3	1	0	4	
С	P	Α	3.0 0.5 0.5		L	Т	Р	H	
					3	1	0	4	
PRE	RE	QUISITE:	Differentiation and Integration	Domain		Leve	1		
C01		Apply ort canonical	hogonal transformation to reduce quadratic form to forms.	Cognitive Remembrand			Remember Apply		
CO2		Apply pow and series.	wer series to tests the convergence of the sequences . Half range Fourier sine and cosine series.	Cognitive Psychomo	tor	Appl Guid	Apply Guided Response		
CO3	5	Find the d functions.	lerivative of composite functions and implicit Euler's theorem and Jacobian	Cognitive Psychomo	tor	Remember Guided Response		ponse	
CO4		Explain the expansion constraints Directional	ne functions of two variables by Taylors , by finding maxima and minima with and without s using Lagrangian Method. Il derivatives, Gradient, Curl and Divergence.	CognitiveUnderstAffectiveReceive		erstand ive			
CO5	;	Apply Dif	ferential and Integral calculus to notions of and to improper integrals.	Cognitive A _I		Appl	у		

Unit 1: Matrices 12
Linear Transformation - Eigen values and Eigen vectors -Properties of Eigen values and Eigen vectors -
Cayley-Hamilton Theorem - Diagonalisation of Matrices - Real Matrices: Symmetric - Skew-Symmetric
and Orthogonal Quadratic form - canonical form - Nature of Quadratic form and Transformation of
Quadratic form to Canonical form (Orthogonal only).
Unit 2: Sequences and series12
Sequences: Definition and examples-Series: Types and convergence- Series of positive terms - Tests of
convergence: comparison test, Integral test and D'Alembert's ratio test Fourier series: Half range sine and
cosine series- Parseval's Theorem.
Unit 3: Multivariable Calculus: Partial Differentiation12
Limits and continuity -Partial differentiation - Total Derivative - Partial differentiation of Composite
Functions: Change of Variables – Differentiation of an Implicit Function - Euler's Theorem- Jacobian.
Unit 4: Multivariable Calculus: Maxima and Minima and Vector Calculus12
Taylor's theorem for function of Two variables- Maxima, Minima of functions of two variables: with and
without constraints - Lagrange's Method of Undetermined Multipliers - Directional Derivatives - Gradient,
Divergence and Curl.
Unit 5: Differential and Integral Calculus12
Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their
properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.
LECTURE TUTORIAL TOTAL
45 15 60
TEXT BOOKS:

1. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill New Delhi, 11th Reprint, 2015. (Unit-1, Unit-3 and Unit-4).

2. N.P. Bali and Manish Goyal, "A text book of Engineering Mathematics", Laxmi Publications, Reprint, 2014. (Unit-2).

3. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 40th Edition, 2010. (Unit-5).

REFERENCE BOOKS:

- 1. G.B. Thomas and R.L. Finney, "Calculus and Analytic geometry", 9th Edition, Pearson, Reprint, 2002.
- 2. Veerarajan T., "Engineering Mathematics for first year", Tata McGraw-Hill, New Delhi, 2008.
- 3. D. Poole, "Linear Algebra: A Modern Introduction", 2nd Edition, Brooks/Cole, 2005.
- 4. Erwin kreyszig, "Advanced Engineering Mathematics", 9th Edition, John Wiley & Sons, 2006.

Cos Versus GA mapping

Table 1: Mapping of Cos with GAs:

		РО												50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 2	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 3	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 4	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 5	3	2	1	1	2	1	0	0	0	0	0	1	1	1
Total	15	10	5	5	10	5	0	0	0	0	0	5	5	5
Scaled Value	3	2	1	1	2	1	0	0	0	0	0	1	1	1

 $1-5 \longrightarrow 1, 6-10 \longrightarrow 2, 11-15 \longrightarrow 3$

1-Low relation , 2- Medium relation , 3- High relation

COU	RSE	CODE	XCP102		L	T	•	P	С
COU	RSE	NAME	PROGRAMMING FOR PROBLEM SOLVING		3	0		2	5
C	Р	Α	3.2 1.8 0.0		L	T	•	Р	Η
		l			3	0		4	7
COU	RSE	OUTCO	ME	D	omain		I	level	
CO1	De usi	<i>fine</i> prog ing I/O sta	gramming fundamentals and <i>Solve</i> simple programs itements	Cog Psy	nitive chomo	tor	Re Ur Ap Gu Re	ememl ndersta oply uided espons	ber and
CO2	De and	f ine synta d arrays	ax and write simple programs using control structures	Cog Psy	nitive chomo	tor	Re Ur Ap Gu Re	ememl ndersta oply uided espons	ber and
CO3	Ex	plain and	write simple programs using functions and pointers	Cog Psyc	nitive homot	or	Ur Ap Gu Re	ndersta oply uided espons	and se
CO4	Ex	p lain and	write simple programs using structures and unions	Cog Psy	nitive chomo	tor	Ur Ap Ar Gu Re	ndersta oply nalyze nided espons	and
CO5	Ex pro	p lain and ojects	write simple programs using files and Build simple	Cog Psyc	nitive chomo	tor	Re Ur Cr Gu Re	ememl nderst reate uided espons	ber and

COURSE	CONTENT	Hours
UNIT I	PROGRAMMING FUNDAMENTALS AND INPUT / OUTPUT STATEMENTS	9 + 9
	Theory Introduction to components of a computer system, Program – Flowchart – Pseudo code – Software – Introduction to C language – Character set – Tokens: Identifiers, Keywords, Constants, and Operators – sample program structure -Header files – Data Types-Variables - Output statements – Input statements. Practical 1. Program to display a simple picture using dots. 2. Program for addition of two numbers 3. Program to swap two numbers 4. Program to solve any mathematical formula	
UNIT II	CONTROL STRUCTURE AND ARRAYS	9 + 9
	Theory Control Structures – Conditional Control statements: Branching, Looping - Unconditional control structures: switch, break, continue, goto statements – Arrays: One Dimensional Array – Declaration – Initialization – Accessing Array Elements – Searching – Sorting – Two Dimensional arrays - Declaration – Initialization – Matrix Operations – Multi Dimensional Arrays - Declaration – Initialization. Storage classes: auto – extern – static. Strings: Basic operations on strings.	

	 Program for copying contents Program using files using stru 	of one file	to another file.								
	File management in C - File operation functions in C - Defining and opening a file - Closing a file - The getw and putw functions - The fprintf & fscanf functions - fseek Function – Files and Structures.										
	Theory File management in C - File operation	n functions	in C - Defining and a	ppening a file -							
UNIT V	FILES				9 + 9						
	 Program to read and display s Program to read and display s arrays Program to create linked list u 	tudent marl tudent marl using Struct	c sheet Structures wit cs of a class using Str ures with pointers	h variables uctures with							
	Theory Structures and Unions - Giving values to members - Initializing structure - Functions and structures - Passing structure to elements to functions - Passing entire function to functions - Arrays of structure - Structure within a structure and Union. Practical										
UNIT IV	STRUCTURES AND UNIONS		9 + 9								
	 Theory Functions: Built in functions – U methods - Passing arrays to functio functions. Pointers - Pointer declarati pointer arithmetic - Pointers and fur Pointer to arrays - Use of Pointers list(no implementation). Practical Program to find factorial of a Programs using Recursion suc Ackerman function etc. Quick Programs using Pointers 	User Define ns – Recur on - Addrea nction - Ca in self-refe given numb ch as Findir c sort or Me	ed Functions - Para sion - Programs usi ss operator - Pointer ll by value - Call b rential structures-No per using four function g Factorial, Fibonaco rge sort	meter passing ng arrays and expressions & y Reference - tion of linked n types. ci series,							
UNIT III	FUNCTIONS AND POINTERS				9 + 9						
	 Program to find greatest of 3 in 2. Program to display divisible in Statement Program to remove duplicate Program to perform string ope Performing basic sorting algorithms 	numbers us numbers bet element in a erations. rithms	ing Branching Staten ween n1 and n2 usin an array.	ients g looping							

TF	TEXT BOOKS /REFERENCE BOOKS											
1.	Byron	Gottfried,	"Programming	with	С",	III	Edition,	(Indian	Adapted	Edition),	TMH	
publications, 2010												
•	publicati	ons, 2010		D 1 11		• • • •	0					

2. Yeshwant Kanethker, "Let us C", BPB Publications, 2008

- 3. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Pearson Education Inc. 2005
- 4. Behrouz A. Forouzan and Richard. F. Gilberg, "A Structured Programming Approach Using C", II Edition, Brooks–Cole Thomson Learning Publications, 2001

5. Johnson baugh R. and Kalin M., "Applications Programming in ANSI C", III Edition, Pearson Education India, 2003

6. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill, 7th edition 2017.

		РО												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2		
CO1	3	2	0	0	3	0	0	0	0	0	2	3	2	0		
CO2	3	2	0	0	2	0	0	0	0	0	2	3	2	0		
CO3	2	2	1	2	2	0	0	0	0	0	2	2	2	0		
CO4	2	2	1	2	2	0	0	0	0	0	2	2	2	0		
CO5	2	2	1	0	2	0	0	1	0	2	2	2	2	0		
Total	12	10	3	4	11	0	0	1	0	2	10	12	10	0		
Scaled Value	3	2	1	1	3	0	0	1	0	1	2	3	2	0		

Table 1: COs Versus POs Mapping

 $1-5 \rightarrow 1, \qquad 6-10 \rightarrow 2, \qquad 11-15 \rightarrow 3$

1 - Low Relation, 2- Medium Relation, 3- High Relation

COURSE CODE XGS103										L	Т	P	()	SS	C									
COUR	RSE NA	ME	E	EN	GLISH	H											2	0	1		0	3		
PRE-I	REQUI	SITES (1	(IF A	FA	NY)												L	Т	Р		SS	Η		
С	P ·	Α	2.	2.0	0.6 0.	.4											2	0	2		0	4		
COUR	OSE OI	ITCOM	1FC.	'C.										ח	mo	in			I ovo	.1				
			oll th	tho	maani	ing fo	or pro	por 11	1000	70			 		oma	tivo			Dom		hor			
	ADUU	y to recal	an m			ing io		sper u	usago	ge)gnn	live			Apply					
	Appiy	fu the co	miq	nque				maaa					 		ogni	tive			.y	hor				
	Com	y the co	Not			rs m	senter	ancihi		Mait	tina)gnn	live								
C04	Consi			Natu	ire and	Style	e or se	ensio	ble v	W III.	ung		 	-	Jgnn	live								
Practicing the writing skills Psychon										omo	otor		Resp	on	ise									
CO6Grasping the techniques in learning sounds and etiquettesPsychomotorAdaptin										ng														
UNIT I - Vocabulary Building											9	9												
 1.1 The concept of Word Formation 1.2 Root words from foreign languages and their use in English 1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives. 1.4 Synonyms, antonyms, and standard abbreviations. 																								
1.4 Synonyms, antonyms, and standard abbreviations. UNIT II - Basic Writing Skills													9	9										
2.1 Ser 2.2 Us 2.3 Imp 2.4 Cre 2.5 Org 2.6 Tec	ntence S e of phr portanc eating c ganizing chnique	Structures ases and e of prop oherence g principl s for writ	es d cla per p ce ples o riting	claus er pu es of ing p	ses in s inctuati f paragi precisel	senter ion graphs ly	ences as in de	locum	nent	ts														
UNIT	III - Id	entifying	ng Co	Co	mmon	Erro	ors in	n Wri	riting	g			 								9	9		
3.1 Sul 3.2 No 3.3 Mi 3.4 Art 3.5 Pre 3.6 Re 3.7 Cli	bject-ve un-pror splaced ticles position dundan chés	erb agreen noun agre modifien ns cies	emer reem ers	nent eme S	ent																			
UNIT IV - Nature and Style of sensible Writing										9	9													
 4.1 Describing 4.2 Defining 4.3 Classifying 4.4 Providing examples or evidence 4.5 Writing introduction and conclusion 																								
UNIT V - Writing Practices9										9														
5.1 Comprehension																								

5.2 Précis Writing

5.3 Essay Writing

Unit VI - Oral Communication

(This unit involves interactive practice sessions in Language Lab)

- □ Listening Comprehension
- □ Pronunciation, Intonation, Stress and Rhythm
- Common Everyday Situations: Conversations and Dialogues
- □ Communication at Workplace
- □ Interviews
- □ Formal Presentations

SUGGESTED READINGS:

(i) Practical English Usage. Michael Swan. OUP. 1995

(ii) Remedial English Grammar. F.T. Wood. Macmillan.2007

- (iii) On Writing Well. William Zinsser. Harper Resource Book. 2001
- (iv) Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006
- (v) Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011
- (vi) Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

Table 1: Mapping of Cos with POs:

							РО						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	0	0	0	0	0	2	0	1	0	0	0	0	0
CO2	2	0	0	0	0	0	2	0	1	0	0	0	0	0
CO3	1	0	0	0	0	0	1	0	1	0	0	0	0	0
CO4	2	0	0	0	0	0	1	0	1	0	0	0	0	0
CO5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	7	0	0	0	0	0	6	0	4	0	0	0	0	0
Scaled Value	2	0	0	0	0	0	2	0	1	0	0	0	0	0
	1	0	0	0	0	0	1	0	1	0	0	0	0	0

1-5=1, 6-10 = 2, 11-15=3

1- Low Relation, 2 – Medium Relation, 3- High Relation

COUI	RSE COI		L	Т	Р	C				
COUI	RSE NAN	ИE	APPLIED CHEMISTRY FOR ENGINEED	RS	3	1	1	5		
С	P	A	3.5 1.0 0.5		L	Т	P	H		
					3	1	2	6		
PREB	REQUISI	TES	NI							
COUI	RSE OUI	ГСОМ	ES:	Domain	Lev	vel				
CO1	<i>Identify</i> electron <i>Describ</i> and alka	Cognitive Psychomotor	Rei Per	nembe ceptio	er n					
CO2	Interpret thermod	Cognitive Psychomotor	Une Set	dersta	nd					
CO3	<i>Explain</i> atomic,	and <i>l</i> molecu	<i>Measure</i> microscopic chemistry in terms of alar orbitals and intermolecular forces.	Cognitive Psychomotor Affective	Apj Me	oly chanis	sm Reo	ceive		
CO4	Apply, electron molecul	<i>Measi</i> nagneti lar ener	<i>ure</i> and <i>Distinguish</i> the ranges of the c spectrum used for exciting different gy levels in various spectroscopic techniques	Cognitive Psychomotor Affective	Ren Ana Per Res	nembo alyze ceptio pond	er n			
CO5	Describ chemica molecul	e, Illu al reac les.	strate and Discuss the stereochemistry and ctions that are used in the synthesis of	Cognitive Psychomotor	Ren Apj Me	nembe oly chanis	er sm			
UNIT	I PI	ERIOD	DIC PROPERTIES AND WATER CHEMIS	TRY			8+3-	+6		
Effect period electro and ex	tive nucle lic table, onegativit xplanation	ar char electro y, pola of har	rge, penetration of orbitals, variations of s, p, onic configurations, atomic and ionic sizes, rizability and oxidation states. Water Chemis dness, determination of hardness by EDTA me	d and f orbital ionization ene try -Water quali thod-Introductio	energies ty Pa on to	gies of , elec ramet alkalin	f atom etron ers-De nity.	is in the affinity, efinition		
UNIT	-II US	SE OF	FREE ENERGY IN CHEMICAL EQUILIP	BRIA			12+3	8+6		
Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Corrosion-Types, factors affecting corrosion rate and Control methods. Use of free energy considerations in metallurgy through Ellingham diagrams. Advantages of electroless plating										

UNIT-IIIATOMIC AND MOLECULAR STRUCTURE10)+3+6
------------------------------------------	-------

Schrodinger equation. Particle in a box solution and their applications for conjugated molecules and nanoparticles.. Molecular orbitals of diatomic molecules and plots of the multicenter orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomic molecules. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

Intermolecular forces and potential energy surfaces

electroless plating of nickel and copper on Printed Circuit Board (PCB).

Ionic, dipolar and Vander waals interactions. Equations of state of real gases and critical phenomena. Potential energy surfaces of H_3 , H_2F and HCN and trajectories on these surfaces.

UNIT-IVSPECTROSCOPIC TECHNIQUES AND APPLICATIONS7+3+6

Principles of spectroscopy and selection rules. Electronic spectroscopy-chromophore, auxochromes, types of electronic transition and application. Fluorescence and its applications in medicine. Vibrational spectroscopy-types of vibrations, Instrumentation and applications. Rotational spectroscopy of diatomic molecules. Nuclear magnetic resonance spectroscopy-concept of chemical shift and applications-magnetic resonance imaging. Diffraction and scattering.

UNIT-V STEREOCHEMISTRY AND ORGANIC REACTIONS

8+3+6

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis. Isomerism in transitional metal compounds

Organic reactions and synthesis of a drug molecule

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization reactions and ring opening reactions. Synthesis of a commonly used drug molecule- Aspirin and paracetamol.

	LECTURE	TUTORIAL	PRACTICAL	TOTAL HOURS	
Hours	45	15	30	90	

TEXT BOOKS

- 1. Puri B.R. Sharma, L.R., Kalia K.K. Principles of Inorganic Chemistry, (23rd edition), New Delhi, Shoban Lal Nagin Chand & Co., 1993
- 2. Lee. J.D. Concise Inorganic Chemistry, UK, Black well science, 2006.
- 3. Trapp. C, Cady, M. Giunta. C, Atkins's Physical Chemistry, 10th Edition, Oxford publishers, 2014.
- 4. Glasstone S., Lewis D., Elements of Physical Chemistry, London, Mac Millan & Co. Ltd, 1983.
- 5. Morrison R.T. and Boyd R.N. Organic Chemistry (6th edition), New York, Allyn & Bacon Ltd., 1976.
- 6. Banwell. C.N, Fundamentals of Molecular Spectroscopy, (3th Edition), McGraw-Hill Book Company, Europe 1983.
- Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (4th edition), S./ Chand & Company Ltd. New Delhi, 1977.
- 8. P. S. Kalsi, Stereochemistry: Conformation and mechanism, (9th Edition), New Age International Publishers, 2017.

REFERENCE BOOKS

- 1. Puri B R Sharma L R and Madan S Pathania, "Principles of Physical Chemistry", Vishal publishing Co., Edition 2004
- 2. Kuriocose, J C and Rajaram, J, "Engineering Chemistry", Volume I/II, Tata McGraw-Hill Publishing Co. Ltd. New Delhi, 2000

E RESOURCES - MOOCs:

- 1. http://www.mooc-list.com/course/chemistry-minor-saylororg
- 2. https://www.canvas.net/courses/exploring-chemistry
- 3. http://freevideolectures.com/Course/2263/Engineering-Chemistry-I
- 4. http://freevideolectures.com/Course/3001/Chemistry-I
- 5. http://freevideolectures.com/Course/3167/Chemistry-II
- 6. http://ocw.mit.edu/courses/chemistry/

Labo	Laboratory Part 30 hrs							
Expe	eriments:							
1.	Determination of chloride ion present in the water sample by Argentometric method.	CO1						
2.	Determination of total, temporary and permanent hardness of water sample by EDTA	CO1						

10.	Saponification/acid value of an oil.	CO5
9.	Synthesis of a polymer/drug.	CO5
8.	Estimation of iron by colorimetric method.	CO4
7.	Determination of the rate constant of a reaction.	CO4
6.	Adsorption of acetic acid by charcoal.	CO3
5.	Determination of surface tension and viscosity.	CO3
4.	Potentiometry - determination of redox potentials and emfs.	CO2
3.	Determination of cell constant and conductance of solutions.	CO2
	method.	

- 1. Mendham, Denney R.C, Barnes J.D and Thomas N.J.K., "Vogel's Textbook of Quantitative Chemical Analysis", 6th Edition, Pearson Education, 2004.
- 2. Garland, C. W.; Nibler, J. W.; Shoemaker, D. P. "Experiments in Physical Chemistry", 8th Ed.; McGraw-Hill: New York, 2003.

E RESOURCES - MOOCs:

1.http://freevideolectures.com/Course/2380/Chemistry-Laboratory-Techniques

2. http://freevideolectures.com/Course/2941/Chemistry-1A-General-Chemistry-Fall-2011

3.http://ocw.mit.edu/courses/chemistry/5-301-chemistry-laboratory-techniques

	LECTURE	TUTORIAL	PRACTICAL	TOTAL HOURS
HOURS	45	15	30	90

	РО										PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	0	0	0	0	0	2	3	3	0	0	0	0	0
CO2	2	0	0	0	0	0	1	2	2	0	0	0	0	0
CO3	3	0	0	0	0	0	2	3	3	0	0	0	0	0
CO4	3	0	0	0	0	0	3	3	3	0	0	0	0	0
CO5	3	0	0	0	0	0	2	2	3	0	0	0	0	0
Total	14	0	0	0	0	0	10	13	14	0	0	0	0	0
Scaled Value	3	0	0	0	0	0	2	3	3	0	0	0	0	0

Table 1: Mapping of CO's with PO's:

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

1- Low Relation, 2-Medium Relation, 3-High Relation

COURSE	CODE	XWP105	L T P C						
COURSE	NAME	WORKSHOP PRACTICES	1 0 2 3						
C P	Α	1.5 1.5 0.0		L T P H					
PREREOI	IISITE			1 0 4 5					
COURSE	OUTCOMI	ES:	Domain	Level					
CO1	Summariz	e the machining methods and Practice	Cognitive	Understand					
	machining	operation.	Psychomotor	Guided response					
CO2	Defining 1	netal casting process, moulding methods and	Cognitive	Remember					
C03	Plan basic	carpentry and fitting operation and Practice	Cognitive	Apply					
005	carpentry a	and fitting operations.	Psychomotor	Guided response					
CO4	Summariz	e metal joining operation and Practice	Cognitive	Understand					
	welding op	peration.	Psychomotor	Guided response					
CO5	<i>Illustrate</i> t	he, electrical and electronics basics and	Cognitive	Understand					
	<i>Makes</i> app	ropriate connections.	Psychomotor	Origination					
COURSE	CONTENT	1	L						
EXP.NO		TITLE		CO RELATION					
1	INTRODU	CTION TO MACHINING PROCESS		CO1					
2	PLAIN TU	RINING USING LATHE OPERATION		C01					
3	INTRODU	ICTION TO CNC		CO1					
4	DEMONS'	TRATION OF PLAIN TURNING USING CNO	2	CO1					
5	STUDY O	F METAL CASTING OPERATION		CO2					
6	DEMONS'	TRATION OF MOULDING PROCESS		CO2					
7	STUDY O	F SMITHY OPERATION		CO2					
8	STUDY O	F CARPENTRY TOOLS		CO3					
9	HALF LA	P JOINT – CARPENTRY		CO3					
10	MORTISE	AND TENON JOINT – CARPENTRY		CO3					
11	STUDY O	F FITTING TOOLS		CO3					
12	SQUARE	FITTING		CO3					
13	TRIANGU	LAR FITTING		CO3					
14	STUDY O	STUDY OF WELDING TOOLS CO4							
15	SQUARE	SQUARE BUTT JOINT - WELDING CO4							
16	TEE JOINT – WELDING CO4								
17	INTRODUCTION TO HOUSE WIRING CO5								
18	ONE LAMP CONTROLLED BY ONE SWITCH CO5								
19	TWO LAMPS CONTROLLED BY SINGLE SWITCHCO5								
20	STAIRCASE WIRING CO5								
TEXT BO	OKS								
1. Worksho	op Technolo	gy I, II, III, by S K Hajra, Choudhary and A K G	Chaoudhary. Medi	ia Promoters and					
Publishers Pvt. Ltd., Bombay									

2. Workshop Technology by Manchanda Vol. I,II,III India Publishing House, Jalandhar.

REFERENCES

1. Manual on Workshop Practice by K Venkata Reddy, KL Narayana et al; MacMillan India Ltd.

2. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi

3. Workshop Technology by B.S. Raghuwanshi, Dhanpat Rai and Co., New Delhi.

4. Workshop Technology by HS Baha, Tata McGraw Hill Publishers, New Delhi.

E RESOURCES

1. http://nptel.ac.in/courses/112107145/

Mapping of CO's with PO'S:

		РО										PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	1	2	2	1	0	0	1	1	0	1	2	0	0
CO2	2	1	2	2	1	0	0	1	1	0	1	2	0	0
CO3	2	1	2	2	1	0	0	1	1	0	1	2	0	0
CO4	2	1	2	2	1	0	0	1	1	0	1	2	0	0
CO5	2	1	2	2	1	0	0	1	1	0	1	2	0	0
	10	5	10	10	5	0	0	5	5	0	5	10	0	0
	2	1	2	2	1	0	0	1	1	0	1	2	0	0

 $1-5 \rightarrow 1$, $6-10 \rightarrow 2$, $11-15 \rightarrow 3$

1 - Low Relation, 2- Medium Relation, 3- High Relation

SEMESTER II

COU	COURSE CODE XMA201					Т	Р	С		
COI	JRSE	RSE NAME CALCULUS, ORDINARY DIFFERENTIAL 3 1 EQUATIONS AND COMPLEX VARIABLES						4		
С	Р	Α	3.0 0.5 0.5		L	Т	Р	Η		
					3	1	0	4		
PRE	REQ	UISITE: 1	Mathematics I (Calculus and Linear Algebra)			i				
COU	JRSE	OUTCO	MES:	Dom	ain		Le	evel		
C01	CO1 Find double and triple integrals and to find line, surface and Cogni volume of an integral by Applying Greens, Gauss divergence and Stokes theorem						Apply Remember			
CO2	2 Solve first order differential equations of different types which are Cognitive solvable for p. v. x and Clairaut's type.							Apply		
CO3	Solve Second order ordinary differential equations with variable Cognitive coefficients using various methods.						Apply			
CO4	Us ha	se CR e rmonic fu	quations to verify analytic functions and to find inctions and harmonic conjugate. Conformal mapping	Cogn	itive		Remen Apply	nber		
	of translation and rotation. Mobius transformation. Psychon							1 nse		
CO5	5 Apply Cauchy residue theorem to evaluate contour integrals Cognitive involving sine and cosine function and to state Cauchy integral formula, Liouvilles theorem. Taylor's series, zeros of analytic Affective functions, singularities, Laurent's series.						Apply Receiv	ve		

Unit -I MULTIVARIABLE CALCULUS	(INTEGRATION)		12						
Multiple Integration: Double integrals (Cartesian) - change of order of integration in double integrals - Change of variables (Cartesian to polar) - Triple integrals (Cartesian), Scalar line integrals - vector line integrals - scalar surface integrals - vector surface integrals - Theorems of Green, Gauss and Stokes.									
Unit –II FIRST ORDER ORDINARY D	IFFERENTIAL EQ	UATIONS	12						
Exact - linear and Bernoulli's equations - solvable for p - equations solvable for y- equations y- equations solvable for y- equations	Euler's equations - uations solvable for x	Equations not of first c and Clairaut's type.	legree: equations						
Unit - III ORDINARY DIFFERENTIAL	EQUATIONS OF H	IIGHER ORDERS	12						
Second order linear differential equations v Cauchy-Euler equation- Power series soluti and their properties.	Second order linear differential equations with variable coefficients- method of variation of parameters - Cauchy-Euler equation- Power series solutions- Legendre polynomials- Bessel functions of the first kind and their properties								
Unit -IV COMPLEX VARIABLE – DIFI	FERENTIATION		12						
Differentiation-Cauchy-Riemann equation conjugate- elementary analytic functions Conformal mappings- Mobius transformation	s- analytic function (exponential, trigono ons and their propertie	s-harmonic functions-fi metric, logarithm) and es.	nding harmonic their properties-						
Unit - V COMPLEX VARIABLE – INTE	EGRATION		12						
Contour integrals - Cauchy-Goursat theorem (without proof) - Cauchy Integral formula (without proof)- Liouville's theorem (without proof)- Taylor's series- zeros of analytic functions- singularities- Laurent's series – Residues- Cauchy Residue theorem (without proof)- Evaluation of definite integral involving sine and cosine- Evaluation of certain improper integrals using the Bromwich contour.									
LECTURE TUTORIAL TOTAL									
45 15 60									
Text Book: 1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 40thth Edition, 2008. Reference Books: 1. G.B. Thomas and R.L. Finney, "Calculus and Analytic geometry", 9th Edition, Pearson, Reprint, 2002. 2. Erwin kreyszig, "Advanced Engineering Mathematics", 9th Edition, John Wiley & Sons, 2006. 3. W. E. Boyce and R. C. DiPrima, "Elementary Differential Equations and Boundary Value Problems", 9thEdn. Wiley India, 2009. 4. S. L. Ross, "Differential Equations", 3rd Ed., Wiley India, 1984. 5.E. A. Coddington, "An Introduction to Ordinary Differential Equations", Prentice Hall India, 1995. 6. E. L. Ince, "Ordinary Differential Equations", Dover Publications, 1958. 7. J. W. Brown and R. V. Churchill, "Complex Variables and Applications", 7th Ed., McGraw Hill, 2004.

8. N.P. Bali and Manish Goyal, "A text book of Engineering Mathematics", Laxmi Publications, Reprint, 2008.

Cos Versus GA mapping

Table 1: Mapping of Cos with GAs:

							PO						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 2	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 3	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 4	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 5	3	2	1	1	2	1	0	0	0	0	0	1	1	1
Total	15	10	5	5	10	5	0	0	0	0	0	5	5	5
Scaled	3	2	1	1	2	1	0	0	0	0	0	1	1	1
Value														

$1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

0 - No relation, 1 - Low relation, 2 - Medium relation, 3 - High relation

COURSE CODE XES202							P	С
COUI	RSE N.	AME	ENVIRONMENTAL SCIENCES		3	0	0	0
C	Р	А	2.5 0.0 0.5		L	Т	P	H
		.			3	0	0	3
COUI	RSE O	UTCON	MES	Domain	L	evel		.4
CO1	Des anth	<i>cribe</i> the	e significance of natural resources and <i>explain</i> ic impacts.	Cognitive	Re Ui	emen nders	iber tand	
CO2	<i>Illu</i> natu bala	strate th ral geo	e significance of ecosystem, biodiversity and bio chemical cycles for maintaining ecological	Cognitive	U	nders	tand	
CO3	<i>Ider</i> poll	<i>tify</i> the utions a	facts, consequences, preventive measures of major and <i>recognize</i> the disaster phenomenon.	Cognitive Affective	Re Re	emen eceiv	nber e	
CO4	Exp cont	<i>lain</i> the trol mea	socio-economic, policy dynamics and <i>practice</i> the sures of global issues for sustainable development.	Cognitive	U A	nders nalyz	tand e	
CO5 <i>Recognize</i> the impact of population and the concept of various Cognitive welfare programs, and <i>apply</i> the modern technology towards environmental protection.							tand	
UNIT - I INTRODUCTION TO ENVIRONMENTAL STUDIES AND ENERGY								2

Definition, scope and importance – Need for public awareness – Forest resources: Use and overexploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, flood, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources, case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – Role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

UNIT – II ECOSYSTEMS AND BIODIVERSITY

Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to Biodiversity – Definition: genetic, species and ecosystem diversity - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

7

10

10

UNIT – III ENVIRONMENTAL POLLUTION

Definition – Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – Solid waste management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: flood, earthquake, cyclone and landslide.

UNIT -IV SOCIAL ISSUES AND THE ENVIRONMENT

Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Wasteland reclamation – Consumerism and waste products – Environment Protection Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness. **UNIT –V HUMAN POPULATION AND THE ENVIRONMENT** 6

UNIT – V HUMAN POPULATION AND THE ENVIKONMENT

Population growth, variation among nations – Population explosion – Family welfare programme – Environment and human health – Human rights – Value education - HIV / AIDS – Women and Child welfare programme– Role of Information Technology in Environment and human health – Case studies.

			LECTURE	TUTORIAL	ΤΟΤΑΙ
			45	0	45
TE	ΧТ	BOOKS			
	1. 2. 3. 4. 5. 6.	Miller T.G. Jr., Environmental Science, W Townsend C., Harper J and Michael Begor Trivedi R.K and P.K.Goel, Introduction to Disaster mitigation, Preparedness, Recover Ltd, New Delhi, 2006. Introduction to International disaster mana Gilbert M.Masters, Introduction to Enviro Pvt., Ltd., Second Edition, New Delhi, 200	adsworth Publishing Co, US n, Essentials of Ecology, Bla Air pollution, Techno Scien ry and Response, SBS Publi gement, Butterworth Heiner nmental Engineering and So 04.	SA, 2000. ackwell Science, ace Publications, shers & Distrib mann, 2006. cience, Pearson I	UK, 2003 India, 2003. putors Pvt. Education
RE	FEI	RENCE BOOKS			
	1.	Trivedi R.K., Handbook of Environmental Vol. I and II, Enviro Media, India, 2009.	Laws, Rules, Guidelines, C	ompliances and	Standards,
	2.	Cunningham, W.P.Cooper, T.H.Gorhani, H Mumbai, 2001.	Environmental Encyclopedia	a, Jaico Publ., Ho	ouse,
	3.	S.K.Dhameja, Environmental Engineering 2012.	g and Management, S.K.Kat	aria and Sons, N	ew Delhi,
	4.	Sahni, Disaster Risk Reduction in South A	sia, PHI Learning, New Del	lhi, 2003.	
	5.	Sundar, Disaster Management, Sarup & So	ons, New Delhi, 2007.	-	
	6.	G.K.Ghosh, Disaster Management, A.P.H.	Publishers, New Delhi, 200	6.	
ER	ES	OURCES	1		
	1.	http://www.e-booksdirectory.com/details.p	hp?ebook=10526		
	2.	https://www.free-ebooks.net/ebook/Introdu	action-to-Environmental-Sc	ience	
	3.	https://www.free-ebooks.net/ebook/What-i	s-Biodiversity		
	4.	https://www.learner.org/courses/envsci/uni	it/unit_vis.php?unit=4		
	5.	http://bookboon.com/en/pollution-preventi	on-and-control-ebook		
	6.	http://www.e-booksdirectory.com/details.p	hp?ebook=8557		
	7.	http://www.e-booksdirectory.com/details.p	hp?ebook=6804		
	8.	http://bookboon.com/en/atmospheric-pollu	tion-ebook		
	9.	http://www.e-booksdirectory.com/details.p	hp?ebook=3749		
	10.	http://www.e-booksdirectory.com/details.p	hp?ebook=2604		
	11.	http://www.e-booksdirectory.com/details.p	hp?ebook=2116		
	12.	http://www.e-booksdirectory.com/details.p	hp?ebook=1026		
	13.	http://www.faadooengineers.com/threads/7	7894-Environmental-Scienc	e	

Table 1 : Mapping of CO's with PO's:

		РО												50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	0	0	0	0	0	2	3	3	0	0	0	0	0
CO2	2	0	0	0	0	0	1	2	2	0	0	0	0	0
CO3	3	0	0	0	0	0	2	3	3	0	0	0	0	0
CO4	3	0	0	0	0	0	3	3	3	0	0	0	0	0
CO5	3	0	0	0	0	0	2	2	3	0	0	0	0	0
Scaled value	3						2	3	3					

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

COURSE CODE XBE203									Р	С	
COUR	RSE NA	ME	ELECTRICAL SYSTEMS	AND ELECTRON	ICS	ENGINEERING	3	1	1	5	
С	Р	Α	3.8 1.2 0.0				L	Т	Р	Η	
							3	1	2	6	
PRER	EQUIS	SITES : P	IYSICS							1	
COUR	RSE OU	JTCOMES				Domain	Leve	el			
CO1	Defi	Cognitive	Rem	emb	er						
	para	Psychomotor	Understand								
CO2	Defi	<i>ne</i> and <i>E</i>	g devices x <i>plain</i> the opera	ation of DC and	AC	Cognitive	Rem	emb	er		
	mac	hines.	1 1				Unde	ersta	nd		
CO3	Reco	<i>ill</i> and <i>Illu</i>	strate various sem	niconductor devices	and	Cognitive	Rem	emb	er		
	char	application acteristics of	f basic semicondu	ictor devices.	ութու	Psycholiotor	Mecl	hani	sm		
CO4	Rela	te and Exp	<i>lain the</i> number s	systems and logic g	ates.	Cognitive	Rem	emb	er		
	Con	s <i>truc</i> t the d	ifferent digital cire	cuit.		Psychomotor	Unde	ersta	ind		
CO5	Labo	el and Outl	ne the different t	ypes of microproces	ssors	Cognitive	Rem	emb	er		
	and	their applic	ations.			-	Unde	ersta	nd		
UNIT	I- FUN	DAMENT	ALS OF DC AN	D AC CIRCUITS,	MEA	SUREMENTS		9+	6+1	2	
Funda	mentals	of DC– O	nm's Law – Kirch	off's Laws - Source	es - V	oltage and Curren	t relati	ons	–Sta	ar/Delta	
Transf	ormatic	n - Fundar	nentals of AC – A	verage Value, RMS	S Valu	ie, Form Factor -	AC po	ower	r and	1 Power	
Factor,	, Phaso	r Represen	tation of sinusoid	dal quantities - Sin	iple S	Series, Parallel, Se Ammeter, Voltmet	ries P	arall 1 Dx	lel C	Circuit -	
type m	eters (V	Watt meter	and Energy meter)			Annieler, voltmet	ci) and	u Dy	man	Iometer	
UNIT	II – EI	LECTRIC	L MACHINES					9 -	- 3+	0	
Constr	uction,	Principle o	f Operation, Basic	Equations, Types a	and Aj	pplication of DC C	Genera	tors,	DC	motors	
- Basic	cs of S	ingle Phas Single Phas	e Induction Motor	r and Three Phase ree phase transform	Induc	ction Motor- Cons	structio	on, 1	Prin	ciple of	
UNIT	III – S	EMICONI	OUCTOR DEVIC	ES	(015, 11			9 -	+ 0+	8	
Classif	fication	of Semico	nductors, Construc	ction, Operation and	d Cha	racteristics: PN Ju	nction	Dio	ode ·	– Zener	
Diode,	PNP, 1	NPN Transi	stors, Field Effect	Transistors and Sili	icon C	Controlled Rectifier	r – Ap	plica	atior	18.	
UNIT	IV – D	IGITAL E	LECTRONICS				9) + 3	8+10)	
Basic	of Con	cepts of N	imber Systems, L	ogic Gates, Boolea	ın Alg	gebra, Adders, Sul	otracto	ors, 1	mult	iplexer,	
demult	tiplexer	, encoder, c	ecoder, Flip-flops	, Up/Down counter	s, Shi	ft Registers.					
UNIT	$\mathbf{V} - \mathbf{M}$	ICROPRO	CESSORS				9⊣	- 3+	0		
Archite	Architecture, 8085, 8086 - Interfacing Basics: Data transfer concepts – Simple Progra									.s	
LIST (LIST OF EXPERIMENTS :										
1.	Stud	y of Electri	an Symbols, 1001	s and Safety Precau	uons,	rower Supplies.					
2.	Study	y of Active	and Passive eleme	$\frac{1}{10}$	uctors	s and Capacitors, E	, Bread Board.				
5.	Verif	ication of A	Voltage, Curre	nt and Power in Sei	nes an	a Parallel connect	10n.	1 •			
4.	l esti	ng of DC \ lboard by u	oltage and Curren	it in series and paral	uel res	sistors which are c	onnect	led 1	n		
5.	Fluor	rescent lam	connection with	choke.							
6. Staircase Wiring.											
4. 5.	Testi bread Fluor	ng of DC V lboard by u rescent lam	oltage and Curren sing Voltmeter, A o connection with	t in series and paral mmeter and Multim choke.	llel res neter.	sistors which are c	onnect	ted i	n		
6.	Staircase Wiring. 41										

7.	Forward and Reverse bias characteristics of PN junction diode.													
8.	Forward and Reverse bias c	haracteristics of z	ener diode.											
9.	Input and Output Characteri	stics of NPN trar	nsistor.											
10.	Construction and verificatio	n of simple Logi	c Gates.											
11.	Construction and verificatio	n of adders.												
12.	Construction and verificatio	on of subtractor.												
	LECTURE TUTORIAL PRACTICAL TOTAL													
		45	15	30	90									
TEXT	BOOKS													
1. Meth	na V.K., 2008. Principles of E	lectronics. Chand	and Company.											
2. Malv	vino, A. P., 2006. Electronics	Principles. 7 th ed.	New Delhi: Tata	McGraw-Hill.										
3. Raja	kamal, 2007. Digital System-I	Principle & Desig	gn. 2 nd ed. Pearson	education.										
4. Mori	ris Mano, 1999. Digital Desig	n. Prentice Hall o	f India.											
5. Ram	esh, S. Gaonkar, 2000. Micro	processor Archite	ecture, Programmir	ng and its Application	ions with the									
8085	. 4 th ed. India: Penram Internat	tional Publication	IS.											
REFEI	RENCE BOOKS:													
1. Corte	on, H.,2004. Electrical Techno	ology. CBS Publi	shers & Distributo	rs.										
2. Syed	l, A. Nasar, 1998, Electrical C	ircuits. Schaum S	Series.											
3. Jacol	b Millman and Christos, C. Ha	alkias, 1967. Elec	ctronics Devices.No	ew Delhi: McGraw-H	Hill.									
4. Milli	man, J. andHalkias, C. C., 19	72. Integrated Ele	ectronics: Analog a	nd Digital Circuits and	nd Systems.									
Tok	yo: McGraw-Hill, Kogakusha	Ltd.												
5. Moh	ammed Rafiquzzaman, 1999.	Microprocessors	- Theory and Appl	lications: Intel and N	lotorola.									
Prent	ice Hall International.													
E-KEF	ERENCES:													
I. NIP	EL, Basic Electrical Technolo	bgy (Web Course), Prof. N. K. De, F	rof. I. K. Bhattachar	rya and Prof.									
G.D.	J.D. KOY, III Kharagpur. Prof I. Umanand, http://fraquideoloctures.com/Course/2325/Resig Electrical Technology# USc													
2. PIOI.	L. Omanand, http://freevideor	ectures.com/Cou	se/2555/Dasic-Ele	ctrical-recimology#,	1150									
Bang 3 http:	alule.	agandra/ Dr. Nac	andro Krishnonuro	UT Modros										
3. mp.	4 Dr I Umanand http://www.nptelvideos.in/2012/11/basic-electrical-technology.html IISC Bangalore													
4. DI.L	omananu, nup://www.npterv	10005.111/2012/11	vasic-electrical-le	Dr.LUmanand, http://www.nptelvideos.in/2012/11/basic-electrical-technology.html, IISC Bangalore.										

							PO						PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO 1	3	3	1	1	1	1	0	0	1	1	1	0	0	0	
CO 2	3	3	1	1	1	1	0	0	1	1	1	0	0	0	
CO 3	2	2	2	1	2	2	1	1	1	1	1	0	0	0	
CO 4	2	2	1	1	1	1	1	1	1	1	1	0	0	0	
CO 5	2	2	1	1	1	1	1	1	1	1	1	0	0	0	
Total	12	12	6	5	6	6	3	3	5	5	5	0	0	0	
Scaled	3	3	2	1	2	2	1	1	1	1	1	0	0	0	
value															

Table: 1 Mapping of COs with POs:

$1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

0-No relation, 1-Low relation, 2-Medium relation, 3-High relation

COL	L	Т	Р	С						
COU	J RSE I	NAME	APPLIED PHYSICS FOR ENGINEERS		3	1	2	6		
С	Р	A	3.8 1.8 0.4		L	Т	Р	Н		
					3	1	3	7		
PREF	REQU	ISITE: B	asic Physics in HSC level							
COU	RSE C	UTCON	IES	Domaiı	n		Leve	1		
CO1	Iden elasti and t	<i>tify</i> the icity and echnolog	basics of mechanics, <i>explain</i> the principles of <i>determine</i> its significance in engineering systems ical advances.	Cognitive Psychomore	tor	Understand Mechanism				
CO2	<i>Illus</i> electr electr	Cognitive Psychomot Affective	tor	Remember Analyze Mechanism Respond						
CO3	Unde and laser	erstand th describe s and fibr	the working principle and application of various e optics.	Cognitive Psychomot Affective	tor	Und App Mec Rece	ersta ly hanis eive	nd sm		
CO4	Anal of lat	<i>yse</i> energ test techn	y bands in solids, <i>discuss</i> and <i>use</i> physics principles ology using semiconductor devices.	Cognitive Psychomot Affective	tor	Und Ana Mec Rece	ersta lyze hanis eive	nd sm		
CO5	<i>Deve</i> equat	<i>lop</i> Kno tion for si	wledge on particle duality and <i>solve</i> Schrodinger imple potential.	Cognitive:		Understand Apply				
UNIT	- I M	ECHAN	ICS OF SOLIDS	.		9+3+9				
Mech conser Elasti Mome Exper	anics: rvation icity: S ent, co fimenta	Force - N of energ Stress - S uple and I determi	Newton's laws of motion - work and energy - impulse y and momentum - Friction. Strain - Hooke's law - Stress strain diagram - Clas torque - Torsion pendulum - Applications of torsion nation of Young's modulus: Uniform bending and non DMAGNETIC THEORY	and moment ssification of pendulum - -uniform be	tum - of ela Bend nding	torqu stic r ling o	e - la nodu f bea	uw of lus - ums -		
Laws consta law - circula circula	of ele ant, int Maxy arly an arly an	ectrostatic ernal field well's equ d elliptic d elliptic OPTICS ,	es - Electrostatic field and potential of a dipole; D d - Clausius Mossotti Equation - Laws of magnetism nation - Plane electromagnetic waves; their transvers ally polarized light - quarter and half wave plates - pr ally polarized light. LASERS AND FIBRE OPTICS	ielectric Pol - Ampere's F e nature - e roduction an	larisat Farada expres d dete	tion, ay's la sion ection	Diele w; L for p of p +3+1	ectric enz's lane, lane,		
Ontic	ndev	and	disne	rsive						
power LASE Applie Fibre Types	power of a prism- Interference of light in thin films: air wedge - Diffraction: grating. LASER: Introduction - Population inversion -Pumping - Laser action - Nd-YAG laser - CO ₂ laser - Applications Fibre Optics: Principle and propagation of light in optical fibre - Numerical aperture and acceptance angle - Types of optical fibre - Fibre optic communication system (Block diagram). UNIT -IV SEMICONDUCTOR PHYSICS 9+3+6									
Semic semic semic Diode	conduct onduct onduct es and	etors: En cors - Cor cors - P ty Transist	ergy bands in solids - Energy band diagram of g acept of Fermi level - Intrinsic semiconductors - Conc pe and N type semiconductors - Hall effect. ors : P-N junction diode - Forward bias and reverse bia	ood conducter of holes as - Rectific	ctors, - dop ation	insul ping - actio	ators Extr n of c	and insic liode		

- We	orking of full wave rectifier using P N junction	on diode	s - PNP and N	PN transistors - Three different
in co	ommon emitter configuration.	ningurat	ion - working o	i INPIN transistor as an ampimer
UNI	T –V QUANTUM PHYSICS			9+3+0
Intro	duction to quantum physics, black body radi	ation, C	ompton effect,	de Broglie hypothesis, wave –
parti	cle duality, uncertainty principle, Schrodinger	wave eq	uation (Time de	pendent and Time independent),
parti	cle in a box, Extension to three dimension - Deg	generacy	·	
TEX	AT BOOKS	voice" 1	Nonnat Dai Duk	lighting 2000
	1. Gaur R. R. and Gupta S. L., Engineering Physics' 2 Avadhanulu M N "Engineering Physics'	ysics , i Volur	ne I and II) S	Chand & Company Ltd New
]	Delhi, 2010.	(voiu	ile 1 ulle 11), 5.	Chana & Company Eta., 1100
REF	FERENCE BOOKS			
_	1. Palanisamy P. K., "Engineering Physics", Sc	itech Pu	blications (India) Pvt. Ltd, Chennai.
4	2. Arumugam M., "Engineering Physics" (Volu	me I and	l II), Anuradha	Publishers, 2010.
	3. Senthil Kumar G., "Engineering Physics", 2	nd Enla	ged Revised Ed	ition, VRB Publishers, Chennai,
4	4. Mani P., "Engineering Physics", Dhanam Pu	blicatior	s. Chennai, 200	7.
E R	ESOURCES			
NPT	EL, Engineering Physics, Prof. M. K. Srivastav	/a, Depa	rtment of Physic	cs, IIT, Roorkee.
	LABO	RATO	<u>RY</u>	
1.	Torsional Pendulum - determination of momen	nt of ine	rtia and rigidity	modulus of the given material
2.	Uniform Bending - Determination of the Your	ng's Moo	ulus of the mate	erial of the beam.
3.	Non-Uniform Bending - Determination of the	Young's	Modulus of the	material of the beam.
4.	Meter Bridge - Determination of specific resis	tance of	the material of	the wire.
5	Spectrometer - Determination of dispersive po	wer of t	he give prism	
5. 6	Spectrometer - Determination of wavelength c	of variou	s colours in Hg	source using grating
0.	Spectrometer - Determination of wavelength of	1 variou	·	source using graning.
/.	Air wedge - Determination of thickness of a g	ven thir	wire.	
8.	Laser - Determination of wavelength of given	laser so	arce and size of	the given micro particle using
	Laser grating.			
9.	Post office Box - Determination of band gap of	f a give	n semiconductor	•
10.	PN Junction Diode - Determination of V-I cha	racterist	ics of the given	diode.
REF	FERENCE BOOKS			
]	1. Samir Kumar Ghosh, "A text book of Adv	anced P	ractical Physics	", New Central Agency (P) Ltd,
	2. Arora C.L., "Practical Physics", S. Chand &	Compa	ny Ltd., New D	elhi, 2013.
3	3. Umayal Sundari AR., "Applied Physics Lab	oratory	Manual", PMU	Press, Thanjavur, 2012.
	LECTURE TUTOR	IAL	PRACTICA	TOTAL HOURS
			L	

	LLCIUNL	ICIONIIL	IMICITON	IOINLHOUND	1
			L		
Hours	45	15	30	90	

 Table 1: Mapping of CO's with PO:

						P	0					PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	3	2	2	2	1	0	0	0	1	0	0	1	0	0	
CO2	3	0	1	0	1	0	0	0	0	0	0	1	0	0	
CO3	3	2	2	2	1	0	0	0	1	0	0	1	0	0	
CO4	3	2	2	2	1	0	0	0	1	0	0	1	0	0	
CO5	3	0	2	0	0	0	0	0	0	0	0	1	0	0	
Total	15	6	9	6	4	0	0	0	3	0	0	5	0	0	
Scaled Value	3	2	2	2	1	0	0	0	1	0	0	1	0	0	

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

1- Low Relation, 2-Medium Relation, 3-High Relation

COURSE CODE	XEG205	L	Τ	P	С
COURSE NAME	ENGINEERING GRAPHICS	2	0	1	3
C P A	1.75 1.0 0.25	L	Т	Р	Η
		2	0	2	4

PREREQUISITE: NIL								
COURS	SE OUTCOMES:	Domain	Level					
CO1	Apply the national and international standards,	Cognitive	Apply					
	construct and practice various curves	Psychomotor	Guided response	2020				
CO2	Interpret construct and practice orthographic	Cognitive	Understand	liella				
002	neipret, construct and practice of thographic	Psychomotor	Mechanism					
	projections of points, straight lines and planes.	Affective	Responds to Phenon	nena				
CO3 Construct Sketch and Practice projection of solids Cognitive Apply								
	in various positions and true shape of sectioned	Psychomotor	Complex Overt Res	ponse				
	solids.	Affective	Responds to Phenon	nena				
CO4	Interpret, Sketch and Practice the development of	Cognitive	Understand					
	lateral surfaces of simple and truncated solids,	Psychomotor	Complex Overt Res	ponse				
	intersection of solids.	Affective	Responds to Phenon	nena				
CO5	Construct sketch and practice isometric and	Cognitive	Apply					
	perspective views of simple and truncated solids.	Psychomotor	Complex Overt Res	ponse				
		Affective	Responds to Phenon	nena				
UNIT- OBJEC	T INTRODUCTION, FREE HAND SKETCHING TS AND CONSTRUCTION OF PLANE CURVE	OF ENGG		6+6				
Importa	nce of graphics in engineering applications – u	ise of drafting	instruments – BIS					
specific	ations and conventions as per SP 46-2003.							
Pictoria	l representation of engineering objects – representatio	n of three dimens	sional objects in two					
almensi	onal media – need for multiple views – developing	visualization skill	s through free hand					
Polygon	is & curves used in engineering practice $-$ methods of	construction – co	nstruction of ellipse					
parabola	a and hyperbola by eccentricity method – cycloidal	and involute curv	ves – construction –					
drawing	of tangents to the above curves.							
UNIT –II PROJECTION OF POINTS, LINES AND PLANE SURFACES								
General principles of orthographic projection – first angle projection – layout of views – projections								
of point	s, straight lines located in the first quadrant – determin	nation of true leng	ths of lines and their					
inclinations to the planes of projection – traces – projection of polygonal surfaces and circular								
lamina inclined to both the planes of projection.								
UNIT-I	II PROJECTION OF SOLIDS AND SECTIONS	OF SOLIDS		6+6				

Projection of simple solids like prism, pyramid, cylinder and cone when the axis is inclined to one plane of projection – change of position & auxiliary projection methods – sectioning of above solids in simple vertical positions by cutting plane inclined to one reference plane and perpendicular to the other and above solids in inclined position with cutting planes parallel to one reference plane – true shapes of sections.

UNIT - IV DEVELOPMENT OF SURFACES AND INTERSECTION OF 6+6 SOLIDS Need for development of surfaces - development of lateral surfaces of simple and truncated solids prisms, pyramids, cylinders and cones - development of lateral surfaces of the above solids with square and circular cutouts perpendicular to their axes - intersection of solids and curves of intersection -prism with cylinder, cylinder & cylinder, cone & cylinder with normal intersection of axes and with no offset. 6+6

UNIT - V ISOMETRIC AND PERSPECTIVE PROJECTIONS

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones – principles of perspective projections – projection of prisms, pyramids and cylinders by visual ray and vanishing point methods.

THEORY	PRACTICAL	TOTAL HRS
30	30	60
TEXT BOOKS	Ł	
1. Bhatt, N.D, "Engineering Drawing", Charotar Publishing Hou	se, 46 th Edition-20	03.
2. Natarajan, K.V, "A Textbook of Engineering Graphics", Dha	nalakshmi Publishe	ers, Chennai,
2006 .		
3. Dr. P.K. Srividhya, P. Pandiyaraj, "Engineering Graphics", P.	MU Publications,	Vallam,
2013		

REFERENCES

- 1. Luzadder and Duff, "Fundamentals of Engineering Drawing" Prentice Hall of India PvtLtd, XI Edition 2001.
- 2. Venugopal,K. and Prabhu Raja, V., "Engineering Graphics", New Age International(P) Ltd., 2008.
- 3. Gopalakrishnan.K.R,. "Engineering Drawing I & II", Subhas Publications, 1998.
- 4. Shah, M.B and Rana, B.C., "Engineering Drawing", Pearson Education, 2005.

E RESOURCES

- 1. http://periyarnet/Econtent
- 2. http://nptel.ac.in/courses/112103019/

Table 1: Mapping of CO's with PO'S:

	РО											PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	3	3	2	3	2	3	1	1	2	3	3	3	-
CO2	3	3	3	1	3	1	3	1	1	1	2	3	3	-
CO3	3	3	3	1	3	1	3	1	1	1	2	3	3	-
CO4	3	3	3	1	3	1	3	1	1	1	2	3	3	-
CO5	3	3	3	1	3	1	3	1	1	1	2	3	3	-
Total	15	15	15	6	15	6	15	5	5	6	11	3	3	-
Scaled	3	3	3	2	3	2	3	1	1	2	3	3	3	-

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

1- Low Relation, 2-Medium Relation, 3-High Relation

SEMESTER III

COUI	RSE CO)DE	XPS301		L	Т	Р	С	
COUI	RSE NA	ME	PROBABILITY AND STATISTICS		3	1	0	4	
С	Р	Α	4.0 0.0 0.0		L	Т	Р	Η	
					3	1	0	4	
PRER	REQUIS	SITE: C	ALCULUS AND LINEAR ALGEBRA	-					
COU	RSE OU	JTCOM	IES:	Domain	Leve	el			
C01	CO1 <i>Explain</i> conditional probability, independent events, <i>find</i> expected Cognitive values and Moments of Discrete random variables with properties						Understand Remember		
CO2	 O2 <i>Find</i> distribution function, Marginal density function, conditional density function, <i>define</i> density function of conditional distribution functions normal, exponential and gamma distributions. 						Remember		
CO3	CO3 <i>Find</i> measures of central tendency and to <i>determine</i> tatistical Cognitive Reme parameters of Binomial, Poisson and Normal and to find correlation, regression and Rank Correlation coefficient of two variables.					emb	er		
CO4	4 <i>Explain</i> large sample test for single proportion, difference of Cognitive Understand proportion, single mean, difference of means and difference of standard deviations with simple problems.								
CO5	<i>Expla</i> corre Probl	<i>tin</i> sma lation c ems.	Il sample test for single mean, difference of mean and oefficients, variance test, chisquare test with simple	Cognitive	Unde	ersta	ind		

UNIT I: BASIC PROBABILITY			10					
Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Chebyshev's Inequality.								
UNIT II: CONTINUOUS PROBABILITY DISTRIBU	JTIONS		10					
Continuous random varibales and their properties, distrib gamma densities.	oution functions a	and densities, normal	, exponential and					
UNIT III: BIVARIATE DISTRIBUTIONS			10					
Bivariate distributions and their properties, distribution of	sums and quotier	nts, conditional densit	ies, Bayes' rule.					
UNIT IV: BASIC STATISTICS			10					
Measures of Central tendency: Moments, skewness and and Poisson - evaluation of statistical parameters for thes correlation.	Kurtosis - Prob e three distributio	ability distributions: 1 ons, Correlation and r	Binomial, normal egression – Rank					
UNIT V: APPLIED STATISTICS			10					
Curve fitting by the method of least squares- fitting of st curves. Test of significance: Large sample test for sing difference of means, and difference of standard deviations	raight lines, seco gle proportion, di	nd degree parabolas a fference of proportion	and more general ons, single mean,					
UNIT VI: SMALL SAMPLES			10					
Test for single mean, difference of means and correlation for goodness of fit and independence of attributes.	coefficients, test	for ratio of variances	- Chi-square test					
	LECTURE	TUTORIAL 7	ГОТАL					
	45	15	50					

TEXTBOOKS/REFERENCES

- 1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- 2. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
- 3. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
- 4. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
- 5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
- 6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
- 7. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New
 - Delhi, 2010.

		РО										PS	50	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 2	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 3	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 4	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 5	3	2	1	1	2	1	0	0	0	0	0	1	1	1
Total	15	10	5	5	10	5	0	0	0	0	0	5	5	5
Scaled Value	3	2	1	1	2	1	0	0	0	0	0	1	1	1

Table 1: Cos Vs PO Mapping

 $1-5 \rightarrow 1, \qquad 6-10 \rightarrow 2, \qquad 11-15 \rightarrow 3$

1 - Low Relation, 2- Medium Relation, 3- High Relation

COUI	RSE C	ODE	XCS302		L	Т	P	С		
COUI	RSE N	AME	ANALOG & DIGITAL ELECTRONIC CIR	CUITS	3	0	2	5		
С	Р	A	3.0 1.0 1.0		L	Т	P	H		
		1			3	0	4	7		
COUI	RSE O	UTCO	ME	Domain	Level					
CO1	Cla app	ussify an olicatior	nd <i>describe</i> the basics of devices and discuss the	Cognitive Psychomotor	Understand r Set					
CO2	App app	Cognitive Psychomotor	Understand Remember Set							
CO3	App fan	<i>ply</i> the lilies	Boolean algebra to <i>design</i> the digital logic	Cognitive Psychomotor	Understand Mechanism					
CO4	Describe and design the Combinational digital circuits Cognitive Psychomotor Affective						and ber I			
CO5	Dis	cuss an	Cognitive Psychomotor Affective	Understand Remember Set Respond						

COURSE	CONTENT	Hours
UNIT I	SEMICONDUCTOR DEVICES AND CIRCUITS	9 + 12
	 Basics and characteristics – p-n junction diode, Zener diode, BJT and MOSFET – applications, rectifier, clipper, clamper and amplifier circuits. Differential amplifier and Direct coupled Multistage amplifier. List of Experiments: Design and implementation of rectifiers, clipper and Clamper Circuits Design and implementation of amplifier circuits. 	
UNIT II	LINEAR AND NON LINEAR APPLICATIONS OF OP-AMP	9 + 12
	 Introduction to op-amp-Linear applications; Inverting and non-inverting amplifier, differential amplifier, Integrator, active filter, voltage regulator, We in bridge and Phase shift oscillators Nonlinear applications; Comparator, Zero crossing Detector, wave and triangular wave generators. List of Experiments 3. Design and implementation of Op-amp linear applications. 4. Design and implementation of Op-amp non-linear applications 	
UNIT III	FUNDAMENTALS OF DIGITAL SYSTEMS AND LOGIC FAMILIES	9 + 12
	Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive –OR operations, Boolean algebra, examples of IC gates. Number Systems – binary, signed binary, octal and hexadecimal number-arithmetic calculation-digital logic families; TTL, Schottky TTL and CMOS logic. A/D and D/A converter. List of Experiments: 5. Verification of Boolean theorems using digital logic gates.	
UNIT IV	COMBINATIONAL DIGITAL CIRCUITS	9 + 12
	 Standard representation for logic function, K-map representation, Multiplexer, Demultiplexer, Adders, Subtractors, Digital comparator and code converters. List of Experiments: 6. Design and implementation of combinational circuits using basic gates for code converters. 	

	7. Design and implementation8. Design and implementation	on of binary ad on of Multiplex	der / subtractor usin ers/Demultiplexers.	g basic gates.	
UNIT V	SEQUENTIAL DIGITAL	CIRCUITS,N	IEMORIES AND I	PLD	9 + 12
	Sequential digital circuits; types and applications-Cour Memory organization and characteristics of memori addressable memory, PLD (Memory and List of Experiments: 9. Design and implementation 10. Design and implementation	Flipflops-SR, iters types and operation, exp es, read only Programmable on of Shift regi ion of counters	J-K, T and D flip applications. anding memory siz y memory, rando Logic Device). sters.	e flops-Shift Register ze, classification and m access memory,	
		LECTURE	PRACTICAL	TOTAL	
		45	60	105	
ΤΕΥΤ Β(MKS / DEFEDENCE BOOI	V S	i		

1. R.L.Boylestad, L. Nashelsky, Electronic devices, and circuit theory, Prentice Hall, 2002

- 2. A.S.Sedra and K.C.Smith,"Microelectronic Circuits", New York, Oxford University Press, 7th edition
- 3. R.P.Jain,"Modern Digital Electronics", McGraw Hill Education, 2009
- 4. M.M. Mano,"Digital logic and Computer design", Pearson Education India, 2016.
- 5. A.Kumar 'Fundamentals of Digital circuits'', Prentice hall India, 2016.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

	РО										PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	1	1	1	1	1	1	1	0	0	0	0	2	0
CO2	1	1	1	1	1	1	1	1	0	0	0	0	2	0
CO3	3	3	3	2	3	3	3	1	0	0	0	0	3	1
CO4	3	3	3	2	3	3	3	1	0	0	0	0	3	1
CO5	3	3	3	2	3	3	3	1	0	0	0	0	3	1
	3	3	3	2	3	3	3	1	0	0	0	0	3	3

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

1- Low Relation, 2-Medium Relation, 3-High Relation

COUI	RSE CO	ODE	XCS303		L	Т	Р	С				
COUI	RSE NA	AME	DATA STRUCTURE & ALGORITHMS	5	3	0	2	5				
С	P	Α	4.0 1.0 0.0		L	Т	Р	Η				
					3	0	4	7				
COUI	RSE O	UTCO	ME	Domain	Leve	l						
C01	O1 Understand and apply linear data structures Cognitive Psychomoto						Understand Apply Guided Response					
CO2	Unde	erstand	and <i>apply</i> nonlinear data structures	Cognitive Psychomotor	Understand Apply Guided Response							
CO3	Unde	erstand	and <i>apply</i> sorting techniques	Cognitive Psychomotor	Understand Apply Guided Response							
CO4	Unde	erstand	and <i>apply</i> graph algorithms	Cognitive Psychomotor	Understand Apply Guided Response							
CO5	Desiį	gn diff	erent algorithm techniques.	Cognitive	Unde Apply	rstand y						

COURSE	CONTENT	Hours
UNIT I	LINEAR DATA STRUCTURE	9 + 18
	TheoryADT – List ADT – Stack ADT – Queue ADT.Practical1. Singly Linked List2. Doubly linked List3. Circular Linked List4. Stack Using Array implementation5. Queue Using Array Implementation6. Program for Balancing symbol7. Program for Postfix expression evaluation	
UNIT II	NON LINEAR DATA STRUCTURE	9 + 14
	TheoryTrees – Binary Trees – Binary Search Trees – AVL Trees – Splay Trees – TreeTraversal – B Trees- B+ TreePractical8. Binary Search Tree	

UNIT III	SORTING	12 + 14
	Theory	
	Insertion sort – Shell sort – Heap sort – Merge sort – Quick sort – Bucket sort –	
	External Sorting	
	Practical	
	9. Insertion Sort	
	10. Heap Sort	
	11. Merge Sort	
	12. Quick Sort	
UNIT IV	GRAPH ALGORITHMS	12 + 14
	Theory	
	Topological sort – Shortest path algorithms – Network Flow problems – Minimum	

	Theory	D::1 10									
	Theory Greedy Algorithms – Divide and Conquer – Dynamic Programming - Randomized										
UNIT V	Γ V ALGORITHM DESIGN TECHNIQUES										
	 Spanning Tree – Applications of Depth First search – NP completeness. Practical Dijkstra's Algorithm 										

TEXT BOOKS / REFERENCE BOOKS

- 1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, Reprint 2011.
- 2. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, "Introduction to Algorithms", Second Edition, Mcgraw Hill, 2002
- 3. Reema Thareja, "Data Structures Using C", Oxford University Press, 2011
- 4. Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
- 5. "How to Solve it by Computer", 2nd Impression by R. G. Dromey, Pearson Education

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

						Р	0						Р	SO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	1	1	1	1	0	0	0	1	0	1	1	3	2
CO2	3	2	1	1	1	0	0	0	1	0	1	1	3	2
CO3	3	1	1	1	1	0	0	0	1	0	1	1	3	2
CO4	3	2	1	2	1	0	0	0	1	0	1	1	3	2
CO5	3	1	1	2	0	0	0	0	0	0	1	2	3	2

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

1- Low Relation, 2-Medium Relation, 3-High Relation

COUR	SE CODE	XCS304		L	Т	P	С
COUR	SE NAME	OBJECT ORIENTED PROGRAMMING		2	0	2	4
С	P A	3.0 0.5 0.5		L	Т	Р	Η
	I			2	0	4	6
COUR	SE OUTCOM	Ε	Domain	Leve	el	I	1
CO1	To understan objects in C+	<i>nd</i> the basic concepts of OOP and classes and +.	Cognitive Psychomotor Affective	Unde Guid Set	erstai led R	nd espoi	ıse
CO2	To <i>develop</i> a <i>usage</i> of file	<i>a</i> solution to problems and demonstrating the handling in C++.	Cognitive, Psychomotor Affective	Appl Crea Guid Set	y te led R	espoi	ıse
CO3	To understan patterns.	ad the basic concepts of OOP in Java and design	Cognitive Psychomotor Affective	Unde Guid Set	erstai led R	nd espoi	ıse
CO4	To <i>apply</i> the Exception has	e ability to program with Multithreading and ndling in java.	Cognitive Psychomotor Affective	Unde Appl Guid Set	erstan y led R	nd espoi	nse
CO5	To <i>demonstr</i> I/O manipula	<i>ate</i> the ability to <i>develop</i> a solution to various tion operations and connectivity to database.	Cognitive Psychomotor Affective	Unde Appl Guid Set	erstai y led R	nd .espoi	ıse
COUR	SE CONTEN	Γ		L		Hou	rs
UNIT-	I PROGRAM	IMING IN C++				6 + 1	2
C++ fu state sp destruct List of 1. Desig 2.Imple such as UNIT -	andamentals, C pace- concrete i tors, operator o Experiments: gn C++ classes ement complex integer to com	lasses and objects, Abstract data types, ADT ir invariant- abstraction function. Implementing oper verloading – inheritance, functions and polymorph with static members, methods with default argum number class with necessary operator overloadi plex, double to complex, complex to double etc. NDLING IN C++	nplementation- (rations Construc hism. ents, friend funct ng and type con	Concre etors a tions. versio	ete nd ns	6+1	2
C++ str operation I/O – E List of 3. Impl proper of 4. Over	reams – consol- ons, manipulato xception handl Experiments: lement Matrix constructor, des load the new as III JAVA IN	e streams – console stream classes-formatted and ors - File streams - classes file modes file pointer ing. class with dynamic memory allocation and ne structor, copy constructor, and overloading of assi nd delete operators to provide custom dynamic allo TRODUCTION & DESIGN PATTERNS	unformatted con rs and manipulat cessary methods gnment operator. ocation of memo	isole I ions f s. Gi ry.	/O ile ve	6+1	2
Design pattern. classes, List of 5. Simp	patterns. Intro Introduction objects, metho Experiments: le Java applica	duction and classification. The iterator pattern. to java, data types, variables and arrays, opera ods, Memory management. tions For understand reference to an instance of a class	- Model-view-c tors, control sta (object), method	ontrol temen s	ler ts,		
	-	Handling Strings in Java Constructor in Java					

UNIT- IV JAVA INTRODUCTION & PROGRAMMING								
Inheritance Packages and Interfaces, Exc	ception handling St	rings, Input /Output,	Multithreading –	•				
interrupting threads – thread states – thr	read priorities – thr	ead synchronization -	– Executors.					
List of Experiments:	_							
6. Simple Package creation.								
- Developing user defined packa	ges in Java							
7. Interfaces								
- Developing user-defined interf	aces and implemen	tation						
- Use of predefined interfaces								
8. Exception Handling Mechanism in Jav	va							
- Handling pre-defined exception	ns							
UNIT V FILE HANDLING IN JAVA								
Files - streams - byte streams,	character streams,	text input/output, bir	ary input/output,	6 + 12				
random access file operations, I	File management us	sing File class.						
Connecting to a database using	JDBC	-						
List of Experiments:								
9. Program to implement strea	aming models							
10. Program to implement JDB	C Connectivity							
11. Create a GUI interface prog	gram using scala.							
	LECTURE	PRACTICAL	TOTAL					
	30	60	90					

TEXT BOOKS /REFERENCE BOOKS

- 1. K.R.Venugopal, Rajkumar Buyya, T.Ravishankar, "Mastering C++", TMH, 2003
- 2. Bjarne Stroustrup, "The C++ programming language", Addison Wesley, 2000
- 3. Herbet Schidt and Dale Srien, "Java Fundamentals A comprehensive Introduction", TMH.
- 4. Herbert Schildt, "The Complete Reference (Fully updated for jdk7)", Oracle press 8th Edition, 2012
- 5. Barbara Liskov, Program Development in Java, Addison-Wesley, 2001
- 6. Java for Programmers, P.J. Deitel and H.M. Deitel, Pearson education
- 7. Java: How to Program P.J. Deitel and H.M. Deitel, PHI.
- 8. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
- 9. Thinking in Java, Bruce Eckel, Pearson Education
- 10. Ira Pohl, "Object oriented programming using C++", Pearson Education Asia, 2003
- 11. John R. Hubbard, "Programming with C++", Schaums outline series, TMH, 2003
- 12. E. Balagurusamy "Object Oriented Programming with C++", TMH 2/e
- Cay S.Horstmann and Gary Cornel, "Core Java Programming Volume I", 9th Edition, 2012.
- 14. Programming in Java, Bruce Eckel, Pearson Education
- 15. Programming in Java, S. Malhotra and S. Choudhary, Oxford Univ. Press.
- 16. Deitel & Deitel, "Java How to Program", Prentice Hall, 9th Edition, 2012

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

						P	0						PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	3	3	3	3	2	2	2	1	0	0	2	1	1
CO2	3	3	3	3	3	2	2	2	1	0	0	2	1	1
CO3	2	2	2	3	3	3	2	2	1	0	0	1	2	1
CO4	2	2	2	2	0	0	0	0	0	0	0	0	2	1
CO5	3	2	3	3	3	0	2	2	2	0	0	0	1	1
	3	3	3	3	3	2	2	2	5	0	0	1	2	5

 $1-5 \rightarrow 1$, $6-10 \rightarrow 2$, $11-15 \rightarrow 3$

1 - Low Relation, 2- Medium Relation, 3- High Relation

COUI	RSE CO)DE	XUM305	P	С			
COUI	RSE NA	ME	ENTREPRENEURSHIP DEVELOPMENT		2	0	0	2
С	Р	A	1.2 0.0 0.8		L	Т	Р	H
	i	<u>.</u>			2	0	0	2
COUI	RSE OU	JTCOM	E	Dom	ain	Le	vel	
CO1	Rec	ognise a	nd <i>describe</i> the personal traits of an entrepreneur.	Cogr Affe	itive ctive	Un Re	derstai ceive	nd
CO2	Dete repo	e rmine ort.	the new venture ideas and <i>analyze</i> the feasibility	Cogr	nitive	Un An	derstaı alyze	nd
CO3	Dev or in	<i>elop</i> the n team.	business plan and <i>analyze</i> the plan as an individual	CognitiveAffective			Analyze Receive	
CO4	Des laun	c ribe va ching ar	rious parameters to be taken into consideration for ad managing small business.	Cogr	nitive	Un	dersta	nd
CO5	Des Rigl	cribe Т nts	echnological management and Intellectual Property	Cogr	itive	Un	dersta	nd
UNIT	I ENT	REPRE	ENEURIAL TRAITS AND FUNCTIONS				6	
Defini Entrep a caree	tion of preneurs er and r	f Entre hip Dev national	preneurship; competencies and traits of an er elopment; Role of Family and Society ; Achievement I development.	ntrepre Motiva	neur; tion; E	factor Entrepr	s affe eneurs	ecting hip as
UNIT	-II NE	W PRC	DUCT DEVELOPMENT AND VENTURE CREA	TION	I		6	
Ideation Feasib	on to C oility R	Concept eport F	development; Sources and Criteria for Selection of Project Profile: processes involved in starting a pro-	f Prod ew ve	luct; n	narket legal	assess	ment;

Ownership; Case Study.

UNIT-III ENTREPRENEURIAL FINANCE

Financial forecasting for a new venture; Finance mobilization; Business plan preparation; Sources of Financing, Angel Investors and Venture Capital; Government support in startup promotion.

6

6

UNIT -IV LAUNCHING OF SMALL BUSINESS AND ITS MANGEMENT

Operations Planning - Market and Channel Selection - Growth Strategies - Product Launching - Incubation, Monitoring and Evaluation of Business - Preventing Sickness and Rehabilitation of Business Units.

UNIT-V TECHNOLOGY MANAGEMENT, IPR PORTFOLIO FOR NEW 6 **PRODUCT VENTURE**

Technology management; Impact of technology on society and business; Role of Government in supporting Technology Development and IPR protection; Entrepreneurship Development Training and Other Support Services.

LECTURE	TUTORIAL	TOTAL
30	0	30

TEXT BOOKS

- Hisrich, 2016, Entrepreneurship, Tata McGraw Hill, New Delhi. •
- S.S.Khanka, 2013, Entrepreneurial Development, S.Chand and Company Limited, New Delhi.

REFERENCE BOOKS

- Mathew Manimala, 2005, *Entrepreneurship Theory at the Crossroads, Paradigms & Praxis*, Biztrantra ,2nd Edition.
- Prasanna Chandra, 2009, *Projects Planning, Analysis, Selection, Implementation and Reviews*, Tata McGraw-Hill.
- P.Saravanavel, 1997, Entrepreneurial Development, Ess Pee kay Publishing House, Chennai.
- Arya Kumar,2012, *Entrepreneurship: Creating and Leading an Entrepreneurial Organisation*, Pearson Education India.
- Donald F Kuratko, T.V Rao, 2012, *Entrepreneurship: A South Asian perspective*, Cengage Learning India.
- Dinesh Awasthi, Raman Jaggi, V.Padmanand, *Suggested Reading / Reference Material* for Entrepreneurship Development Programmes (EDP/WEDP/TEDP), EDI Publication, Entrepreneurship Development Institute of India, Ahmedabad. Available from: http://www.ediindia.org/doc/EDP-TEDP.pdf

WEB SITES AND WEB RESOURCES:

- Jeff Hawkins, " Characteristics of a successful entrepreneur", ALISON Online entrepreneurship courses, "https://alison.com/learn/entrepreneurial-skills
- Jeff Cornwall, "Entrepreneurship -- From Idea to Launch", Udemy online Education, https://www.udemy.com/entrepreneurship-from-idea-to-launch/

Course Outcomes		РО														
	1	2	3	4	5	6	7	8	9	10	11	12				
CO1	0	0	0	0	0	0	0	0	3	3	3	1				
CO2	0	0	1	2	3	2	1	1	1	2	3	0				
CO3	0	0	0	0	0	1	0	2	3	3	0	2				
CO4	0	0	0	0	0	1	1	2	3	0	3	3				
CO5	0	0	0	0	0	1	1	3	0	0	0	3				
Total	0	0	1	2	3	5	3	8	10	8	9	9				
Scaled Value			1	1	1	2	1	2	3	2	2	2				

TABLE :1 MAPPING Cos Vs POs:

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

1- Low Relation, 2-Medium Relation, 3-High Relation

COUR	SE CO	DDE	XUM306LTPC										
COUR	SE NA	ME	CONSTITUTION	NOF INDIA			3	0	0	0			
С	Р	A	2.0 0.0 1.0				L	Т	P	H			
COUD		TTCOM	7		Damain	Ta	3	0	0	3			
	SE UU	ICOM	E 20 Constitutional Hi	atom	Domain	Lev	dorat	and					
				story	Cognitive			1					
CO2	Und	erstand t	ne Powers and Func	tions	Cognitive	Un	derst	and					
CO3	Und	e rs<i>tand</i> t l	ne Legislature		Affective	Rei	nem	ber					
CO4	Und	e rs<i>tand</i> t l	ne Judiciary		Affective	Rei	nem	ber					
CO5	Und	e <i>rstand</i> tl	ne Centre State relat	ions	Cognitive	Un	derst	and					
UNIT	[8			
Constit Directiv	utiona ve prin	l History- ciples of	• The Constitutional State Policy.	Rights- Preamble- Fund	amental Rights-	Fund	amei	ntal E	Duties	}-			
UNIT	II									9			
The Un of Mini	ion Ex isters-I	ecutive- Prime Mi	The President of Inc nister- Powers and F	lia (powers and function Functions.	s)- Vice-Presider	nt of l	India	-The	Cou	ncil			
UNIT	III									10			
Union l	Legisla	ature- Str	ucture and Function	s of Lok Sabha- Structur	e and Functions	of Ra	jya S	Sabha	l-				
UNIT	IVE PI	ocedure	in mora- important (commutes of Lok Sabila	- Speaker of the	LOK	Sabii	a.		9			
The Un Jurisdic	ion Ju	diciary- I Iudicial r	Powers of the Supremers	me Court- Original Juriso	diction- Appelete	e juris	sdict	ions-	Advi	sory			
UNIT	V									9			
Centre	State r	elations-	Political Parties- Ro	ble of governor, powers a	and functions of (Chief	Min	ister-	-				
Legisia	live A	ssembry-	LECTURE	TUTORIAL	PRACTICA	L		ТО	TAL	1			
			45	0	0			4	45				
REFE	RENC	ES											
1. W.F	I.Morr	is Shores	- Government and p	olitics of India, NewDel	hi,B.1.Publisher	s,197	4.						
2. M.V	/.Pylee	e- Constit	utional Government	in India, Bombay, Asia	Publishing Hous	se, 19	77.						
3. R.T	hanker	- The Go	vernment and politi	cs of India, London:Mac	millon, 1995.								
4. A.C	.Kapu	r- Select	Constitutions S,Cha	nd & Co.,NewDelhi, 199	95								
5. V.D	.Maha	ijan- Sele	ct Modern Governm	ents,S,Chand &Co, New	vDelhi,1995.								
6. B.C	.Rout-	Democra	actic Constitution of	India.									
7. Gop	al K.P	uri- Cons	stitution of India, Ind	dia 2005.									

Table 1: Mapping of COs with POs

]	PO						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	2	0	0	1	0	0	0	0	0	0	0	0	0	0
CO 2	2	0	0	1	0	0	0	0	0	0	0	0	0	0
CO 3	2	0	0	1	0	0	0	0	1	0	0	0	0	0
CO 4	2	0	0	1	0	0	0	1	1	0	0	0	0	0
CO 5	2	2	0	1	0	0	0	1	1	0	0	0	0	0
Total	10	2	0	5	0	0	0	2	3	0	0	0	0	0
Scaled Value	2	1	0	1	0	0	0	1	1	0	0	0	0	0

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

1- Low Relation, 2- Medium Relation, 3- High Relation

COURSE CODE	XCS307	L	Т	P	С
COURSE NAME	IN-PLANT TRAINING – I	0	0	0	0
C:P:A	0:0:0				
		L	Т	P	H
		0	0	0	0

COUF	RSE OUTCOMES	Domain	Level
CO1	<i>Relate</i> classroom theory with workplace practice	Cognitive	Understand
CO2	<i>Comply with</i> Factory discipline, management, and business practices.	Psychomotor	Guided Response
CO3	Demonstrates teamwork and time management.	Psychomotor	Guided Response
CO4	Describe and display hands-on experience on practical skills obtained during the programme.	Psychomotor	Perception
CO5	<i>Summarize</i> the tasks and activities done by technical documents and oral presentations	Psychomotor	Guided Response

CO Vs PO Mapping

	PO											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	2	0	0	0	0	0	0	0	0	0	0	0
CO2	0	0	0	0	0	0	1	3	0	0	1	0
CO3	0	0	0	0	0	0	0	0	3	1	3	1
CO4	0	1	2	1	3	0	0	0	0	0	0	3
CO5	0	0	0	3	0	0	0	0	0	3	0	1
Total	2	1	2	4	3	0	1	3	3	4	4	5
Scaled	1	1	1	1	1	0	1	1	1	1	1	1

SEMESTER IV

COUR	COURSE CODE XCS401							С		
COUR	SE NA	ME	DISCRETE MATHEMATICS		3	1	0	4		
С	Р	A	400		L	Т	Р	H		
	<u> </u>	<u> </u>			3	1	0	4		
PRER	EQUIS	SITE: C	CALCULUS AND LINEAR ALGEBRA					l		
COUR	SE OU	JTCON	1ES	Domain	Le	vel				
C01	O1 <i>Define</i> and <i>Explain</i> Operations and Laws of Sets, Cartesian Cognitive Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets.						Remember Understand			
CO2	Defi exclu com	<i>ne</i> and <i>b</i> usion, p bination	<i>Explain</i> Basic counting techniques- inclusion and igeon-hole principle, permutation and	Cognitive	Re Ur	mem iderst	ber and			
CO3	<i>Defi</i> Rule	<i>ne</i> and <i>h</i> s of Infe	Explain The Laws of Logic, Logical Implication, erence, The use of Quantifiers.	Cognitive	Re Ur	mem iderst	ber tand			
CO4	Defi Oper	<i>ne</i> and <i>h</i> ration a	Explain Algebraic Structures with one Binary and two Binary Operations.	Cognitive	Remember Understand					
CO5	Defi	ne and I	Cognitive	Re Ur	mem	ber tand				

UNIT I: SETS, RELATION AND FUNCTION

12

12

12

Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem.

Principles of Mathematical Induction:

The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic.

UNIT II:

Basic counting techniques- inclusion and exclusion, pigeon-hole principle, permutation and combination. UNIT III: PROPOSITIONAL LOGIC

Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

UNIT IV: ALGEBRAIC STRUCTURES AND MORPHISM

Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form.

UNIT V: Graphs and Trees

Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points, Shortest distances.

12

LECTURE	TUTORIAL	TOTAL
45	15	60

SUGGESTED BOOKS:

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill

2. Susanna S. Epp, Discrete Mathematics with Applications,4th edition, Wadsworth Publishing Co. Inc.

3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill.

SUGGESTED REFERENCE BOOKS:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application to Computer Science", TMG Edition, Tata Mcgraw-Hill

2. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum's Outlines Series, Seymour Lipschutz, Marc Lipson,

3. Discrete Mathematics, Tata McGraw - Hill

Cos Versus GA mapping

Table 1: Mapping of Cos with GAs:

							PO						PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 2	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 3	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 4	3	2	1	1	2	1	0	0	0	0	0	1	1	1
CO 5	3	2	1	1	2	1	0	0	0	0	0	1	1	1
Total	15	10	5	5	10	5	0	0	0	0	0	5	5	5
Scaled Value	3	2	1	1	2	1	0	0	0	0	0	1	1	1

 $1-5 \rightarrow 1$, $6-10 \rightarrow 2$, $11-15 \rightarrow 3$

0 - No Relation, 1 - Low Relation, 2- Medium Relation, 3- High Relation

COU	RSE C	ODE	XUM402		L	Т	Р	С				
COU	RSE N	AME	TOTAL QUALITY MANAGEMENT		3	0	0	3				
С	Р	A	3.0 0.0 0.0		L	Т	Р	Н				
					3	0	0	3				
COUH	RSE O	UTCO	ME	Domain		Le	vel					
CO1	List and	and <i>E</i> : its limi	<i>xplain</i> the basic concepts of total quality concepts tations.	Cognitive	Reme Unde	embe rstan	r, Id					
CO2Analyze and Explain the Customer satisfaction, Employee involvement, supplier selection and appraise the performance by TQM principle.Cognitive EvalueAnalyze Evalue												
CO3	Exp	<i>lain</i> an	d <i>Apply</i> the Statistical Process Control Tools.	Cognitive	Unde Apply	rstan y	ıd,					
CO4	Apply Apply Apply Apply Select and Explain the different TQM tools and their significance. Cognitive Understand											
CO5	Exp	<i>lain</i> the	e importance aspects of different quality systems	Cognitive	Unde	rstan	d					
COUI	RSE C	ONTE	NT				Hou	rs				
UNIT	'I IN	TROD	UCTION				9)				
]	Definit Analys – Histo manage philoso	ion of quality – Dimensions of quality – Quality pla is techniques for quality costs – Basic concepts of To rical review –Principles of TQM – Leadership – Co ement – Quality Council –Quality statements – Strat phy – Barriers to TQM implementation	anning – Qualit otal Quality Ma oncepts – Role regic planning -	ty cost nagem of sen - Demi	s – ent ior ing						
UNIT	'II T	QM Pl	RINCIPLES				9)				
	Customer satisfaction – Customer perception of quality – Customer complaints – Service quality –Customer retention – Employee involvement – Motivation, empowerment, teams, recognition and reward – Performance appraisal – Benefits – Continuous process improvement – Juran trilogy – PDSA cycle – 5S – Kaizen – Supplier partnership – Partnering – Sourcing – Supplier selection – Supplier rating – Relationship development – Performance measures – Basic concepts – Strategy – Performance measure											
UNIT	'III S	TATIS	TICAL PROCESS CONTROL (SPC)				9)				
	r	The sev	ven tools of quality – Statistical fundamentals – Meas	sures of central	tender	ncy						

and dispersion – Population and sample – Normal curve – Control charts for
variables and attributes – Process capability – Concept of six sigma – New seven
management tools.9UNIT IV TQM TOOLS9Benchmarking – Reasons to benchmark – Benchmarking process – Quality Function
Deployment (QFD) – House of quality – QFD process – Benefits – Taguchi quality
loss function – Total Productive Maintenance (TPM) – Concept – Improvement
needs – FMEA – Stages of FMEA.9UNIT V QUALITY SYSTEMS9Need for ISO 9000 and other quality systems – ISO 9000:2000 quality system –
Elements –Implementation of quality system – Documentation – Quality auditing –

TS 16949 – ISO 14000 –Concept, requirements and benefits.										
	LECTURE	TUTORIAL	TOTAL							
	45	0	45							

TEXT BOOKS

1. Dale H. Besterfiled, et. Al. "Total Quality Management", New Delhi, Pearson Education, Inc. 2007. 2.James R. Evans and William M. Lidsay, "The Management and Control of Quality", 5th Edition, South-Western, 2002.

REFERENCES

- 1. Feigenbaum, A.V., "Total Quality Management", McGraw Hill, 1991.
- Oakland, J.S., "Total Quality Management", Butterworth Heineman, 1989.
 Narayana V. and Sreenivasan, N.S., "Quality Management Concepts and Tasks", New Age International, 1996.
- 4. Zeiri, "Total Quality Management for Engineers", Wood Head Publishers, 1991.

E- REFERENCES

http://nptel.ac.in/faq/110101010/Prof.IndrajitMukherjee,IIT,Bombay and Prof.Tapan P.Bagchi, IIT, Kharagpur.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

						P	0						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	0	0	0	0	0	2	1	3	2	1	2	1	1	0
CO2	0	0	0	0	0	2	1	3	2	1	2	1	1	0
CO3	0	0	0	0	0	2	1	3	2	1	2	1	1	0
CO4	0	0	0	0	0	2	1	3	2	1	2	1	1	0
CO5	0	0	0	0	0	2	1	3	2	1	2	1	1	0
Total	0	0	0	0	0	10	5	15	10	5	10	5	5	0
Scaled	0	0	0	0	0	2	1	3	2	1	3	1	1	0

 $1-5 \rightarrow 1$, $6-10 \rightarrow 2$, $11-15 \rightarrow 3$

1 - Low Relation, 2- Medium Relation, 3- High Relation

COU	JRSE	CODE	XCS403		L	Т	P	C
COL	JRSE	NAME	COMPUTER ORGANIZATION & ARCH	ITECTURE	3	0	2	5
С	P	A	4.0 1.0 0.0		L	Т	Р	H
		i.			3	0	4	7
СО	URSI	E OUTC	OME	Domain	L	Level	.L	
CO	1	Descri variou	<i>be</i> functional unit of computer and <i>Recognize</i> s Addressing modes.	Cognitive Psychomoto	or	ember, erstand ed Response		
CO	2	Descri	<i>be</i> and <i>Analyze</i> of arithmetic unit.	Cognitive Psychomoto	or	Remember, Analyze Guided Response		
CO	3	Descri	<i>be</i> and <i>Recognize</i> the basic processing unit.	Cognitive Psychomoto	or	onse		
CO	4	Explai	<i>n</i> and <i>Illustrate</i> the memory System.	Cognitive Remember Psychomotor Analyze Guided Re				onse
CO	5	Explai	<i>n and Analyze</i> the I/O Organization.	Cognitive Psychomoto	or	Remer Analyz Guideo	nber, æ 1 Resp	onse

COURSE CONTENT	Hours
UNIT I BASIC STRUCTURE OF COMPUTERS	9+9
 Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues- Measuring, Reporting and Summarizing Performance – Quantitative principles of computer design Practical: String Manipulations, Sorting And Searching- Ascending & Descending Largest & Smallest. 	
UNIT II ARITHMETIC UNIT	9+6
 Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations. Practical: 3.16 Bit Arithmetic Operation a. Addition b. Subtraction c. Multiplication d. Division 4. Logical Operations. 	
UNIT III BASIC PROCESSING UNIT	9
Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control. Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.	
UNIT IV MEMORY SYSTEM	9+9

	Basic concepts – Semiconducto memories - Performance consi requirements – Secondary stora Practical: Simulate the mapping technique 5. Direct Mapped cache 6. Associative Mapped cache 7. Set Associative Mapped cache	or RAMs - ROM deration – Virtua ge. es of Cache memo ne.	s – Speed - size a al memory- Memo ory	nd cost – Cache rry Management	
UNIT V I/O	ORGANIZATION				9+6
	Accessing I/O devices – Interr circuits – Standard I/O Interface Practical: 8. Traffic light control 9. Stepper motor control 10.Key board and Display	upts – Direct Me es (PCI, SCSI, US	emory Access – B SB).	uses – Interface	
		LECTURE	PRACTICAL	TOTAL	
		45	30	75	

TEXT BOOKS /REFERENCE BOOKS

- 1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 6th Edition "Computer Organization", McGraw-Hill, 2012.
- 2. John L. Hennessey and David A. Patterson," Computer Architecture: A Quantitative Approach", 5th Edition, Morgan Kaufmann, 2011
- 3. William Stallings, "Computer Organization and Architecture Designing for Performance", 9th Edition, Pearson Education, 2010
- 4. John P. Hayes, "Computer Architecture and Organization", 3rd Edition, McGraw Hill, 1998

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

							PC)					PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2	3	2	2	1	1	0	0	0	2	2	3	1
CO2	3	2	3	1	2	1	2	0	0	0	1	1	3	1
CO3	3	2	2	2	2	1	1	0	0	0	3	1	3	1
CO4	3	2	2	1	2	1	1	0	0	0	1	1	3	1
CO5	3	2	3	2	1	1	1	0	0	0	2	1	3	1
Total	15	10	13	8	9	5	6	0	0	0	9	6	15	5

 $1-5 \rightarrow 1$, $6-10 \rightarrow 2$, $11-15 \rightarrow 3$ 0 - No Relation, 1 - Low Relation, 2- Medium Relation, 3- High Relation

COURSE CODE XCS404							Р	С	
COU	RSE N	AME	OPERATING SYSTEMS		3	0	2	5	
С	P	Α	4.0 1.0 0.0		L	Т	Р	Н	
	L	1			3	0	4	7	
COURSE OUTCOMEDomainLevel									
CO1	CO1 Understand the fundamental concepts of Operating system Cognitive Psychomotor Under								
CO2	Und sche	<i>erstand</i> a duling alg	and <i>implement the</i> process management, CPU gorithms, threads and Real time scheduling.	Cognitive Psychomot	or	Und App	erstanc ly	1	
CO3	Und com	<i>erstand</i> municatio	and <i>implement</i> recognize the inter-process on, synchronization and deadlocks.	Cognitive Psychomot	or	Und App	erstanc ly	1	
CO4	Und tech	<i>erstand</i> niques.	and <i>implement</i> the <i>memory</i> management	Cognitive Psychomot	or	Und App	erstanc ly	1	
C05	<i>Und</i> Man	<i>erstand</i> agement	the concepts of storage management, Disk and file management.	Cognitive Psychomot	or	Und	erstand		
COU	RSE (CONTEN	T				Но	Hours	
UNI	ΓΙΟ	PERATI	NG SYSTEMS OVERVIEW				9 +	6	
 Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System. Practical Basic Commands in Linux Write programs using the process related system calls of UNIX operating system like fork, exec, exit, wait, getuid, geteuid, close, kill etc Write C programs to simulate UNIX commands like ls, grep, etc 									
UNIT	'II P	ROCES	S MANAGEMENT				9+0	6	
 Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor Scheduling: Real Time scheduling: RM and EDF. Practical 4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc) 									

5. Implement the various scheduling algorithms like FCFS and SJF scheduling, Priority and Round robin scheduling.

UNIT III	FIII INTER-PROCESS COMMUNICATION									
	Inter-process Commu	inication:	Critical	Section,	Race	Conditions,	Mutual			
	Exclusion, Hardware	Solution,	Strict	Alternati	on, Pet	erson' Soluti	on, The			
	Producer\Consumer	Problem, S	Semapho	res, Event	Counte	rs, Monitors, 1	Message			

 Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc. Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, and Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery. Practical 6. Simulate Inter Process Communication 7. Implement the semaphores like Producer – Consumer problem 8. Implementation of Banker's Algorithm 	
UNIT IV MEMORY MANAGEMENT	9+6
 Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of Operation – Page allocation– Hardware support for paging, Protection and sharing, Disadvantages of paging. Virtual Memory: Basics of Virtual Memory– Hardware and control structures – Locality of reference, Page fault, Working Set, Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not Recently used (NRU) and Least Recently used (LRU). Practical 9. Implementation of Memory Management Scheme- Paging a. Implementation of First Fit Algorithm b. Implement the contiguous file allocation technique d. Implementation of FIFO Page Replacement Algorithm 	
UNIT V I/O SYSTEMS	9+6
I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, Secondary-Storage Structure: Disk structure, Disk scheduling algorithms. Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks. File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance. Practical 	
45 30 75	
	<u> </u>

TEXT BOOKS /REFERENCE BOOKS	
1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9 th John Wiley and Sons Inc., 2012.	Edition,
2. William Stallings, "Operating Systems – Internals and Design Principles", 7 th Edition, Prentice 2011	Hall,
3. Charles Crowley, "Operating Systems: A Design-Oriented Approach", Tata McGraw Hill Ed 1996.	lucation,
4. Gary J. Nutt," Operating Systems: A Modern Perspective", 2 nd Edition, Addison-Wesley,2000	

5. Maurice Bach," Design of the Unix Operating Systems", 8th Edition, Prentice-Hall of Ind 6. Daniel P. Bovet, Marco Cesati, "Understand the Linux Kernel", 3rd Edition, , O'Reilly and India,2012

Associates,2005

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

	РО											PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	1	3	0	0	0	0	0	1	0	0	1	3	1
CO2	3	3	3	1	0	0	0	0	0	0	1	2	3	1
CO3	2	3	3	1	1	0	0	0	1	0	1	2	3	1
CO4	3	2	0	1	1	1	1	0	1	0	0	2	3	1
CO5	3	2	0	1	1	1	1	0	1	0	0	2	3	1
	3	3	2	1	1	1	1	0	1	0	1	2	3	1

 $1-5 \rightarrow 1$, $6-10 \rightarrow 2$, $11-15\rightarrow 3$

1 - Low Relation, 2- Medium Relation, 3- High Relation

COUR	SE CO	ODE	XCS405	L	Т	Р	С		
COUR	SE NA	AME	DESIGN AND ANALYSIS OF ALGORITHM	3	0	2	5		
С	Р	Α	4.0 1.0 0.0		L	Т	Р	Η	
I					3	0	4	7	
COURSE OUTCOME Domain							Level		
CO1	Exp algo solv	Understand							
CO2	Desi and	ign algor sorting a		Apply Guided Respons					
CO3	Ana asyn	lyze any nptotic ne	given algorithm and express its complexity in otation	Cognitive Psychomotor		Analyz Guidec	æ l Resj	ponse	
CO4	Exp prob Hare	lain the blem as bo d	limitations of algorithm and Identify any elonging to the class of P, NP-Complete or NP-	Cognitive Psychomotor		Understand Guided Respons			
CO5	Prop	oose appr	oximation algorithm for any NP problem	Cognitive Psychomotor		Analyz Guideo	æ l Resj	ponse	
COUR	SE CO	ONTEN	Г				Ηοι	ırs	
UNIT	I	ANALY	SING ALGORITHMS				9		
		analysis Perform of recu Recursic The Ro The Sul Probabi Aggrega	ance measurements of Algorithm, Time and sparsive algorithms through recurrence relations on tree method and Masters' theorem. le of Algorithms in Computing - Growth of Fu ostitution Method - The Recurrence Tree Method listic Analysis and Randomized Algorithms – ate Analysis – Accounting Method.	worst-case b ace trade-offs - s: Substitution anctions – Rec l - The Master Amortized A	urren Me	nces - thod - ysis –			
UNIT	II	DIVIDE AND CONQUER & GREEDY DESIGN STRATEGIES							
		Fundam Program of algor Merge S Bounds Linear ' Code, D applicat List of I 1. Sort time rec n, the n taken ve the rand 2. Using set of el experim sorted a	ental Algorithmic Strategies: Brute-Force ming, Branch and-Bound and Backtracking meth ithms - Topological sorting - Analysis of Sorting Sort – Quick Sort Randomized Version – Sorting for Sorting - Selection in Expected Linear Time - Time – Greedy Algorithms - Elements of Gree Dijkstra's Shortest Path Algorithm – Heuristics - ion domains. Experiments: a given set of elements using the Quicksort me juired to sort the elements. Repeat the experime umber of elements in the list to be sorted and j ersus n. The elements can be read from a file of form number generator. g OpenMP, implement a parallelized Merge Sort ements and determine the time required to sort the ent for different values of n, the number of element of elements of number of n, the number of element of the time taken versus n. The element and plot a graph of the time taken versus n. The element of the time take	e, Greedy, nodologies for a Algorithm – Q in Linear Tim - Selection in W edy Strategy - characteristics ethod and dete nt for different plot a graph of r can be generat algorithm to so he elements. I ements in the ements can be	Dy the c puick e - I Wors Hu s and rmin value f the ated ort a Repe list read	namic design c Sort, Lower st case ffman d their ne the ues of e time using given eat the to be d from			

	3. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.								
UNIT III	DYNAMIC PRO	GRAMMING	AND OTHER DI	ESIGN STRATI	EGIES	9 + 9			
	 Dynamic Programming – Matrix Chain Multiplication - Elements of Dynamic programming –Longest Common Sequences – Warshall's and Floyds Algorithm – Transitive Closure – Minimum Spanning Tree - All Pairs Shortest Path Algorithm – Analysis – Backtracking – Graph Coloring Problem – Branch and Bound Strategy - Knapsack Problem - Kruskal's algorithm – Prims algorithm. List of Experiments: Compute the transitive closure of a given directed graph using Warshall's algorithm. S. Obtain the Topological ordering of vertices in a given digraph. Implement 0/1 Knapsack problem using Dynamic Programming. Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm. Implement All-Pairs Shortest Paths Problem using Floyd's algorithm. Parallelize this algorithm, implement it using OpenMP and determine the speed-up achieved. Implement N Queen's problem using Back Tracking. 								
UNIT IV	FLOW NETWO	RKS AND STR	RING MATCHIN	G		8+6			
	 Flow Networks – Network Flow Algorithm - Ford Fulkerson Method - String Matching - Naive String Matching Algorithm – Knuth Morris Pratt Algorithm - Analysis. List of Experiments: Implement the Ford-Fulkerson Algorithm for Maximum Flow Problem. Implement the Knuth Morris Pratt Algorithm 								
UNIT V	NP PROBLEMS					9 + 6			
	 NP-Completeness – Polynomial Time Verification – Theory of Reducibility – Circuit Satisfiability – NP - Completeness Proofs – NP Complete Problems: Vertex Cover, Hamiltonian Cycle and Traveling Salesman Problems - Cook's theorem– Approximation Algorithms – Approximation Algorithms to Vertex - Cover and Traveling Salesman Problems - Randomized algorithms - Class of problems beyond NP – P SPACE. List of Experiments: 13.Implement travelling salesman problem using the dynamic programming approach. 14.Implement the Hamiltonian Cycle using the dynamic programming approach. 								
		LEUTUKE 45		FRAUTICAL 30	101AL 75				
I		40	-		15				

TEXT BOOKS /REFERENCE BOOKS

- 1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Cliford Stein, Introduction to Algorithms, Third Edition, Prentice Hall, 2010.
- 2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms Second Edition, Universities Press, 2008.
- 3. Kenneth A. Berman and Jerome L. Paul, Algorithms, Cengage Learning India, 2010.
- 4. Alfred V Aho, John E Hopcroft and Jeffrey D Ullman, The Design and Analysis of Computer Algorithms, First Edition, Pearson Education, 2006
- 5. Ding-Zhu Du, Ker-I Ko, Xiaodong Hu, Design and Analysis of Approximation Algorithms, Springer Optimization and Its Applications, First Edition, 2011.
6. I.Zámecnikova, J. Hromkovic, Design and Analysis of Randomized Algorithms: Introduction to Design Paradigms (Texts in Theoretical Computer Science. An EATCS Series), 2005.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

	РО												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	1	2	1	0	0	0	0	1	0	0	1	1	1
CO2	2	3	2	1	1	0	0	0	0	0	1	1	2	2
CO3	2	3	2	1	1	0	0	0	1	0	1	1	2	3
CO4	3	2	2	1	1	1	1	0	1	0	0	0	2	3
CO5	2	2	2	1	1	1	1	0	1	0	0	1	1	2
Scaled Value	3	3	2	1	1	1	1	0	1	0	1	1	2	3

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

SEMESTER V

COURS	E CODE	XCS501			L	Т	Р	С	
COURS	E NAME	SIGNALS	& SYSTEMS		3	0	0	3	
C:P:A		3:0:0			L	Т	P	Н	
					3	0	0	3	
PRERE	QUISITES						·		
COURS	E OUTCOMES				Dom	ain	L	/evel	
CO1	Describe and class	sify the sign	als & systems		Cognit	ive	Unders	stand	
CO2	Find and analyze	e the prope	rties of continuous the	ime signal using	Cognit	ive	Analyz	ze	
	Fourier and Lapla	ce Transform	n,						
CO3	<i>Find</i> and solve t	the continuo	ous time LTI system	performance of	Cognit	ive	Apply		
	Fourier and Lapla	ce Transform	n.		~ .				
CO4	<i>Find</i> , <i>apply</i> and <i>a</i>	nalyze the p	properties of discrete	time signal using	Cognit	ive	Analyz	ze	
	Fourier and Z Tra	nstorm.							
CO5	Explain. Solve a	nd <i>determir</i>	<i>ie</i> the performance of	of Discrete Time	Cognit	ive	Evalua	te	
	LTI system in For	rier and Z T	ransform.						
UNIT I	- CLASSIFICATI	ON OF SIC	SNALS AND SYSTE	MS				9	
Continuo	ous time signals (C	T signals)	- Discrete time sign	als (DT signals)	- Step.	Ram	. Pulse.	Impulse.	
Sinusoid	al Exponential Cla	assification	of CT and DT signal	s - Periodic & Ar	periodic	signal	s Deter	ministic&	
Random	signals Energy &	Power sign	als $_{-}$ CT systems and	DT systems Class	sificatio	n of s	veteme _	- Static &	
Dynamic	Linoor & Nonlino	ar Timo you	iont & Time inverient	Causal & Noncouse	Sincario		nstabla	Static &	
				,Causaixinoiicausa	ii, Stabio			0	
	- ANALYSIS OF	CONTINU	OUS TIME SIGNAL	4				9	
Fourier	series analysis-spec	ctrum of Co	ontinuous Time (CT)	signals- Fourier	and Lap	place '	Fransfor	ms in CT	
Signal A	nalysis - Properties.								
UNIT I	II - LINEAR TIMI	E INVARIA	NT- CONTINUOUS	S TIME SYSTEM	IS			9	
Different	tial Equation-Block	k diagram	representation-impul	se response, con	volutior	n inte	grals-Fo	urier and	
Laplace	transforms in Analy	sis of CT sv	stems.	I ,			0		
	/ - ANALVSIS OF	DISCRET	F TIME SIGNALS					Q	
		DISCRET						-	
Baseban	d Sampling of CT si	ignals- Alias	sing, Reconstruction of	of CT signal from I	DT signa	als DT	FT and p	properties,	
Z-transfo	orm & properties.								
UNIT V	- LINEAR TIME	INVARIAN	T-DISCRETE TIM	E SYSTEMS				9	
Differen	ce Equations-Block	diagram rep	presentation-Impulse	response - Convolu	ution su	m- Di	screte Fo	ourier and	
Z Transf	orm Analysis of Re	cursive & N	on-Recursive systems						
	jj		· · · · · · · · · · · · · · · · · · ·	-					
	LEC	TURE	TUTORIAL	PRACTICAL			TOTAL	<i>_</i>	
HO	U RS	45	0	0			45		
TEXT B	OOKS								
1 P Rar	nakrishna Rao "Sio	mals and Sv	stems" Tata McGraw	Hill Publications	2008				
2 DDI	nakrisinia Rao, Sig	incor Syste	me and Signals" 2 nd I	Edition Oxford Un	2000.	Drog	a 2000		
2. D.F. Laun, Finiciples of Linear Systems and Signals, 2 Edition, Oxford University Press, 2009.									
KEFEK	ENCES								
1. R. EZ	eimer, W.H. Trantei	and. R.D.	Fannin, "Signals & Sy	ystems - Continuou	is and D	iscrete	e",		
Pearson	Education, 2009.								
1. John A	Alan Stuller, "An In	troduction to	o Signals and Systems	", Thomson Learn	ing, 200)7.			
2. M.J. I	Roberts, "Signals &	Systems Ar	alysis using Transfor	m Methods & MA	TLAB",	Tata	McGraw	' Hill,	
2007.									
3. Allan	V.Oppenheim, S.W	/ilsky and S	.H.Nawab, "Signals a	nd Systems", Pears	on Edu	cation,	Indian l	Reprint,	
2007.									
E-REFE	E-REFERENCES								
1. http://	/nptel.ac.in/courses/	117104074	(Prof.K.S. Venktesh,	"NPTEL, Signals a	and Syst	ems",	IIT- Kar	npur)	

http://tutorialspoint.com/signals_and_systems/index.htm
 http://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011/lecture-notes/

Mapping of COs with POs:

							PO						PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	2	2	3	0	0	0	1	1	1	0	0	0	0
CO2	2	1	2	3	0	0	0	0	0	1	0	2	2	1
CO3	2	2	3	1	1	2	1	2	2	0	0	0	0	2
CO4	1	2	2	2	0	0	0	0	0	1	0	1	0	2
CO5	1	1	3	3	1	2	1	1	1	0	0	2	2	2
Total	8	8	12	12	2	4	2	4	4	3	0	5	4	11
Scaled value	2	2	3	3	1	1	1	1	1	1	0	1	1	3

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

COU	RSE C	ODE	XCS502		L	Т	P	С		
COU	RSE N	AME	FORMAL LANGUAGE & AUTOMATA THOE	& AUTOMATA THOERY 3 0 0 3						
С	Р	A	3.0 0.0 0.0		L	Т	Р	H		
						0	0	3		
COURSE OUTCOMES Dom							Level			
CO1	O1 Explain and Fundamental of the basic kinds of finite automata and Cogni their capabilities							er		
CO2	Desc	ribe regu	lar and context-free languages	Cogniti	ve Remembe			er		
CO3	Desc	Cogniti	ve Rememb		nembe	er,				
CO4	CO4 Explain Constructions of Turing Machines Cogn							er		
CO5	Desc	Cogniti	ve	Ren	er,					

UNIT I FINITE AUTOMATA

Introduction- Basic Mathematical Notation and techniques- Finite State systems – Basic Definitions – Finite Automaton – DFA & NDFA – Finite Automaton with €-moves – Regular Languages- Regular Expression – Equivalence of NFA and DFA – Equivalence of NDFA's with and without €-moves – Equivalence of finite Automaton and regular expressions –Minimization of DFA- - Pumping Lemma for Regular sets – Problems based on Pumping Lemma.

UNIT II GRAMMARS

Grammar Introduction– Types of Grammar - Context Free Grammars and Languages– Derivations and Languages – Ambiguity- Relationship between derivation and derivation trees – Simplification of CFG – Elimination of Useless symbols - Unit productions - Null productions – Greiback Normal form – Chomsky normal form – Problems related to CNF and GNF.

UNIT III PUSHDOWN AUTOMATA

Pushdown Automata- Definitions – Moves – Instantaneous descriptions –Deterministic pushdown automata – Equivalence of Pushdown automata and CFL - pumping lemma for CFL – problems based on pumping Lemma.

UNIT IV TURING MACHINE

Turing Machines- Introduction – Formal definition of Turing machines –Instantaneous descriptions- Turing Machine as Acceptors – Turing Machine as Transducers Computable Languages and functions – Turing Machine constructions – Modifications of Turing Machines.

UNIT V COMPUTATIONAL COMPLEXITY

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9

9

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Undecidability- Basic definitions- Decidable and undecidable problems - Properties of Recursive and Recursively enumerable languages – Introduction to Computational Complexity: Definitions-Time and Space complexity of TMs –complexity classes – introduction to NP-Hardness and NP-Completeness.

	LECTURE	TUTORIAL	TOTAL
	45	0	45
TEXT BOOKS			
1. Hopcroft J.E., Motwani R. and Ullman J.D, "Introduc Computations", Second Edition, Pearson Education, 2008.	tion to Autom	nata Theory, Lar	nguages and

REFERENCES

1. John.C. Martin, "Introduction to Languages and the Theory of Computation" McGraw-Hill Education, 01-May-2010.

2. Michael Sipser, "Introduction to the Theory of Computation" Cengage Learning, 2012.

E-REFERENCES

Theory of Computation by Prof. Somenath Biswas, Computer Science and Engineering, IIT Kanpur

Mapping of COs with POs:

							PO						PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	2	2	3	0	0	0	1	1	1	0	0	0	0
CO2	2	3	2	3	0	0	0	0	0	1	0	2	2	1
CO3	2	2	3	1	1	2	1	2	2	0	0	0	0	2
CO4	3	2	2	2	0	0	0	0	0	1	0	1	0	2
CO5	1	1	3	3	1	2	1	1	1	0	0	2	2	2
Total	10	10	12	12	2	4	2	4	4	3	0	5	4	11
Scaled	2	2	3	3	1	1	1	1	1	1	0	1	1	3
value														

$1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

COURSE	CODE	XCS503			L	Т	Р	C
COURSE	NAME	DATABASE MANAGEMENT SYSTE	EMS		3	0	2	5
C P	Α	3.5 1.5 0.0			L	Т	Р	H
L					3	0	4	7
Learning This cours • Fa M • Ho • Ho	Objectives: The aims at accilitating the anagement S ow to manipulate the system of	the student to understand the various of systems, the method and model to store datulate through query languages, the effectives m manages the concurrent usage of data in	concepts and fun ta. e designing of rela multi user environ	actionali ational c nment.	ties latab	of ase .	Datal	base
COURSE	OUTCOM	ES	Domain	Remei	Lev	el		
CO1	<i>Construct</i> with the bas	queries with relational database system sics of SQL	Cognitive Psychomotor	Create	d Re	, spor	ise	
CO2	<i>Relate</i> and design of normalizati	<i>Apply</i> the design principles for logical databases, including ER model and on approach	Cognitive Psychomotor	Under Apply Guide	stano ⁄ d Re	1, spor	ise	
CO3	Define and structures organizatio B+ tree and	nber stand	, 1					
CO4	<i>Define</i> and processing	Remei Under	emember, nderstand					
CO5	Work suc development	cessfully in a team by design and nt of database application systems.	Cognitive Psychomotor	Under Apply Guide	stano d Re	ind, Response		
UNIT I	INTRODU	CTION					9+3	3
Inter du sti	an ta Eila a	nd Datahasa sustana Datahasa sustan s	atmaataan Data	Madala	т			Data
models – 1 List of Ex 1. Da	ER model – I periments: atabase desig	nd Database systems- Database systems Relational Model – Keys – Relational Alg on using E-R model and Normalization	ebra and Calculus		- 1	ypes	01 1	Data
UNIT II	RELATION	NAL MODEL					9+2	21
SQL – Da design – F Properties List of Ex 2. Da 3. Da 4. Hi 5. Hi 6. Vi 7. Pr	 SQL – Data definition- Queries in SQL- Updates- Views – Integrity and Security – Relational Database design – Functional dependencies and Normalization for Relational Databases – Decomposition - Desirable Properties of Decomposition - Boyce-Codd Normal Form. List of Experiments: Data Definition Language (DDL) commands in RDBMS Data Manipulation Language (DML) and Data Control Language (DCL) High level language extensions with cursors High level language extension with Triggers Views 							
8. Eı	mbedded SQ	L					••••••	-
UNIT III	DATA ST	ORAGE AND QUERY PROCESSING	D Tartiare et		1. 0	40-5-		9
Organizati Index File	ion of Records – Static Ha	ds in Files – Indexing and Hashing –Orde shing – Dynamic Hashing– Query Process	ered Indices – B+	ige – Fi tree Ind	ie O iex I	rgan Files	– B	n – tree
								9

UNIT IV TRANSACTION MANAGEMENT

Transaction Processing – Introduction- Need for Concurrency control- Desirable properties of Transaction-Schedule and Recoverability- Serializability and Schedules – Concurrency Control – Types of Locks- Two Phases locking- Deadlock- Time stamp based concurrency control – Recovery Techniques – Immediate Update- Deferred Update - Shadow Paging.

UNIT V ADVANCED DATABASES

9+6

Distributed databases - Homogenous and Heterogeneous - Distributed Data Storage Object Oriented Databases - Need for Complex Data types - OO data Model- Nested relations - Complex Types - Inheritance Reference Types - XML - Structure of XML Data - XML Document Schema - Querying and Transformation - Data Mining and Data Warehousing -Web Database-Spatial database - Temporal database - Multimedia database.

List of Experiments:

- 9. Develop the following applications
 - a. Design and implementation of payroll processing system
 - b. Design and implementation of Banking system
 - c. Design and implementation of Library Information System
 - d. Design and implementation of Student Information System

LECTURE	PRACTICAL	TOTAL
45	30	75

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth and S. Sudharshan, "Database System Concepts", Sixth Edition, Tata Mc Graw Hill, 2011.

REFERENCES

1. Ramez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education, 2008.

E-RESOURCES

- 1. http://spoken-tutorial.org
- 2. http://vlab.co.in/

Mapping of COs with POs:

							PO						PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	0	2	1	0	0	0	0	0	0	0	0	3	1
CO2	3	2	1	1	0	0	0	0	0	0	0	0	3	1
CO3	3	0	0	0	0	0	0	0	0	0	0	0	3	1
CO4	3	0	0	0	0	0	0	0	0	0	0	0	3	1
CO5	0	3	3	3	2	0	0	0	2	1	0	0	3	3
Original	12	5	6	5	2	0	0	0	2	1	0	0	15	7
Scaled Value	3	1	2	1	1	0	0	0	1	1	0	0	3	2

$1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

COURSE CODE			XCS504	L	T	Р	С
COURSE NAME			SOFTWARE ENGINEERING	3	0	2	5
С	Р	Α	3.8 1.8 0	L	Т	Р	Η
				3	0	4	7

Objective:

Objective of software engineering course are understand the software life cycle models and software development process and elicit, analyze and specify software requirements, design, develop correct and robust software products, testing and adaptation of software maintenance and emerging trends in software engineering.

COURS	E OUTCOMES		Domain	Level			
CO1	<i>Describe, understan</i> software developme process models.	and and compare various methods of nt activities and software development	Cognitive Psychomotor	Understand, Perception			
CO2	<i>Describe</i> , <i>Ability t</i> knowledge of hur software architecture	o develop, classify and analyze the nan-computer interaction and design for various application.	Cognitive Psychomotor	Understand, Perception			
CO3	<i>Describe</i> , <i>apply</i> , <i>An</i> software testing and	<i>alyze</i> , evaluate and test the basics of netrics.	Cognitive Psychomotor	Understand, Perception			
CO4	<i>Describe</i> , <i>apply</i> , <i>An</i> software maintenant concepts	<i>alyze</i> , evaluate and test the basics of ce and software project management	Cognitive Psychomotor	Understand, Perception			
CO5Understand and , <i>Explain, develop</i> and <i>utilize</i> the advancedCognitiveUnderstandsoftware engineering concepts and software engineeringPerceptdevelopment toolsPercept							
`U	NIT-I SOFT	WARE PROCESS AND REQUIREME	ENTS	9+12			

Introduction – Hardware Vs. Software - A Generic view of Process – SDLC - Process life cycle models (Water Fall, Incremental, Evolutionary, Specialized, Agile) – Agile development - System Engineering. Requirements Engineering - Requirement gathering techniques - Requirements Engineering tasks – Process - Requirement Analysis - Eliciting Requirements - Building the analysis Model - Data Modeling Concepts - Object Oriented Analysis.

List of Experiments:

- 1. Feasibility study for any two application
- 2. Project Planning for the above application
- 3. Software requirement analysis for any two application
- 4. Write SRS for any two application
- 5. Create traceability matrix for any two applications

UNIT –II	DESIGN CONCEPTS AND PRINCIPLES	9+6

Design Engineering – Design Process and Design Concepts and Model-Architectural design - software architecture – data design – architectural design – transform and transaction mapping- Modeling the Component Level Design –Introduction-Designing Class-based Components- User interface analysis and design - Coupling and Cohesion- Design elements of interface, component level and deployment level.

List of Experiments:

- 6. Draw use-case, class for any two applications.
- 7. Draw sequence and collaboration diagram for any two applications.
- 8. Draw activity and state chart for any two applications.
- 9. Component, package and deployment diagram for any two applications.

UNIT-III TESTING

Testing Strategies - A strategic approach to software testing - Strategic Issues - Test strategy for Conventional software, Object oriented software – SQA - Validation Testing - System testing and debugging - Testing fundamentals - Black Box testing - White Box testing - Basis Path testing - control structure testing - Test case

9 + 12

- Perfo	rmance testing	- Object oriented testing.						
List of	Experiments							
10	. Generate and	Implementation of skeleton code for any tw	vo application					
11	. Writing test of	ases for any two application						
12	. Testing proce	ss for any two application						
13	. Check verific	ation & Validation for any two applications	8.					
UNIT	-IV	SOFTWARE PROJECT MANAGEME	ENT		9			
Project	t Management	ife cycle - Need of application maintenance	e – Manageme	nt spectrum - Test	ing Rationale			
Management - Configuration Management - Project Management - project process product measures and								
metric	s – Estimation	of software projects – Decomposition technology	niques and emp	irical estimation r	nodels - Risk			
analys	is and mitigatio	n plans - Procurement management.						
UNIT	V	ADVANCED TOPICS IN SOFTWARE	E ENGINEER	ING	9			
Forma	l Methods – Ba	sic Concepts - Mathematical preliminarie	s-Applying Ma	thematical notatio	ns for formal			
specifi	cation - Forn	al specification languages-Clean room s	oftware Engin	eering-Clean rooi	m Approach-			
Functi	onal specifica	tion-Component-Based Development-Ree	engineering-Sof	tware Reenginee	ering-Reverse			
Engine	ering- Forwar	d Engineering- Introduction to CASE t	tools and testi	ng tools - Soft	ware process			
improv	vement -Auton	ation testing tools.						
			LECTURE	PRACTICAL	TOTAL			
			4 =	• •				
			45	30	75			
TEXT	BOOKS		45	30	75			
TEXT 1.	BOOKS Roger S.Pres	sman, Software engineering- A practition	45 ner's Approach	30 1, McGraw- Hill	75 International			
TEXT 1.	BOOKS Roger S.Pres Edition, 8 th ed	sman, Software engineering- A practition lition, 2015.	45 ner's Approacl	30 n, McGraw- Hill	75 International			
TEXT 1. REFE	BOOKS Roger S.Pres Edition, 8 th ed RENCES	sman, Software engineering- A practition lition, 2015.	45 ner's Approach	30 n, McGraw- Hill	75 International			
TEXT 1. REFE 1.	BOOKS Roger S.Pres Edition, 8 th ed RENCES Ian Sommerv	sman, Software engineering- A practition lition, 2015.	45 ner's Approach	30 n, McGraw- Hill lition, 2016.	75 International			
TEXT 1. REFE 1. 2.	BOOKS Roger S.Pres Edition, 8 th ea RENCES Ian Sommerv Pankaj Jalote	sman, Software engineering- A practition lition, 2015. ille, Software engineering, Pearson educati - An Integrated Approach to Software Engi	45 ner's Approach on Asia, 10 th ec neering, 3 rd edi	30 n, McGraw- Hill lition, 2016. tion 2011.	75 International			
TEXT 1. REFE 1. 2. 3.	BOOKS Roger S.Pres Edition, 8 th ed RENCES Ian Sommerv Pankaj Jalote C.Ravindrana	sman, Software engineering- A practition lition, 2015. ille, Software engineering, Pearson educati - An Integrated Approach to Software Engi th Pandian, "Software metrics – A gu	45 ner's Approach on Asia, 10 th ec neering, 3 rd edi ide to plannir	30 n, McGraw- Hill lition, 2016. tion 2011. ng, analysis and	75 International application",			
TEXT 1. REFE 1. 2. 3.	BOOKS Roger S.Pres Edition, 8 th ed RENCES Ian Sommerv Pankaj Jalote C.Ravindrana AUERBACH	sman, Software engineering- A practition lition, 2015. ille, Software engineering, Pearson educati - An Integrated Approach to Software Engi th Pandian, "Software metrics – A gu publication, Newyork 2011.	45 ner's Approach on Asia, 10 th ec neering, 3 rd edi ide to plannir	30 n, McGraw- Hill lition, 2016. tion 2011. ng, analysis and	75 International application",			
TEXT 1. REFE 1. 2. 3. 4.	BOOKS Roger S.Pres Edition, 8 th ed RENCES Ian Sommerv Pankaj Jalote C.Ravindrana AUERBACH Ali Behforo	sman, Software engineering- A practition lition, 2015. ille, Software engineering, Pearson educati - An Integrated Approach to Software Engi th Pandian, "Software metrics – A gu publication, Newyork 2011. oz, Frederick J Hudson, "Software Engine	45 ner's Approach on Asia, 10 th ec neering, 3 rd edi ide to plannir cering Fundame	30 n, McGraw- Hill lition, 2016. tion 2011. ng, analysis and entals", second ec	75 International application", lition, Oxford			
TEXT 1. REFE 1. 2. 3. 4.	BOOKS Roger S.Pres Edition, 8 th ed RENCES Ian Sommerv Pankaj Jalote C.Ravindrana AUERBACH Ali Behforo University Pr	sman, Software engineering- A practition lition, 2015. ille, Software engineering, Pearson educati - An Integrated Approach to Software Engi th Pandian, "Software metrics – A gu publication, Newyork 2011. oz, Frederick J Hudson, "Software Engine ess, Noida, 2009.	45 ner's Approach on Asia, 10 th ec neering, 3 rd edi ide to plannir cering Fundame	30 n, McGraw- Hill lition, 2016. tion 2011. ng, analysis and entals", second ec	75 International application", lition, Oxford			
TEXT 1. REFE 1. 2. 3. 4. E REH	BOOKS Roger S.Pres Edition, 8 th ed RENCES Ian Sommerv Pankaj Jalote C.Ravindrana AUERBACH Ali Behforo University Pr FERENCES	sman, Software engineering- A practition lition, 2015. ille, Software engineering, Pearson educati - An Integrated Approach to Software Engi th Pandian, "Software metrics – A gu publication, Newyork 2011. oz, Frederick J Hudson, "Software Engine ess, Noida, 2009.	45 ner's Approach on Asia, 10 th ec neering, 3 rd edi ide to plannir cering Fundame	30 n, McGraw- Hill lition, 2016. tion 2011. ng, analysis and entals", second ec	75 International application", lition, Oxford			
TEXT 1. REFE 1. 2. 3. 4. E REH 1.	BOOKS Roger S.Pres Edition, 8 th ed RENCES Ian Sommerv Pankaj Jalote C.Ravindrana AUERBACH Ali Behforo University Pr FERENCES NPTEL Cour	sman, Software engineering- A practition lition, 2015. ille, Software engineering, Pearson educati - An Integrated Approach to Software Engint th Pandian, "Software metrics – A gu publication, Newyork 2011. oz, Frederick J Hudson, "Software Engine ess, Noida, 2009. se Prof. N. L. Sarda, IIT Bombay	45 ner's Approach on Asia, 10 th ec neering, 3 rd edi ide to plannir eering Fundame	30 h, McGraw- Hill lition, 2016. tion 2011. hg, analysis and entals", second ec	75 International application", lition, Oxford			
TEXT 1. REFE 1. 2. 3. 4. E REH 1. 2. 3.	BOOKS Roger S.Pres Edition, 8 th ed RENCES Ian Sommerv Pankaj Jalote C.Ravindrana AUERBACH Ali Behforo University Pr FERENCES NPTEL Coun http://vlab.co	sman, Software engineering- A practition lition, 2015. ille, Software engineering, Pearson educati - An Integrated Approach to Software Enginth Pandian, "Software metrics – A gu publication, Newyork 2011. oz, Frederick J Hudson, "Software Engine ess, Noida, 2009. se Prof. N. L. Sarda, IIT Bombay .in/	45 ner's Approach on Asia, 10 th ec neering, 3 rd edi ide to plannir vering Fundame	30 n, McGraw- Hill lition, 2016. tion 2011. ng, analysis and entals", second ec	75 International application", lition, Oxford			
TEXT 1. REFE 1. 2. 3. 4. E REH 1. 2. 3	BOOKS Roger S.Pres Edition, 8 th ed RENCES Ian Sommerv Pankaj Jalote C.Ravindrana AUERBACH Ali Behforo University Pr SERENCES NPTEL Cour http://vlab.co http://starum	sman, Software engineering- A practition lition, 2015. ille, Software engineering, Pearson educati - An Integrated Approach to Software Enginth Pandian, "Software metrics – A gu publication, Newyork 2011. oz, Frederick J Hudson, "Software Engine ess, Noida, 2009. se Prof. N. L. Sarda, IIT Bombay .in/ .io/	45 ner's Approach on Asia, 10 th ec neering, 3 rd edi ide to plannir cering Fundame	30 n, McGraw- Hill lition, 2016. tion 2011. ng, analysis and entals", second ec	75 International application", lition, Oxford			
TEXT 1. 1. 2. 3. 4. E REH 1. 2. 3. 4.	BOOKS Roger S.Pres Edition, 8 th ed RENCES Ian Sommerv Pankaj Jalote C.Ravindrana AUERBACH Ali Behforo University Pr FERENCES NPTEL Cour http://vlab.co http://starum http://argoun	sman, Software engineering- A practition lition, 2015. ille, Software engineering, Pearson educati - An Integrated Approach to Software Engint th Pandian, "Software metrics – A gu publication, Newyork 2011. oz, Frederick J Hudson, "Software Engine ess, Noida, 2009. se Prof. N. L. Sarda, IIT Bombay .in/ .io/ l.tigris.org/	45 ner's Approach on Asia, 10 th ec neering, 3 rd edi ide to plannir eering Fundame	30 n, McGraw- Hill lition, 2016. tion 2011. ng, analysis and entals", second ec	75 International application", lition, Oxford			
TEXT 1. REFE 1. 2. 3. 4. E REH 1. 2. 3. 4. 5.	BOOKS Roger S.Pres Edition, 8 th ed RENCES Ian Sommerv Pankaj Jalote C.Ravindrana AUERBACH Ali Behforo University Pr FERENCES NPTEL Cour http://vlab.co http://starum http://argoun http://www.	sman, Software engineering- A practition lition, 2015. ille, Software engineering, Pearson educati - An Integrated Approach to Software Engine th Pandian, "Software metrics – A gu publication, Newyork 2011. oz, Frederick J Hudson, "Software Engine ess, Noida, 2009. se Prof. N. L. Sarda, IIT Bombay .in/ .io/ l.tigris.org/ seleniumhq.org	45 ner's Approach on Asia, 10 th ec neering, 3 rd edi ide to plannir eering Fundame	30 n, McGraw- Hill lition, 2016. tion 2011. ng, analysis and entals", second ec	75 International application", lition, Oxford			

Mapping of COs with POs:

		РО												50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	1	2	1	0	0	1	0	0	0	0	0	2	2	1
CO 2	2	3	3	2	2	1	3	0	0	0	0	1	3	2
CO 3	3	3	3	1	1	3	0	1	2	0	3	3	3	3
CO 4	3	3	3	1	1	3	0	1	2	0	3	3	3	3
CO 5	1	3	0	0	3	0	1	0	0	1	0	1	3	1
Total	10	14	10	4	7	8	4	2	4	1	6	10	14	10
Scaled	2	3	2	1	2	2	1	1	1	1	2	2	3	2
value														

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

COURSI		L	Т	Р	C				
COURSI	E NAME	IT WORKSHOP(SCILA)	B/MATLAB)			1	0	1	2
PRERE(UISITES	Working knowledge of (Excel). Basic knowledge understand of matrix and line 1.25 , 0.5 , 0.25	some basic of computer near algebra a	application sof programming and re highly benefic	tware nd an cial.	L 1	T 0	P 2	H 3
Learning	Objectives	1.25 0.5 0.25					U		
• U • B • B	Inderstand the eing able to eing able to	e MATLAB environment do simple calculations using carry out simple numerical co	MATLAB omputations a	nd analyses usin	g MAT	<u>LAI</u>	3		
COURSI CO1	Understand	ES the main features of the MA	TLAR (Jomain Cognitive	Leve	ersta	nd		
development environment Psychomotor Gui Affective Res							lespo	nse	
CO2	Use the MATLAB GUI effectively Cognitive Psychomotor						nd lespo	nse	
CO3	Design sim	ple algorithms to solve probl	ems C F	Cognitive Psychomotor Affective	App Guic Resp	ly led R ond	espo	nse	
CO4	Write simp scientific an	le programs in MATLAB to nd mathematical problems	solve C F	Cognitive Psychomotor Affective	App Guic Resp	ly led R oond	lespo	nse	
CO5	graphical re and implem	epresentations and tips for de nenting MATLAB code	signing C F A	Cognitive Psychomotor Affective	App Guic Resp	Apply Juided Response Respond			
THEORY	Y								
MATLAI constants Matrix a functions Reading a graphic fu	B basics, T operators and in MATLAE and writing d unctions	he MATLAB environment ad simple calculations, Form gebra review, Vectors and ata, file handling, Personalize	, Basic com ulas and funct matrices in ed functions,	nputer programm ions, MATLAB MATLAB, Ma Toolbox structur	ning V toolbo atrix o e, MA	√aria xes perat ΓLA]	bles ions B	and and	15
EXPERI	MENTS								30
 Study of Study of Study of To solv Solution Determining Solution Solution Solution Determining Determin	of Introduction of basic matrix are linear equation of Linear equation of Linear equation of Ei in ation of Ei n of Different n of Different in ation of ro- mination of pro- mination of pro- mination of pro- mination of pro- mination of pro- mination of pro- mination of pro-	on to MATLAB ix operations ation equations for Underdetermine gen values and Eigen vectors ace Equations. ace Equations using Euler Me tial equation using 4th order ots of a polynomial. polynomial using method of I polynomial fit, analyzing resi	ed and over de s of a Square r ethod. Runge- Kutta Least Square (duals, expone	etermined cases. matrix. method. Curve Fitting. ntial fit and error	r bounc	ls fro	om th	e	
			LECTURE	TUTORIAL	, T(OTA	L		i
HOURS	NODC		45	0	45	5			
1 Amos (NCES Gilat 'MATI	AB An Introduction With A	nnlications' ?	R rd edition Wiely	nuhlie	hers	2008		
1.711105					Puolis		2000		

Stephen J. Chapman' MATLAB Programming for Engineers' 5th edition, Cengauge learninb, 2016
 Holly Moore 'MATLAB for Engineers', 5th edition, Pearson, 2012

Table 1: Mapping of COs with POs:

		РО											PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1				1	3							1		
CO2	2	2		1	3							1		
CO3		2	1	2	2						•	1		
CO4					2									
CO5				2	2									
Total	2	4	1	6	12				9			3		
Scaled value	1	1	1	2	3							1		

$1 ext{-} 5 ext{-} 1, 6 ext{-} 10 ext{-} 2, 11 ext{-} 15 ext{-} 3$

COURSE CODE	XCS508	L	Т	P	С
COURSE NAME	IN-PLANT TRAINING – II	0	0	0	0
C:P:A	0:0:0				
		L	Т	Р	H
		0	0	0	0

COUR	SE OUTCOMES	Domain	Level
CO1	<i>Relate</i> classroom theory with workplace practice	Cognitive	Understand
CO2	<i>Comply with</i> Factory discipline, management, and business practices.	Psychomotor	Guided Response
CO3	Demonstrates teamwork and time management.	Psychomotor	Guided Response
CO4	<i>Describe</i> and <i>display</i> hands-on experience on practical skills obtained during the programme.	Psychomotor	Perception
CO5	<i>Summarize</i> the tasks and activities done by technical documents and oral presentations	Psychomotor	Guided Response

CO Vs PO Mapping

	PO											
	1	2	3	4	5	6	7	8	9	10	11	12
C01	2	0	0	0	0	0	0	0	0	0	0	0
CO2	0	0	0	0	0	0	1	3	0	0	1	0
CO3	0	0	0	0	0	0	0	0	3	1	3	1
CO4	0	1	2	1	3	0	0	0	0	0	0	3
CO5	0	0	0	3	0	0	0	0	0	3	0	1
Total	2	1	2	4	3	0	1	3	3	4	4	5
Scaled	1	1	1	1	1	0	1	1	1	1	1	1

COURSE CODE XCS509 L							Т	P	C		
COURSE	NAME	Programming with P	ython			0.5	0	0.5	0		
PREREQU	JISITES	-				L	Т	Р	H		
C:P:A						1	0	0	1		
COURSE	OUTCOM	IES			Domain		Level				
CO1	<i>Describe</i> installation	the evolution of pythe on process with differe	on program an ent OS.	d the handle	Cognitive		Remember				
CO2	Understa	<i>nd</i> the data types and op	perators with di	ctionaries.	Cognitive		Remember, Understand				
UNIT I INSTALLATION											
Downloadi	ng and inst	allation: overview of py	thon – installir	ng python on w	indows –in	stalling	pythe	on on L	linux		
– feature –	History an	d philosophy of python	 interactive m 	ode – structure	with identi	fication	•				
UNIT II	DATA 1	TYPE AND STATEMI	ENT				6				
Identification	on- Data T	ypes and Variables - (Operators -inpu	t and raw inpu	it via the k	eyboard	d - C	onditio	nal		
Statements	-While L	oops -For Loops -For	matted output	-Output with	Print -Sec	quential	Data	а Туре	s -		
Dictionarie	s -Sets and	Frozen Sets -Shallow a	and Deep Copy.								
UNIT III	FUNCT	ION AND REGULAR	R EXPRESSIO	N			6				
Functions -	Recursion	and Recursive Functio	ns - Tests, Doc	Tests, UnitTest	s - Memoiz	zation a	nd De	ecorato	rs -		
Passing Ar	guments-	Namespaces - Global v	vs. Local Varia	bles- File Mar	agement -	Modula	r Pro	gramm	ing		
and Modul	es - Introc	luction in Regular Exp	ressions - Reg	ular Expression	ns, Advanc	ed -Lar	nbda	Opera	tor,		
Filter, Redu	ice and Ma	ip -List Comprehension	- Generators				· ·				
	UBJEC	I ORIENTED PROG		haritanaa Erra	1- C1-	4a C1	0		C1		
Exception Creation	Handling	- Object Oriented Pro	gramming - II	ineritance Exa	inple - Sic	ns - Cl	lasses				
overloading	y – Multith	reading.	s – mes mput s	and output - II	mernance,	porymo	rpms	m, ope	rator		
UNIT V	APPL	ICATION OF PYTHO	N PROGRA	MMING			6				
Graphical	user inter	faces; event-driven pro	ogramming par	adigm; tkinter	[•] module,	creating	g sin	ple G	UI;		
buttons, lab	els, entry f	fields, dialogs; widget a	ttributes - sizes	, fonts, colors l	ayouts, nes	ted fran	nes-,	Networ	:ks,		
and Client/	Server Pro	ogramming; introductio	on to HTML, i	nteracting with	n remote H	ITML s	serve	r, runn	ing		
html-based	queries, de	ownloading pages; CGI	programming,	programming a	simple CC	H form	T				
			LECTURE	TUTORIAL	PRACT	ICAL	ТО	TAL			
			15	0	15		30				
TEXT BO	OKS		A .1		D 1 11 1	~	-	n 1	•		
1. Fundamentals of Python: First Programs Author: Kenneth Lambert Publisher: Course Technology,									logy,		
	earning, 20 ENCES	12 ISDIN-15: 978-1-11	1-82270-3								
1 https://w	iki python	org/moin/BeginnersGui	de/Overview								
2 https://w	ocs nython	org/2/license html									
3. http://www.	w.python.	course.eu/blocks.nhn									
4. http://www.tutorialspoint.com/python											

SEMESTER VI

COURSI	E CODE	XCS601	L	Р	С				
COURSI	E NAME	COMPILER DESIGN		3	0	2	5		
C:P:A		3.5 1.5 0		L	T	P	H		
aatibat				3	0	4	7		
COURSI	E OUTCON	AES	Domain		I	Level			
CO1	Describe t	ne compilers and its construction tools and	Cognitive	R	emem	ber			
001	specificatio	on of tokens.	coginare		ennenn				
CO2	Describe a	nd <i>apply</i> various parsing techniques for	Cognitive,	Understand					
	parsing the	e string.	Psychomotor	Guided					
		-	-	R	espons	se			
CO3	Illustrate a	and construct intermediate language.	Cognitive,	U	nderst	and			
			Psychomotor	G	uided				
			R	espons	se				
CO4	Describe t	he code generation and <i>make use of</i> code	Cognitive,	U	nderst	and			
generator to generate target code. Psychomot					uided				
	a	R	espons	se					
CO5	Explain co	de optimization and apply the optimization	Cognitive,	U	nderst	and			
technique Psychomotor					uiaea				
τινίτα τ	K	espons	0 1 1	2					
Compiler	analycic	of the source program phases of a compiler	cousing of the	compile	ar ar		a of		
phases -	compiler c	onstruction tools $-$ lexical analysis $-$ role of	f lexical analyze	r = in	nut hi	oupin ifferir	$\log OI$		
specificat	ion of token	s-Lex-Simple Program using Lex	r loxiour unuryze		put ot		15		
List of P	rograms								
1. Con	struction of	NFA							
2. Con	struction of	Minimized DFA							
3. Imp	ementation	of Lexical Analyzer Using LexTool.							
4. Gen	eration of To	okens for Given Lexeme.							
5. Con	version of Ir	fix to Postfix Expression							
6. Imp	ementation	of Symbol Table			1				
UNIT II	SYNTAX	ANALYSIS				9 + 8			
Role of the	ne parser –V	Vriting Grammars – Context-Free Grammars –	Fop Down parsin	$\log - Re$	cursiv	e Des	cent		
Parsing –	Predictive	Parsing – Bottom-up parsing – Shift Reduce F	Parsing – Operat	or Prec	edent	Parsi	ng –		
LK Parse	rs – SLR Pa	rser – Canonical LR Parser – LALR Parser-YA	CC –Simple Prog	gram us	ing r	ACC.			
7 Syntox	Apolycic uc	ing VACC							
7. Syntax 8. Implen	rentation of	Shift Reduce Parsing Algorithm							
9 Constr	action of LR	Parsing Table							
10. Const	ruction of C	perator Precedence Parse Table.							
UNIT II	I INTER	RMEDIATE CODE GENERATION				9 + 5	5		
Intermedi	ate language	es – Declarations – Assignment Statements – Be	oolean Expressio	ns – Ca	ise Sta	temer	nts –		
Back pate	ching – Proc	edure calls.	•						
List of P	rograms								
11.Implei	nentation of	Quadruples							
12. Implementation of Triples.									
13. Imple	mentation o	f Intermediate Code Generation.			1	~ -			
UNIT IV	CODE GI	ENERATION	C .		~	9 + 2	2		
Issues in	the design o	t code generator – The target machine – Runtir	ne Storage mana	gement	t – Bas	sic Blo	ocks		
and Flow	Graphs – N	ext-use information – A simple Code generator	r – DAG represe	ntation	or Bas	SIC BI	OCKS		
- reepno	e Optimizat	1011.							
14 Imple	mentation o	f Code Generation							
17. mpic									
						9 + 3	5		

UNIT V CODE OPTIMIZATION AND RUN TIME ENVIRONMENTS

Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing.

List of Programs

15.Implementation of Code Optimization Techniques

		LECTURE	PRACTICAL	TOTAL					
		45	30	75					
TEXT	BOOKS								
1.	Alfred V.Aho, Jeffrey D.Ullman, Ravi	Sethi, "Compile	ers- Principles, Te	chniques, and					
	Tools(Second Edition)", Pearson Education Indi	ia, 2008.							
REFE	RENCES								
1.	Allen I. Holub "Compiler Design in C", Prenti	ice Hall of India,	2003.						
2.	C. N. Fischer and R. J. LeBlanc, "Crafting a co	ompiler with C",	Benjamin Cumm	ings, 2003.					
3.	J.P. Bennet, "Introduction to Compiler Techni	ques", Second Ed	lition, Tata McGraw	- Hill, 2003.					
4.	Henk Alblas and Albert Nymeyer, "Practice a	and Principles of	Compiler Building	with C", PHI,					
	2001.	_							
5.	Kenneth C. Louden, "Compiler Construction	n: Principles and	Practice", Thompso	on Learning,					
	2003.	_	_	_					
E REF	ERENCES								
1.	http://nptel.ac.in/downloads/106108113/								
2.	http://www.svecw.edu.in/Docs%5CCSECDLNo	otes2013.pdf							
3.	https://www.wiziq.com/tests/compiler-design								
4.	http://spoken-tutorial.org/								
5.	http://vlab.co.in/								

Mapping of COs with POs:

						ł	PO						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	2	3	2	3	2	1	0	0	2	1	0	2	3	2
CO 2	2	3	2	3	2	1	0	0	2	1	0	1	3	2
CO 3	1	3	3	2	1	1	0	0	1	1	0	2	3	2
CO 4	2	2	2	2	2	1	0	0	1	1	0	1	3	2
CO 5	2	3	3	1	1	1	0	0	1	1	0	1	3	2
Total	9	14	12	11	8	5	0	0	7	5	0	7	15	10
	2	3	3	3	2	1	0	0	2	1	0	2	3	2

 $1 \text{-} 5 \rightarrow 1, 6 \text{-} 10 \rightarrow 2, 11 \text{-} 15 \rightarrow 3$

COURSE CODE XCS602						Р	С	
COURSE	E NAME	COMPUTER NETWORKS		3	0	2	5	
СРА		3.5 1.25 0.25		L	Т	Р	Η	
				3	0	4	7	
COURSE	OUTCON	IES	Domain		L	evel		
CO1	Understand the various	<i>d</i> the networks components and <i>Analyzing</i> C network components.	ognitive	Understand,				
CO2	CO2 <i>Describe</i> and <i>Recognize</i> the network error detection and Cognitive correction methods.							
CO3Identify and interpret the network switching and addressing methods and develop the various routing simulations.Cognitive Psychomotor						oer, and, respor	ıse	
CO4	Analyse at oriented pr	ransport layer functions and <i>setup</i> connection C performance of the setup connection of the setup con	ognitive sychomotor	A Pe	nalyze	, Crea on	lte	
CO5Describe the Application layer functions and network security and Build simple NS2 simulationsCognitive Psychomotor AffectiveUnder							nse	
UNIT I	DATA CO	MMUNICATIONS	~ .			9		
Compone Topologie Optics – I	nts- Directi es- Protocol Line Coding	on of Data flow-networks- Components and C s and Standards – ISO/OSI model – Transmiss – Modems.	Categories – ty sion Media –Cc	pes axial	of con I Cable	nectione – F	ons- iber	
UNIT II	DATA LI	NK LAYER				9 +15	5	
Error – D	etection and	Correction – Parity – LRC - CRC – Hamming co	de – low Contro	ol and	l Error	contr	ol –	
IEEE 802	.3 - IEEE 80	02.5 - IEEE 802.11 – FDDI – SONET – Bridges.	willdow – HDL	C – I	LAIN -	- Luie	met	
List of Pr	ograms							
1. (a) Imp	lement Sing	le Bit Parity generator and checker using 'C' prog	ram.					
2. (a) Imp	lement Cycl	lic Redundancy checks sender and receiver using c	program.					
(b) Imp	lement chec	ksum sender and receiver using 'C' program.	1 0					
3. Simular	te Stop & W	Vait protocol.						
5. Implem	ent bit stuff	ing sender and receiver using c program.						
UNIT II	I NETWO	PRK LAYER				9+6		
Internetw	orks – Packe	et switching and Datagram approach – IP addressin	ng methods – su	ıbneti	ting – 1	Routi	ng –	
Distance '	Vector Rout	ing – Link State Routing – Routers.						
6. Simula	te the distar	nce vector routing algorithm.						
7. Simulate the link state routing algorithm.								
UNIT IV	TRANSPO	ORT LAYER				9 + 6	1	
Duties of	Transport L	ayer – Multiplexing – De multiplexing – Sockets	s – User Datagr	am P	rotoco	l(UD	P) –	
I ransmiss Services.	sion Contro	1 Protocol (1CP) – Congestion Control – Qual	iity of Service	(QU)	5) – 1	integra	ated	
List of Pr	ograms							
8. Implem	ent echo Se	rver sender and receiver using TCP.						
UNIT V	APPLICAT	TON LAYER				9+3		

Domain Name Space (DNS) – SMTP – POP 3 – Cryptography Case study on TCP/IP Architecture.	FTP – HTTP	- WWW- Security	<i>y</i> -
List of Experiments:			
10. Simulate the file transfer protocol using TCP.			
11. Implement byte stuffing sender and receiver using c	program.		
12. To study NS2-Simple programs.			
	LECTURE	PRACTICAL	TOTAL
	45	30	75
TEXT BOOKS	L		
1. Behrouz A Forouzan "Data Communications Netwo	rking" 4th Editio	on Tata McGraw Hill	, 2008.
2. Andrew S. Tanenbaum, David J. Wetherall, "Co	mputer Networl	ks", 5th Edition, 20	010, ISBN-10:
0132126958, ISBN-13: 978-0132126953	-		
E REFERENCES			
1. http://nptel.ac.in/courses/106105081/			
2. Nptel videos Computer Networks by Prof. Sujoy Gho	sh Department of	f Computer Science	& Engineering
Indian Institute of Technology, Kharagpur.			
3. E-Tools: https://www.wireshark.org/			
1.W. STALLINGS, "Data and Computer Communica	tion", 8th edition	, Pearson Education,	2006,
2. Larry L. Peterson and Peter S.Davie, "Computer Ne	tworks", Harcou	rt Asia Pvt Ltd., Seco	ond Edition
E REFERENCES			
1. http://nptel.ac.in/downloads/106108113/			
2. http://www.svecw.edu.in/Docs%5CCSECDLNo	otes2013.pdf		
3. https://www.wiziq.com/tests/compiler-design			
4. http://spoken-tutorial.org/			
5. http://vlab.co.in/			

Mapping of COs with POs:

						I	20						PS	5 0
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	0	0	0	0	0	0	0	0	0	0	0	3	1
CO 2	3	3	2	0	0	0	0	0	0	0	0	0	2	0
CO 3	3	3	3	0	0	0	2	0	0	0	0	0	3	1
CO 4	1	3	0	0	0	0	0	0	0	0	0	0	2	0
CO 5	1	3	0	0	0	0	0	0	0	0	0	0	2	1
Total	11	12	5	0	0	0	2	0	0	0	0	0	12	3
Scaled Value	2	2	1	0	0	0	1	0	0	0	0	0	2	0

 $1 ext{-} 5 ext{-} 1, 6 ext{-} 10 ext{-} 2, 11 ext{-} 15 ext{-} 3$

COURSI	E CODE	XUM606			L	Т	Р	С				
COURSI	E NAME	ECONOMICS FOR E	NGINEERS		3	0	0	3				
PRERE(UISITES				L	Т	P	Η				
C:P:A		2.64:0.24:0.12			3	0	0	3				
Learning	g Objectives											
≻ T	'o provide cor	nprehensive coverage of	economical con	ncepts	for precise	e deci	ision n	nakings in				
e	ngineering do	mains.										
≻ T	o develop the	e ability of engineers to	analysis the co	ost an	d revenue	by u	sing eq	conomical				
to	ools.											
COURSI	E OUTCOMI	ES			Domain		Level					
CO1	Explain the	concepts of economics i	in engineering	and	Cognitive		Under	stand				
	<i>identify</i> elem	nent of cost to prepare cos	t sheet		Psychomo	otor	Perce	ption				
CO2	Calculate a	and <i>Explain</i> the Break	k-even point	and	Cognitive		Under	stand				
	marginal cos	sting			Dauahomo	tor	& App Doroot	oly				
					i sycholiic	101	reice	puon				
CO3	Summarize	and Use value engineering	g procedure for		Cognitive		Under	stand				
	cost analysis	3			Affective		Receiv	ve				
CO4	Estimate rep	placement problem			Cognitive		Under	stand				
CO5 Compute, Explain and make Use of different methods Cognitive Understand												
of depreciation & Apply												
UNIT I.	 INTRODUC'	TION TO ECONOMICS	2					08				
Flow in a	n economy I	aw of supply and deman	d Concent of F	Engine	ering Eco	nomia	re _ Fr	oineering				
efficiency	¹ Economic e	fficiency. Scope of engine	ering economi	ice- tv	nes of cost	ting a	-s – Li elemen	t of costs				
nrenaratio	on of cost she	et and estimation Margin	nal cost Margi	inal R	evenue Si	ing, v ink c	ost Or	nortunity				
cost	on or cost she	tet and estimation, margin	nar cost, Margi		evenue, st		usi, Of	oportunity				
UNIT II:	BREAK-EV	EN ANALYSIS&SOCIA	AL COST BEN	NEFI	FANALY	SIS		12				
Margin o	of Safety, Pro	ofit, Cost & Ouantity A	nalysis-Produc	ct Miz	decision	s and	l CVP	analysis,				
Profit/Vo	lume Ratio (P	/V Ratio). Application of	Marginal costir	ng. Lii	mitations			, ,				
Social Co	ost Benefit A	nalysis: compare differe	nt project alter	rnative	es, Calcula	te dir	ect, in	direct and				
external e	effects; Monet	izing effects; Result of a s	ocial cost benef	fit ana	lysis.		,					
UNIT III	:DEPRECIA	TION			2			10				
Depreciat	tion- Introduc	ction, Straight line meth	od of depreci	iation,	declining	; bala	ance n	nethod of				
depreciati	ion-Sum of th	ne years digits method of	depreciation, s	sinkin	g fund me	ethod	of dep	preciation/				
Annuity r	nethod of dep	reciation, service output n	nethod of depre	eciatio	n.							
UNIT IV	: REPLACE	MENT AND MAINTEN	ANCE ANAL	YSIS				07				
Replacem	nent and Mai	ntenance analysis – Typ	es of maintena	ance,	types of 1	replac	ement	problem,				
determina	ation of econ	omic life of an asset, Re	eplacement of	an as	set with a	new	asset	– capital				
recovery	with return a	nd concept of challenger	and defender,	Simp	le probabil	listic	model	for items				
which fai	l completely.											
UNIT V:	INFLATION	AND PRICE CHANGE	C					08				
Definition	n, Effects, Cau	uses, Price Change with In	dexes, Types of	of Inde	x, Compos	site						
vs Comm	nodity Indexes	s, Use of Price Indexes in	n Engineering	Econo	omic Anal	ysis,	Cash F	Flows that				
inflate at	different Rate	S.				·····•						
			LECTURE	TU	ΓORIAL	Т	OTAL	1				
HOURS			45	0		4	5					
			••	U		,,	-					

TEXT BOOKS

- 1. G. Rajendra et.al., "Engineering Economy 1st Edition", New Age International, 2006
- 2. S.P.Jain& Narang, "Cost accounting Principles and Practice", Kalyani Publishers,
- Calcutta, 2012.

REFERENCES

- 1. James L. Riggs, David D. Bedworth, Sabah U. Randhawa : Economics for Engineers 4e , Tata McGraw-Hill
- 2. Donald Newnan, Ted Eschembach, Jerome Lavelle : Engineering Economics Analysis, OUP
- 3. John A. White, Kenneth E.Case, DavidB.Pratt : Principle of Engineering Economic Analysis, John Wiley
- 4. Sullivan and Wicks: Engineering Economy, Pearson

Table 1: Mapping of CO's with POs

]	PO						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	2	0	1	0	0	1	1	1	2	2	3		
CO2	2	2	1	2	0	0	2	1	1	2	3	3		
CO3	2	2	1	3	0	0	2	2	1	2	2	3		
CO4	1	2	1	2	0	0	0	1	1	1	2	3		
CO5	1	2	0	1	0	0	1	1	0	1	2	3		
Scaled	1	2	1	2	0	0	1	1	1	2	2	3		
Value														

$1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

COURSE CODE	XCSM02		L	Т	Р	С				
COURSE NAME	WEB DESIGNING		0.5	0	0.5	0				
PREREQUISITE	HTML AND DESIGNING TOOLS		L	Т	Р	H				
C:P:A	0.5:0.5:0		1	0	0	1				
COURSE OUTCO	MES	Domain		Lev	el					
Under	tand and perform the learning principles and	Cognitive		Und	erstand	1				
CO1 technic	ues of client-side programming with HTML5.	Psychomo	otor	Gui	ded					
				Und	erstand	1				
		Cognitive		App	ly	•				
CO2 Under	tana, demonstrate and use the Joomla 1001.	Psychomo	otor	Gui	ded					
	_			Res	ponse					
UNIT I HTMI	5			6						
HTML5 – Overvie	v – Syntax – Attributes – Events – Web Forms 2.0 – S	VG – Math	ML - V	Veb S	tore –	Web				
SQL Database – Se	ver Sent Events - Web Sockets – Canvas – Audio and	l Video – G	eolocati	on - 1	microd	ata —				
Drag and Drop – W	eb workers – IndexDDB – web Messaging – CORS –	web RIC.		6						
		~	~ ~ ~	U						
Introduction – Insta Menu – Extensions	llation – Architecture – Control Panel – Toolbar – Me Menu – Help Menu.	enus – Cont	ent Men	iu – C	Compor	ients				
UNIT IIIJOOML	A MENUS			6						
Create Menus – Adding Menu Items – Modifying Menu Items – Creating Submenus										
UNIT IV JOO	ALA MODULES			6						
Create Modules – H	readcrumb Module – Feed Display Module – Footer M	odule – Lat	est New	s moo	lule -	-				
Search Module – R	ndom Image Module – Who's Online Module – Syndi	cate module	e – Dona	tion I	Module	,				
UNIT V JOOM	LA ADVANCED			6						
Template Manager	- Customize Template - Adding Template - Creat	ing Templa	ite – Cu	istom	ize Log	go –				
Category Manager	ent – Adding Content – Formatting Content – Art	cle Metada	ita – Ao rin Mon	lding	Banne	rs –				
Manager – Website	Backup – Website SEO.	111KS – 1 1úg	gill ivialla	ager -	- LAU	151011				
	LECTURE TUTORIAI	PRACT	TICAL	TO	ГAL					
	15 0	15		30						
TEXT BOOKS										
1. Eric Meyer	on CSS: Mastering the Language of Web Design. 2003	. Eric Meye	er. New	Rider	S					
Publishing.	$\mathbf{D}_{\text{res}} = 11 \text{ (T} \mathbf{M}_{\text{res}} = 1 \text{ CEE} (C$		T 5)") 7	C						
2. A. Inomas	Powell, "The complete reference – HTML and CEE (C ~ 2010	overs HIM	$(L5)^{\circ}$ M	cGrav	v Hill,					
Filui Eului	1, 2010. ming Solutions Inc. "HTML 5 Plack Pook: Covers CS	2 Invesori	nt VMI	vu	тмі					
J. Kogent Lea	Ining Solutions Inc. HTWL5 Black Book. Covers CS.	55, Javasen	pi, Alvil	., лп	I WIL,					
Ajax, FIIF A Kogent Lee	rning Solutions Inc "Web Technologies: HTML JavaS	cript DHD	Iava IS	D VI	MI and	1				
4. Kögent Lea	k Book" Dreamtech Press 2009	onpi, i m ,	Java, JD	n , A1		L				
5. Jennifer M	rriott, Elin Waring, "The Official Joomla! Book – 2^{nd} I	Edition". Ad	ldison-W	Vesley	7					
Professiona	l, 2012.									
REFERENCES										
1. Build Your Own	Web Site the Right Way Using HTML & CSS 2nd Ed	ition by Ian	Llovd.							
2 The Eccontial C	de to CSS and HTMI. Wab Dasign (Essentials) by Cro	ig Groppol								
	the to Cost and III will web Design (Essentials) by Cla	ig Orailliel.								

COUI	RSE C	CODE	XUM704		L T P C									
COUI	RSE N	AME	BIOLOGY		3	3 0 0 I T P								
C:P:A			3:0:0		L	Т	Р	С						
					3	0	0	3						
COUI	RSE O	UTCOM	ES	Domain		Ι	Level							
CO1	To d	escribe h	ow biological observations of 18th Century that	Cognitive	1	Unc	lersta	and						
	lead	to major d	liscoveries.											
CO2	Expl	ain the cel	l morphology and their functions	Cognitive	1	Unc	lersta	and						
CO3	Expl	ain the cel	l functioning and the physiological system	Cognitive	1	Unc	lersta	and						
CO4	To c	lassify the	Biomolecules and to understand the essential of	Cognitive	1	lersta	and							
	Ami	no Acids I	DNA/RNA											
CO5	App	ly Biologic	cal sciences in Engineering Applications.	Cognitive	1	Unc	lersta	and						
			COURSE CONTENT			H	Iour	5						
UNIT	I	Introduc	ction				6							
		Fundame	ental differences between science and engineering	by drawing a	ı									
		comparis	on between eye and camera, Bird flying and aircra	ft Why we	•									
		need to s	tudy biology? - Biological observations of 18th Centre	ary that lead to)									
		major di	scoveries Examples from Brownian motion and	the origin of	f									
		thermody	namics by referring to the original observation of	Robert Brown	ı									
		and Juliu	s Mayor.		e Understand e Understand e Understand e Understand Hours 6 g a we to of wn 9 cal ne- ind 9 to ory 9 uss les									
UNIT	II	Cell Biol	logy			L I F 3 0 0 Level Understan Understan Understan Understan Understan Hours 6 9 9 9 12 12 45								
		Introduct	ion to the cell biology - Cell size and shape	e - Chemica	1									
		composit	ion -Classification of cell and its properties; Ce	ell membrane	-									
		Nucleus	-Mitochondria- Endoplasmic Reticulum Ly	vsosome and	1									
		Peroxiso	me; Microscopy and its types.		9 al e- id 9 co									
UNIT	III	Cell Phy	siology				9							
		Cell cycl	e; Cell signaling, Transport across cell membrane; l	introduction to)									
		Human p	bhysiology - Circulatory system - Respiratory syste	m - Excretory	/									
		system -	Nervous system.											
UNIT	IV	Biomole	cules				9							
		Molecule	es of life - Monomeric units and polymeric structu	ures - Discuss	5									
		about sug	gars, starch and cellulose. Amino acids and proteins	s. Nucleotides	5									
		and DNA	A/RNA. Two carbon units and lipids.											
UNIT	V	Modern	Applications in Biological Sciences				12							
		Principle	s and Application of Biosensor; Basics of Biochips -	– Bio fertilize	r									
		– Bioinf	ormatics – Bio fuel – Introduction to Bio mecha	inics - Neura	1									
		Network	: Artificial Intelligence (AI) - Stem Cell; Introduction	on to Genetics	;									
		Genetic I	Engineering and its Application, Safety Hazardous Ef	fect.										
				Total Hours	5		45							
TEXT	BOO	KS/REFI	ERENCE BOOKS											
1) Bio	logy:	A global a	approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa:	Cain, M, L.;	Wa	sse	rman	, S.						
A.; Mi	inorsk	y, P. V.; Ja	ackson, R. B. Pearson Education Ltd				_							
2) Dr.	Sohin	1 Singh an	d Dr. Tanu Allen, "Biology for Engineers", Vayu E	ducation of In	dia,	Ne	w De	elhi,						
2014.														

References:

1) Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley and Sons

2) Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company

3) Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher

4) Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers 5)Biology for Engineers (ISBN: 9781121439931), TMH

Online References:

i) www.bio12.com/ch3/RaycroftNotes.pdf

ii) www.engineering.uiowa.edu/bme050/cvb-solids.pdf

iii) www.biologyjunction.com/mendelian_genetics.html

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

						Р	0						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2	1	1	0	1	2	1	0	0	3	3	2	1
CO2	2	2	2	1	0	1	2	1	0	0	3	3	3	1
CO3	3	2	1	1	0	1	2	1	0	0	3	3	2	1
CO4	2	2	1	1	0	1	2	1	0	0	3	3	1	1
CO5	3	2	1	2	0	1	2	1	0	0	3	3	2	1
	13	10	6	6	0	5	10	5	0	0	15	15	10	5

 $1 \text{-} 5 \rightarrow 1, 6 \text{-} 10 \rightarrow 2, 11 \text{-} 15 \rightarrow 3$

						RSE CODE XUM705 L T P							
COU	RS	E CODE	XUM705		L	Т	P	С					
COU	RS	E NAME	DISASTER MANAGEMENT		3	0	0	0					
PRE	RE	QUISITE			L	Т	P	Η					
C :	P :	A	2.64 : 0.24 :0.12		3	0	0	3					
COU	IRS	E OUTCO	ME	Domain]	Level						
CO	1	Understan types of dis	d the concepts of application of saster preparedness	Cognitive	App	licatio	on						
CO	2	Apply GIS	and RS for disaster mitigation	Cognitive	Ana	lyze							
CO.	3	Know the	essentials of risk reduction	Cognitive	Ana	lyze							
CO	4	Estimate I	Disaster and mitigation aspects	Cognitive	App	licatio	n						
CO	5	Understan tsunami	d the effects of earthquake and	Cognitive	App	licatio	on						
COU	RS	IRSE CONTENT T I											
UNI	IT I INTRODUCTION												
	UNIT INTRODUCTION Introduction – Disaster preparedness – Goals and objectives of ISDR Programme- Risk identification – Risk sharing – Disaster and development: Development plans and disaster management –Alternative to dominant approach – disaster – development linkages - Principle of risk												
UNI	ГΠ	APPL	JCATION OF TECHNOLOGY IN	DISASTER RI	SK			9					
		REDU	JCTION										
		Appli	cation of various technologies: Data b	ases – RDBMS -	– Man	agem	ent						
		Inform	nation systems – Decision support	system and other	ner sy	stems	— 120						
		teleco	apine information systems – intra	Remote sensing	mets	– VIC neight	leo						
		contri	bution of remote sensing and GIS - Ca	ise study	,-an n	lisigin	. —						
UNI	ГП	I AWA	RENESS OF RISK REDUCTION					9					
		Trigge	er mechanism – constitution of trigge	er mechanism –	risk r	educti	ion	-					
		by ed	ucation – disaster information netwo	ork – risk reduc	tion b	y put	olic						
		aware	ness										
UNIT IV DEVELOPMENT PLANNING ON DISASTER													
Implication of development planning – Financial arrangements – Areas of													
		impro	vement – Disaster preparedness –	- Community l	based	disas	ter						
		manag	gement – Emergency response.										
UNI	ľV	<u>SEIS</u>	MICITY			4	1	9					
		Seism	ic waves – Earthquakes and faults	- measures of a	an ear	tnqua	ке,						
		magni	iude and mensity – ground damage –	i sunamis and e	arınqu	T	otol	15 hm					
1						10	ual	43 NFS					

TEXT BOOKS Siddhartha Gautam and K Leelakrishna Rao, "Disaster Management Programmes and Policies", Vista International Pub House, 2012. Arun Kumar, "Global Disaster Management", SBS Publishers, 2008. REFERENCES Encyclopedia of Disaster Management, Neha Publishers & Distributors, 2008. Pardeep Sahni, Madhavimalalgoda and Ariyabandu, "Disaster risk reduction in south Asia", PHI, 2002. Amita Sinvhal, "Understanding earthquake disasters" TMH, 2010. Pardeep Sahni, Alka Dhameja and Uma Medury, "Disaster mitigation: Experiences and reflections", PHI, 2000.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

						P	0						PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1					5	2							
CO2	2					1	2					1		
CO3	1					2	2	1				2		
CO4	1					2	2	1				1		
CO5						5	2	3				1		
	5					15	10	5				5		

 $1 \text{-} 5 \rightarrow 1, 6 \text{-} 10 \rightarrow 2, 11 \text{-} 15 \rightarrow 3$

COURS	SE CODE	XCS706		L			C
COURS	SE NAME	PROJECT PHASE – I		0	0	6	6
C:P:A		5:0.5:0.5					
				L	Т	Р	Η
				0	0	6	12
COURS	SE OUTCOMES	Domair	1	Le	vel	<u> </u> <u> </u>	
CO1	<i>Identify</i> the En interest.	gineering Problem relevant to the domain	Cognitiv	ve	Ar	nalyze	
CO2	Interpret and I	nfer Literature survey for its worthiness.	Cognitiv	ve	Aŗ		
CO3	Analyse and identified the problem.	entify an appropriate technique for solving	Cognitiv	ve	Aŗ	ply	
CO4	<i>Perform</i> experi- /Simulation/Pro	mentation ogramming/Fabrication, <i>Collect</i> , and	Cognitiv Psychor	gnitive ychomotor		Create Guided	
	<i>interpret</i> data.			Response		e	
CO5	Record and Re	Cognitiv	ve	Ur	Understand		
CO6	Devote oneself	as a responsible member and <i>display</i> as a	Cognitiv	ve	Create		
	leader in a team	n to <i>manage</i> projects.	Affectiv	ve	Re	spone	1
CO7	Responding of	project findings among the technocrats.	Affective Respond				

CO Vs PO Mapping

	PO	PS	PS											
	1	2	3	4	5	6	7	8	9	10	11	12	01	02
CO1	3	3	-	-	-	1	1	1	-	-	-	1	3	2
CO2	2	2	-	1	-	-		-	-	-		0	3	2
CO3	1	1	1	2	2	1	1	1	-	-		0	3	2
CO4	2	2	3	3	3	1	1	1	-	-		0	3	2
CO5	1	1	1	1	1	-	-	-	2	3	2	3	3	2
CO6	-	-	-	2	-	3	1	3	3	3	2	3	3	2
CO7	1	1	-	2	-	3		-	1	3	2	1	3	2
Total	10	10	5	11	6	10	4	6	6	9	6	8	21	14
Scale	2	2	1	3	2	2	1	2	2	2	2	2	3	3
d														

COURSE CODE	XCS707	L	Т	P	С
COURSE NAME	IN-PLANT TRAINING – III	0	0	0	0
C:P:A	0:0:0				
		L	T	Р	H
		0	0	0	0

COUR	SE OUTCOMES	Domain	Level
CO1	<i>Relate</i> classroom theory with workplace practice	Cognitive	Understand
CO2	<i>Comply with</i> Factory discipline, management, and business practices.	Psychomotor	Guided Response
CO3	Demonstrates teamwork and time management.	Psychomotor	Guided Response
CO4	Describe and display hands-on experience on practical skills obtained during the programme.	Psychomotor	Perception
CO5	<i>Summarize</i> the tasks and activities done by technical documents and oral presentations	Psychomotor	Guided Response

CO Vs PO Mapping

	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C01	2	0	0	0	0	0	0	0	0	0	0	0
CO2	0	0	0	0	0	0	1	3	0	0	1	0
CO3	0	0	0	0	0	0	0	0	3	1	3	1
CO4	0	1	2	1	3	0	0	0	0	0	0	3
CO5	0	0	0	3		0	0	0	0	3	0	1
Total	2	1	2	4	3	0	1	3	3	4	4	5
Scaled	1	1	1	1	1	0	1	1	1	1	1	1

COUR	SE CO	DE	XCSM03		L	T	Р	С			
COUR	SE NA	ME	R PROGRAMMING		1	0	0	0			
PRERF	EQUIS	ITES			L	T	Р	H			
С	P	Α	0.0 0.0 0.0		1	0	0	1			
COURS students	SE OU s should	TCOM d be abl	IES: Upon completion of the course, the e to	Doi	main		Leve	el			
CO1Demonstrate how to install and configure RStudioCognitiveUnderstand											
CO2	Expl	ain the	use of data structure and loop functions.	Cognit	ive	Un	dersta	nd			
CO3	Impl vario	ement 1 ous prob	ists and matrices to provide solutions for lems.	Cognit	ive	Un	dersta	nd			
CO4	Stud statis	y abou stical pr	t factors and data frames and to solve oblems.	Cognit	ive	Un	dersta	nd			
CO5	Appl using	y vario g R.	ous plot functions to visualize the results	Cognit	ive	Un	dersta	nd			
UNIT I	INT	RODU	CTION					2			
Overvie	w of R	, R data	a types and objects, reading and writing data,	sub set	ting R O	bject	s, Esse	entials			
of the F	R Lang	uage, Ir	stalling R, Running R, Packages in R, Calcu	ulations	, Comple	ex nu	imbers	in R,			
Roundi	ng, Ari	thmetic	, Modulo and integer quotients, Variable na	ames an	d assign	ment	t, Ope	rators,			
Integers	s, Facto	rs, Logi	cal operations								
UNIT II CONTROL STRUCTURES, VECTORS, AND FUNCTIONS3											
Contro	l Struc	ctures:	If statement, ifelse statement, if- else() fu	inction,	switch()	fun	ction,	repeat			
loop, w	hile lo	op, for	loop, break statement, next statement, Vector	ors: Cre	ating Ve	ector	s, Acc	essing			
element	s of a	Vector	, Operations on Vectors, Vector Arithmetics	; Funct	ions: Fo	rmal	and	Actual			
arguments, Named arguments, Global and local variables, Argument and lazy evaluation of											

functions, Recursive functions

UNIT III LISTS AND MATRICES3Lists: Creating Lists, General List Operations, List Indexing Adding and Deleting List Elements,
Getting the Size of a List, Accessing List Components and Values, Applying Functions to Lists,
Matrices - Creating matrices, Accessing elements of a Matrix, Operations on Matrices, Matrix
transpose

UNIT IV FACTORS AND DATA FRAMES3Data Frames: Creating data frame, Operations on data frames, Accessing data frames, Common
Functions Used with Factors, Creating data frames from various sources, Factors: Understanding
factors, Modifying factors, Factors in Data frames.3UNIT V DATA VISUALIZATION IN R4

Need for data visualization, Bar plot. Plotting categorical data, Stacked bar plot, Histogram plot() function and line plot, pie chart / 3D pie chart, Scatter plot, Box plot.

LECTURE	TUTORIAL	TOTAL
15	0	15

- 1. Roger D. Peng," R Programming for Data Science ", 2012.
- 2. Norman Matloff, "The Art of R Programming- A Tour of Statistical Software Design", 2011.

REFERENCE BOOKS

Garrett Grolemund, Hadley Wickham,"Hands-On Programming with R: Write Your Own Functions and Simulations", 1st Edition, 2014

E-REFERENCE

- 1. https://swayam.gov.in/nd1_noc19_ma33/preview
- 2. http://www.r-tutor.com/elementary-statistics
- 3. https://www.tutorialspoint.com/r/

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

			PSO											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	-	1	-	3	-	-	-	2	1	-	3	3	1
CO 2	3	-	1	-	3	-	-	-	2	1	-	3	3	1
CO 3	3	-	1	-	3	-	-	-	2	1	-	3	3	1
CO 4	3	-	1	-	3	-	-	-	2	1	-	3	3	1
CO 5	3	-	1	-	3	-	-	-	2	1	-	3	3	1
	15	-	5	-	15	-	-	-	10	5	-	15	15	5

		PO												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
Original	15	-	5	-	15	-	-	-	10	5	-	15	15	5
Scaled to 0,1,2,3 scale	3	-	1	-	3	-	-	-	2	1	-	3	3	1

 $1 ext{-} 5 ext{-} 1, 6 ext{-} 10 ext{-} 2, 11 ext{-} 15 ext{-} 3$

COURSE CODE XUM801 L T P									С			
COUI	RSE NA	ME	CYBER SECURITY		3	0)	0	3			
С	Р	Α	300		0	0)	Р	Η			
					3	0)	0	3			
COUI	RSE OU	TCOMES		Domain		~	L	level				
CO1	To i conc	<i>dentify</i> , <i>lear</i> cepts of netw	<i>n, practice,</i> and <i>understand</i> the basic orks and cyber-attacks.	Cognitive	-	Rem Anal Appi	emi lyse ly.	ber, ,				
CO2	To a the s	<i>lefine</i> the co scanning too	ncepts of system vulnerability scanning and ls	Cognitive		Rem	eml	ber				
CO3	To a defe dete	<i>lemonstrate,</i> nse mechani ct and quara	<i>describe</i> , and <i>differentiate</i> the network sms and <i>identify and apply</i> the tools used to ntine network attacks.	Cognitive		Und Anal App	ersta lyze ly.	and, ² ,				
CO4	To a scan	lescribe, diff ning.	<i>Terentiate, apply</i> the different tools for	Cognitive		Und Anal App	ersta lyze ly.	and,				
CO5	CO5To <i>identify</i> and <i>list</i> the types of cybercrimes, cyber laws and cyber-crime investigations.CognitiveRemember											
UNIT	I – INT	RODUCTI	ON						9			
for Di attacks Securi Organ Protoc hub, g UNIT Overv Probe, Scann Netwo – Tcpo UNIT Firewa Packet Forwa Detect	stributed s, Classi ty Chal izations, cols TCP ateway a II - SYS iew of v Vulner ing - N ork Reco dump and III - NE alls and I t Charact rding, th	I Information fication of <i>i</i> lenges in Laptops se /IP, IPV4, an and Modulati STEMS VUI ulnerability rability Prob letcat, Soca nnaissance d Windump, CTWORK E Packet Filter teristic to Fil le basic of V em, Cryptoo	 h Systems: Role of Internet and Web Service Threats and assessing Damages Security in Mobile Devices, authentication service Security Concepts in Internet and World Wide and IPV6. Functions of various networking com on Techniques. LNERABILITY SCANNING scanning, Open Port / Service Identification, be, Vulnerability Examples, OpenVAS, Mean at, understanding Port and Services tools Nmap, THC-Amap and System tools. N Wireshark, Ettercap, Hping Kismet. DEFENCE TOOLS s: Firewall Basics, Packet Filter Vs Firewall, F ter, Stateless VsStateful Firewalls, Network A Virtual Private Networks, Linux Firewall, Win 1. 	es. Informatic mobile and ecurity, Secu e Web: Brid ponents-rout Banner / Ve etasploit. Ne - Datapipe fetwork Sniffe How a Firewa ddress Transl dows Firewa	on S Wire urity ef re ers, two ers ion two e, F ers a ll Pr latio III, S	yster eless Imj eviev bridą n Ch rks Fpipe nd I rotec n (N nort:	m T Cc plic w o ges, vo ges, Vul c, V njec ts a AT	Treats omput ation f Inte switc switc switc switc nerab VinRe ction t Netw) and roduc	and ing- for ernet ches, 9 affic oility elay, tools 9 vork, Port ction			
UNIT	IV – T(OOLS FOR	SCANNING						9			
Scanni Stunne and Bi UNIT	ing for v el, Appli rute-Forc V - INT	veb vulnerat cation Inspe ce Tools – Jo RODUCTI	bilities tools: Metasploit tool, Nikto, W3af, H ction tools – Zed Attack Proxy, Sqlmap. DV hn the Ripper, L0htcrack, Pwdump, THC-Hyd ON TO CYBER CRIME AND LAW	ITTP utilities WA, Webgo ra.	s - C at, F	Curl, Passv	Ope	enSSI 1 Cra	L and cking			
Cyber	Crimes,	Types of	Cybercrime, Hacking, Attack vectors, C	yberspace a	nd C	Crim	inal	Beha	avior,			
Clarifi Respo Histor as Tai Introdu Trojan wirele	cation of nse, Dig y of the rgets, Co uction to and bac ss Netwo	of Terms, Tr ital Forensic Internet, Re ontaminants Cyber Crim ckdoors, Ste orks.	raditional Problems Associated with Computers, Computer Language, Network Language, Fecognizing and Defining Computer Crime, and Destruction of Data, Indian IT ACT 2 are Investigation: Password Cracking, Key logg ganography, DOS and DDOS attack, SQL inj	er Crime, In Realms of the Contemporation 000. ers and Spyw ection, Buffe	e Cyl ry (vare, er Ov	luctio ber v Crim Viru verfl	on t worl es, is an ow,	to Inc Id, A Comp nd We Attac	bident Brief outers orms, ck on			

			LECTURE	TUTORIAL	TOTAL
			45	0	45
TEX	T	BOOKS			
]	Ι.	Nina Godbole, "Information Systems Security: Security Practices, w/cd", Wiley Publications, 2008, ISBN 10: 8	/ Management, 1 126516925, ISE	Metrics, Framewo 3N 13 : 97881265	orks and Best 16926
2	2.	Thomas J. Mowbray, "Cybersecurity: Managing Sys Intrusions", Wiley Publications, 2013, Kindle Edi 9788126549191	stems, Conducti tion, ISBN 10	ng Testing and : 812654919X,	Investigating ISBN 13 :
	3.	D.S. Yadav, "Foundations of Information Technolo Edition, 2006, ISBN-10: 8122417620, ISBN-13: 978-8	gy", New Age 122417623.	International pu	ublishers, 3 rd
REF	ΈI	RENCES			
]	Ι.	Mike Shema, "Anti-Hacker Tool Kit", McGraw Hill Ec	lucation, 4 th edit	ion, 2014,	
	2.	Nina Godbole, SunitBelapure, "Cyber Security Under	rstanding Cyber	Crimes, Comput	ter Forensics
		and Legal Perspectives", Wiley publications, 2 9788126521791.	013, ISBN 10	: 8126521791,	ISBN 13 :
2	3.	Corey Schou, Daniel Shoemaker, "Information Ass	surance for the	Enterprise: A	Roadmap to
		Information Security (McGraw-Hill Information Assura	ance & Security)",	
		Tata McGraw Hill, 2013, ISBN-10: 0072255242, ISBN	1-13: 978-00722	55249.	
4	1.	VivekSood, "Cyber Laws Simplified", McGraw Hill	Education (IND	OIA) Private Limi	ited in 2001,
	_	ISBN-10: 0070435065, ISBN-13: 978-0070435063.	1:1 0005 51		
).	Steven M.Furnell, "Computer Insecurity", Springer Put	blisher, 2005 Ed	ition.	
E – J	RE	FERENCES			
]	Ι.	https://www.cryptool.org/en/			
	2.	https://www.metasploit.com/			
	3.	http://sectools.org/tool/hydra/			
4	1.	http://www.hping.org/			
4	5.	http://www.winpcap.org/windump/install/			
(5.	http://www.tcpdump.org/			
	7.	https://www.wireshark.org/			
8	3.	https://ettercap.github.io/ettercap/			
ç).	https://www.concise-courses.com/hacking-tools/top-ter	n/		
1	10.	https://www.cirt.net/Nikto2			
]	11.	http://sqlmap.org/			

Table 1: Mapping of COs with POs

]	PO						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	3	3	3	3	0	2	2	2	0	0	0	3	2
CO2	3	3	3	3	2	1	1	1	2	0	0	0	3	2
CO3	0	3	2	2	0	1	2	2	0	0	0	0	0	0
CO4	2	2	2	2	0	0	0	0	0	0	0	0	0	0
CO5	3	2	3	3	3	0	2	2	2	0	0	0	3	2
Total	11	13	13	13	8	2	7	7	6	0	0	0	9	6
Scaled value	3	3	3	3	2	1	2	2	2	0	0	0	2	2

1-5→1, 6-10→2, 11-15→3

COURSE	E CODE	XCS804	L	Τ	P	С			
COURSE	E NAME	PROJECT WORK PHASE – II		0	0	6	6		
C:P:A		5:0.5:0.5	•						
				L	Т	Р	Η		
				0	0	6	12		
COURSE	E OUTCOMI	ES	DOMAIN		LE	VEL			
CO1	Identify the domain inte	e Engineering Problem relevant to the erest.	Cognitive	Analyze					
CO2	<i>Interpret</i> a 5worthines	nd <i>Infer</i> Literature survey for s.	Cognitive	App					
CO3	Analyze an solve the p	d <i>identify</i> an appropriate technique for roblem.	Cognitive	Apply					
CO4	Perform ex Programmi and interp	perimentation Simulation/ ng/ Fabrication, <i>Collect</i> , <i>ret</i> data.	Cognitive Psychomotor	Apply Guided Respor			nse		
CO5	Record and document.	<i>Report</i> the technical findings as a	Cognitive	Understand					
CO6	Devote one display as a	self as a responsible member and a leader in a team to <i>manage</i> projects.	Cognitive Affective	Cre Res	Create Respond				
CO7	Responding technocrats	g of project findings among the $\frac{1}{2}$.	Affective	Res	pond				

CO Vs PO Mapping

	DO1	PO	PSO1	PSO2										
	PUI	2	3	4	5	6	7	8	9	10	11	12		
CO1	3	3	-	-	-	1	1	1	-	-	-	1	3	2
CO2	2	2	-	1	-	-		-	-	-			3	2
CO3	1	1	1	2	2	1	1	1	-	-			3	2
CO4	2	2	3	3	3	1	1	1	-	-			3	2
CO5	1	1	1	1	1	-	-	-	2	3	2	3	3	2
CO6	-	-	-	2	-	3	1	3	3	3	2	3	3	2
CO7	1	1	-	2	-	3		-	1	3	2	1	3	2
Total	10	10	5	11	6	10	4	6	6	9	6	8	21	14
Scaled	2	2	1	3	2	2	1	2	2	2	2	2	3	3

COUR	L	Т	P	С								
COUR	SE NA	ME	ARTIFICIAL INTELLIGENCE		3	0	0	3				
С	P	A	300		L	T	P	H				
COUD	SE OI	ITCO	MES	Domoin	3	U T	0	3				
COUR	SE UU		vies	Domain	_	L	Level					
CO1	Rep	resent	knowledge using propositional calculus and	Cognitive	U	nder	stand					
CO2	Solv	ve sear	ch problems by applying a suitable search strategy	Cognitive	A	nnlv						
001	201		en procients of approximate sector strategy	e og mar o		-PP-J						
CO3	Use	infere	nce rules to produce predicate calculus expression.	Cognitive	A	pply						
CO4	App	<i>ly</i> and	design a fuzzy logic system using fuzzy rules	Cognitive	A	pply						
CO5	Unc	lerstan	<i>d</i> various optimization methods and know about	Cognitive	U	nder	stand					
genetic algorithm												
	UNIT I INTRODUCTION 9											
History Genera	/ of A	I; Cha lem S	racteristics of AI applications, Problem Solving b olving Production Systems Control Strategies: E	y Search and orward and B	Con lacky	trol S vard	Strate Chai	gies,				
Exhaus	stive Se	arches	: Depth First and Breadth First Search.	orward and L	Juckv	aru	Chan	iiiig,				
UNIT	II SE	ARCH	ISTRATEGIES					9				
Hill cl	imbing	- Ba	cktracking - Graph search - Properties of A* als	gorithm - Moi	notor	e re	stricti	on -				
Special	lized p	oducti	on systems - AO* algorithm. Constraint Satisfaction	Problems Gam	ne Pla	iying	Min	Max				
Search	procec	lure.	WI FOCE DEDDESENTATION					0				
UNII	111							9				
Game to Pred	playing licate C	; - Kno Calculu	wledge Representation, Knowledge Representation is, Reasoning, Use of Predicate Calculus, Knowledge	sing Predicate Representation	Logi 1 usii	ic, In ig otl	trodu	ction ogic-				
Structu	ired Re	presen	tation of Knowledge, STRIPS	_		_		_				
UNIT	IV	FUZ	ZZY SET THEORY					9				
Introdu	iction t	o Neur	o – Fuzzy and Soft Computing – Fuzzy Sets – Basic	Definition and	Tern	ninol	ogy –	Set-				
theoret	ic Ope	rations	6 – Member Function Formulation and Parameteri	zation – Fuzzy	y Ru Paar	les a	nd F	uzzy				
Inferen	ice Sys	tems –	Mamdani Fuzzy Models – Sugeno Fuzzy Models –	Tsukamoto Fu	IZZY	Mode	g – 1 els – 1	Input				
Space	Partitio	ning aı	nd Fuzzy Modeling.		•			•				
UNIT	V	OPTI	MIZATION					9				
Deriva	tive-ba	sed Op	timization - Descent Methods - The Method of Stee	pest Descent –	Clas	sical	New	ton's				
Metho	d – Ste	ep Siz	e Determination – Derivative-free Optimization –	Genetic Algor	rithm	s –	Simu	lated				
Annea	iiiig – r	Calluon	LECTU	RE TUTORI	AL		тот	FAL				
			45	0			4	5				
TEXT	TEXT BOOKS											
1.	Elaine	e Rich	and Kevin Knight: Artificial Intelligence – Tata McG	raw Hill, 2008								
2.	Dan V	V. Patt	erson, "Introduction to AI and ES", Pearson Education	n, 2007. Addison-Wesle	vIo	nome	in 10	98				
	U.Lu	, ···	Lation,		., L U		, 17	/0				
REFE	RENC	ES										
1.	Nils J	. Nilss	on: Principles of Artificial Intelligence – Narosa Publ	ication house.			-					
2.	Artifi Edi	cial Intition.	telligence: A Modern Approach, Stuart Rusell, Peter	r Norving, Pea	rson	Educ	ation	2nd				

- 3. Artificial Intelligence, Winston, Patrick, Henry, Pearson Education.
- 4. Artificial Intelligence by Gopal Krishna, Janakiraman.
- 5. N.J. NILSSON, "Principles of Artificial Intelligence", Narosa Publishing House, 1980

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

							РО						PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	1	3	0	0	0	0	0	0	0	0	0	0	1	0	
CO2	1	3	0	0	0	0	0	0	0	0	0	0	2	0	
CO3	1	3	0	1	1	0	0	0	0	0	0	0	3	0	
CO4	1	3	0	2	0	0	0	0	0	0	0	0	1	0	
CO5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
Total	5	13	0	3	1	0	0	0	0	0	0	0	6	0	
Scaled Value	1	3	0	1	1	0	0	0	0	0	0	0	2	0	

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

COURS	E COD	E	XCSE52		L	Т	Р	С			
COURSE CODE XCSE52 COURSE NAME GRAPH THEORY C P A 3.0 0.0 0.0 LEARNING OBJECTIVES: • Be familiar with the most fundamental Graph Theory topics and results. • Be exposed to the techniques of proofs and analysis. • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •								3			
C	P A	1	3.0 0.0 0.0		L	Т	Р	Η			
LEARN	ING OI	BJE	CTIVES:			L					
•]	Be famil	liar v	vith the most fundamental Graph Theory topics and r	esults.							
	Daarma	and t	the techniques of proofs and evolution								
COURS	F OUT		o the techniques of proofs and analysis.	Domain		T	معما				
COUNS				Domani							
CO1	Write	prec	ise and accurate mathematical definitions of objects	Cognitive	R	lemei	nber				
	in grap	ph th	eory.	~	L	nder	stand				
CO2	Use r	math	ematical definitions to identify and construct	Cognitive	R	lemei	nber				
	examp	ples a	ind to distinguish examples from non-examples.		L	nder	stand				
CO3	examples and to distinguish examples from non-examples.UnderstandCO3Validate and critically assess a mathematical proof.CognitiveRemember UnderstandCO4Use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions.CognitiveRemember UnderstandCO5Reason from definitions to construct mathematical proofs.CognitiveRemember UnderstandUNIT IINTRODUCTION9Graphs – Introduction – Isomorphism – Sub graphs – Walks, Paths, Circuits –Connectedness – Components – Euler graphs – Hamiltonian paths and circuits – Trees – Properties of trees – Distance and centres in tree – Rooted and binary trees.9										
CO4Use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions.CognitiveRemember UnderstandCO5Reason from definitions to construct mathematical proofs.CognitiveRemember Understand											
CO4Use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions.CognitiveRemember UnderstandCO5Reason from definitions to construct mathematical proofsCognitiveRemember											
~~-	mather	mati	cal thinking in creative investigation of questions.		l	nder	stand				
CO5	Reason	n fro	m definitions to construct mathematical proofs.	Cognitive	R	lemei	nber				
			NYOTYON		L	Understand					
UNITI	INI	rko	DUCTION					9			
Graphs -	- Introdu	uctio	n – Isomorphism – Sub graphs – Walks, Paths, Circu	its –Connected	iness	- Co	ompoi	nents			
– Euler g	graphs –	- Har	niltonian paths and circuits – Trees – Properties of tr	ees – Distance	and c	entre	es in t	ree –			
Rooted a	and bina	ry tr	ees.								
UNIT II	[TREE	ES, (CONNECTIVITY & PLANARITY					9			
Spanning	g trees –	- Fun	damental circuits – Spanning trees in a weighted gra	ph – cut sets –	Prop	erties	s of ci	ut set			
– All cu	it sets –	Fun	damental circuits and cut sets – Connectivity and	separability – 1	Netw	ork f	lows	- 1-			
Isomorp	hism –	2-Is	comorphism – Combinational and geometric grap	phs – Planer	grap	ns –	Diff	erent			
represen	tation of	f a pl	aner graph.	T				0			
UNIT II			RICES, COLOURING AND DIRECTED GRAPH	1				8			
Chromat	tic numb	ber –	Chromatic partitioning – Chromatic polynomial –	Matching – Co	verir	ng — 1	Four	color			
problem	- Direc	ted g	graphs – Types of directed graphs – Digraphs and bi	nary relations -	- Dir	ected	paths	s and			
connecte	edness –	Eule	er graphs.								
UNIT I	V]	PER	MUTATIONS & COMBINATIONS					9			
Fundame	ental pri	incin	les of counting - Permutations and combinations -	Binomial theo	rem	- cor	nhina	tions			
with ren	petition	- C	combinatorial numbers - Principle of inclusion a	and exclusion	- D	eran	vemei	nts -			
Arrangements with forbidden positions											
UNIT V	G	ENF	CRATING FUNCTIONS					10			
Generati	ng func	tion	s - Partitions of integers - Exponential generating	function – Su	mma	tion	opera	tor -			
Recurren	nce relat	tions	- First order and second order – Non-homogeneou	s recurrence re	latio	ns - 1	Metho	od of			
generatii	ng functi	ions.									
<u> </u>	<u> </u>		LECTU	RE TUTORI	AL		TOT	FAL			
			Δ5	Λ			Δ	5			
				v			-				
REFER	ENCES	5									

- 1. Narsingh Deo, "Graph Theory: With Application to Engineering and Computer Science", Prentice Hall of India, 2003.
- 2. Grimaldi R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", Addison Wesley, 1994.
- 3. Clark J. and Holton D.A, "A First Look at Graph Theory", Allied Publishers, 1995.
- 4. Mott J.L., Kandel A. and Baker T.P. "Discrete Mathematics for Computer Scientists and Mathematicians", Prentice Hall of India, 1996.
- 5. Liu C.L., "Elements of Discrete Mathematics", McGraw Hill, 1985.
- 6. Rosen K.H., "Discrete Mathematics and Its Applications", McGraw Hill, 2007.

E-References:

- https://nptel.ac.in/courses/106108054/
- https://nptel.ac.in/courses/111106086/51

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

		РО												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2		
CO 1	3	2	1	1	1	0	1	0	0	0	0	1	2	2		
CO 2	1	3	2	1	1	0	0	0	0	0	0	1	2	2		
CO 3	1	2	3	1	0	0	0	0	0	0	0	1	2	2		
CO 4	1	2	2	3	0	0	0	0	0	0	0	1	2	2		
CO 5	0	2	3	3	0	0	0	2	0	0	0	1	2	2		
Total	6	10	7	2	0	1	0	3	0	0	0	5	5	10		

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

COURSE CODE			XCSE53	L	Т	P	C					
COUF	RSE N	AME	DATA COMMU	DATA COMMUNICATION								
С	Р	Α	3.0 0.0 0.0			L	Т	Р	H			
						3	0	0	3			
COUF	Level											
CO1	Unde	erstand the	basic concepts for	data communication	Cognitive	Remember						
CO2	Und link l	<i>erstand</i> the ayer.	error detection an	ad error correction in the data	Cognitive	Analyze						
CO3	CO3 Understand and analyze networks layer functions and subnet Cognitive creation								Remember, Analyze			
CO4	Unde	e rstand the	concepts of transp	ort layer	Cognitive	Remember						
CO5	Reco	<i>gnize</i> the d	esign issue of appl	ication layer	Cognitive	A	nalyze	2				
UNIT	Ī	DATA	COMMUNICAT	IONS	t.	i		9	+3			
UNIT Types backw	II of erro	DATA ors and dete	EXAMPLE 1 STATES IN THE STATES INTO STATES I	, VRC, LRC, CRC technique	es - Error corr Hamming coo	rection	1 - For ata lin	9 ward	+3 and			
Need to protoco Synchi	for dat ol, Err ronous	a link control, or control, communic	arol - Line discipli ARQ, Stop and w cations - Asynchro	ne, ENQ / ACK, Flow cont vait ARQ, Sliding window A nous and Synchronous Proto	rol stop and RQ Protocol ocol - Charac	wait s: Asy ter or	sliding ynchro iented	g win onous proto	dow and col,			
UNIT	III one	NETW	ORK LAYER	s - Link access procedures.				9)+3			
Netwo Datagr State F	ork lay ram ap Routing	er design proach – Il g – Routers	issues, Congestion P addressing methol.	n Control algorithm, Intern ods – Subnetting – Routing	etworks – P – Distance V	acket ector	switc Routir	hing 1g – 1	and Link			
UNIT	IV	TRANS	SPORT LAYER					9	9+3			
Duties Transm Service	of Tranission es., Co	Insport Lay Control I Innection m	er – Multiplexing Protocol (TCP) – (nanagement.	– De multiplexing – Sockets Congestion Control – Quali	– User Datag ty of Service	ram P (QO	rotocc S) – l	ol(UD Integr	P) – ated			
UNIT	V	APPLI	CATION LAYER					9-	+3			
Domai study TCP/II	in Nan on TC P: TCF	ne Space (I CP/IP Arch P/IP and the	DNS) – SMTP – P nitecture , Directo Internet - TCP/IP	OP 3 – FTP – HTTP – WW ry services - Common Ma and OSI.	W- Security - nagement Inf	Cryp forma	otograp tion P	ohy (Protoc	Case ol -			
				LECTURE	TUTORIAL	ı]	[otal				
				45	15			60				
TEXT 1. 2.	BOO Behr Andı 0132	KS: ouz A Forc rew S. Tan 126958, IS	uzan "Data Comm enbaum, David J. V BN-13: 978-01321	unications Networking" 4 th E Wetherall, "Computer Netwo 26953	Edition Tata N orks", 5th Edi	IcGra tion, 2	w Hill 2010, 1	, 200 ISBN	8. -10:			
REFE	RENC	CES										
William Schewber ,"Data Communication", McGraw Hill, 2009.
 Tanenbaum , "Computer Networks", PHI, 5th Edition, 2011
 E REFERENCES
 http://people.du.ac.in/~ngupta/teach_networks.html
 http://www.cs.hunter.cuny.edu/~saad/courses/networks/notes/note1_ho.pdf
 http://www.vub.ac.be/BIBLIO/nieuwenhuysen/courses/chapters/network.pdf
 http://lecturenotes.in/notes/engg/paper/dccn/page1.html

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

						I	0						I	PSO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	1	1	1	0	1	0	3	3	3	1	2	2
CO 2	1	3	2	1	1	0	1	0	1	1	1	1	2	2
CO 3	1	2	3	1	1	0	1	0	1	1	1	1	2	2
CO 4	1	2	2	3	3	0	3	0	1	1	1	1	2	2
CO 5	0	2	3	3	3	0	3	2	0	0	0	1	2	2
Total	6	10	7	2	2	1	2	3	6	6	6	5	5	10

1-5→1, 6-10→2, 11-15→3

COURSE	E CODE	XCSE54			L	Т	Р	С			
COURSE NAMEINFORMATION THEORY AND CODING3003PREREQUISITESProbability theoryLTPHCPA3.00.00.03003											
PREREC	QUISITES	Probability theory			L	Т	P	Η			
C P	Α	3.0 0.0 0.0			3	0	0	3			
COURSE	E OUTCOME	S		Doma	in	Lev	el				
CO1:	Describe the l	basic notions of information and o	channel capacity	Cognit	ive	Ren	nemb	er			
CO2:	Describe the l	Pulse code Modulation Systems		Cognit	ive	Ren	nemb	er			
CO3:	<i>Explain</i> and A	Apply the error control coding		Cognit	ive	Ren Und	ersta	er, nd			
CO4:	<i>Describe</i> an techniques	nd Analyze compression an	d decompression	1 Cognit	ive	Ren Und	ersta	er nd			
CO5:	<i>Explain</i> and <i>I</i>	Illustrate Multimedia communica	tion Techniques	Cognit	ive	Ren Und	iemb ersta	er nd			
UNIT I	INFORMA	TION ENTROPY FUNDAMEN	NTALS	i			9)			
Uncertainty, Information and Entropy – Source coding Theorem – Huffman coding –Shannon Fano co – Discrete Memory less channels – channel capacity – channel coding Theorem – Channel capacity Theorem. UNIT II DATA AND VOICE CODING 9											
Differenti coding – Vocoders	al Pulse code Delta Modula and LPC.	Modulation – Adaptive Differention – Adaptive Delta Modulati	ntial Pulse Code I on – Coding of s	Modulatio speech sig	n – A gnal a	Adapti at low	ve su bit 1	ibband rates –			
UNIT II	ERROR C	CONTROL CODING					9)			
Linear Bl Polynomi Convoluti	ock codes – S al – Parity c onal codes.	yndrome Decoding – Minimum check polynomial – Encoder f	distance considera for cyclic codes	tion – cy – calcul	clic c ation	odes - of s	- Gei yndro	nerator ome –			
UNIT IV	COMPRE	ESSION TECHNIQUES					9	•			
Principles Image Co Introducti	- Text compre mpression – G on to JPEG sta	ession – Static Huffman Coding – raphics Interchange format – Tag indards.	- Dynamic Huffma ged Image File Fo	n coding rmat – Di	– Ari gitize	thmeti d docu	c coc imen	ling – ts –			
UNIT V	AUDIO AN	D VIDEO CODING					9	9			
Linear Pr coders – V	edictive coding Video compress	g – code excited LPC – Percep sion – Principles – Introduction to	otual coding, MPH o H.261 & MPEG	EG audio Video sta	code ndard	rs – I s.	Oolby	audio			
			LECTURE	TUTORIA	۱L	TO	ΓAL				
			45 ()		45					
TEXT BO	DOKS:										
1.R Bose,	"Information	Theory, Coding and Cryptography	y", TMH 2007								
2. Simon	Haykin, Comm	nunication Systems, John Wiley &	k sons, 4th Editior	, 2001.							
3. Fred H	alsall, "Multim	edia Communications, Application	ons Networks Prot	ocols and	St	andarc	ls", P	earson			
Educatior	i, Asia 2002; C	hapters: 3,4,5.									
REFERE	NCES										
1. N 2. W	 Mark Nelson, "Data Compression Book", BPB Publication 1992. Watkinson I. "Compression in Video and Audio" Focal Press London 2002. 										
E REFEI	RENCE	1	,,,,	= 0 0 = .							

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

						P	0						PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	2	1	0	0	1	0	1	0	0	0	1	2
CO 2	3	2	1	1	0	0	0	0	1	0	0	0	2	2
CO 3	3	2	1	1	0	0	1	0	1	0	0	0	2	2
CO 4	3	2	2	0	0	0	1	0	1	0	0	0	2	2
CO 5	3	2	2	1	0	0	1	0	1	0	0	0	2	3
	15	10	8	4	0	0	4	0	5	0	0	0	9	11
Scaled value	3	2	2	1	2	0	1	0	1	0	0	0	2	3

 $1 \text{-} 5 \rightarrow 1, 6 \text{-} 10 \rightarrow 2, 11 \text{-} 15 \rightarrow 3$

COURS	COURSE CODEXCSE61LTPCCOURSE NAMEWER AND INTERNET TECHNOLOGY3003												
COURSE NAMEWEB AND INTERNET TECHNOLOGY3003PREREQUISITESLTPCPA3.0 0.0 0.03003COURSE OUTCOMESDomainLevel													
PREREC	QUISITES				L	Т	Р	Η					
С	P A	3.0 0.0 0.0			3	0	0	3					
COURS	E OUTCOME	S		Doma	in	Lev	rel						
CO1:	<i>Understand</i> core Internet	<i>the</i> technological foundations o protocols	f the Internet an	d Cognit	ive	K	nowl	edge					
CO2:	<i>Understand</i> design.	the fundamental tools and tech	nologies for we	b Cognit	ive	K	nowl	edge					
CO3:	<i>Develop</i> cod related to XM	e to demonstrate, understandi IL	ng of knowledg	e Cognit	ive	K U	nowlenders	edge, stand					
CO4:	<i>Identify</i> and mechanism.	outline the threats, firewalls	and authenticatio	n Cognit	ive	Ki U	nowl nders	edge, stand					
CO5:	Use fundame	ntal skills to host a website.		Cognit	ive	K L	nowle Jnder	edge, stand					
UNIT IINTRODUCTION TO INTERNET9													
Introduct HTTP(SI Name Se Up Lead Systems.	Introduction, Evolution of Internet, Internet Applications, Internet Protocol -TCP/IP, UDP, HTTP, Secure HTTP(SHTTP) Internet Addressing – Addressing Scheme – Ipv4 & IPv6, Network Byte Order, Domain Name Server and IP Addresses, Mapping, Internet Service Providers, Types Of Connectivity Such As Dial-Up Leaded Vsat Etc. Web Technologies: Three Tier Web Based Architecture; JSP, ASP, J2EE .Net Systems.												
UNIT II	UNIT II HTML CSS AND SCRIPTING 9												
HTML - HTML S Id Selecto CGI, Jav Expression and event	HTML - Introduction, SGML, DTD(Document Type Definition, Basic Html Elements, Tags and usages, HTML Standards, Issues in HTML DHTML: Introduction Cascading Style Sheets: Syntax, Class Selector, Id Selector DOM (Document Object Model) & DSO (Data Source Object) Approaches To Dynamic Pages: CGI, Java Applets, Plug Ins, Active X, Java Script – Java Script Object Model, Variables-Constant – Expressions, Conditions- Relational Operators- Data Types – Flow Control – Functions & Objects-events and event handlers – Data type Conversion & Equality – Accessing HTML form elements												
UNIT II	I XML						ļ	9					
What is build on Documen Sections, Data, Nor	XML – Basic XML, Generat tts & Data ,Det Resolving a na rmalizing DTD	Standards, Schema Standards, I ing XML data, Writing a simple fining Attributes & Entities in the aming conflict, Using Namespace S.	Linking & Preser XML File, Crea e DTD ,Defining es, Designing an 2	tation Sta ting a Doc Parameter XML data	ndard cumen Entit struct	s, Sta t type ies & ure, N	ndaro e defi cond Norm	ls that nition, litional alizing					
UNIT IV	INTERN	ET SECURITY & FIREWALL	S				9	9					
Security Security, Encrypted Applicati	Threats From I Various elect d Documents on Gateways, A	Mobile Codes, Types Of Viruses tronic payment systems, Intro And Emails , Firewalls: Harder AAA (Authentication ,Authorizati	, Client Server So duction to EDI, ned Firewall Hos on And Accounti	ecurity Th Challeng ts, IP- Pa ng)	reats, ges–R cket	Data espon Screei	& M se S ning,	essage ystem, Proxy					
UNIT V	UNIT V WEBSITE PLANNING & HOSTING 9												
Introduct Search E FTP Serv Telnet Cl	Introduction, Web Page Lay-Outing, Where To Host Site, Maintenance Of Site, Registration Of Site On Search Engines And Indexes, Introduction To File Transfer Protocol, Public Domain Software, Types Of FTP Servers (Including Anonymous),FTP Clients Common Command. Telnet Protocol, Server Domain, Telnet Client, Terminal Emulation. Usenet And Internet Relay Chat.												
			LECTURE	TUTORL	AL	ТО	TAL						
			45	0		45							
TEXT B	OOKS:												
1.Internet 2. Alexis Commun	 I.Internet & Intranet Engineering- Daniel Minoli, TMH. Alexis Leon and Mathews Leon – Internet for Every One, Tech World.3. Fred Halsall, "Multimedia Communications, Applications Networks Protocols and Standards", Pearson Education, Asia 2002; 												

Chapters: 3,4,5. REFERENCES

- 1. Eric Ladd, Jim O'Donnel –"Using HTML 4, XML and JAVA"-Prentice Hall of India 1999.
- 2. "Beginning Java Script "- Paul Wilton SPD Publications -2001.
- 3. Frontiers of Electronics of Commerce, Ravi kalakota & Andrew B. Whinston
- 4. Addison WesleyAdvance Java- Gajendra Gupta , firewall Media

E REFERENCE

1. NPTEL, Communication Engineering, Prof. Surendra Prasad, Department of Electrical Engineering Indian Institute of Technology, Delhi HauzKhas New Delhi -110 016

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

						P	0						PS	0
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	3	3	1	0	0	0	0	0	0	0	3	2
CO 2	3	2	3	3	1	0	0	0	0	0	0	0	3	2
CO 3	1	1	2	2	0	0	0	0	0	0	0	0	0	0
CO 4	3	3	2	3	1	0	0	0	0	0	0	0	3	2
CO5	1	1	2	1	0	0	0	0	0	0	0	0	3	2
	11	9	12	12	3	0	0	0	0	0	0	0	12	8
Scaled Value	3	2	3	3	1								3	2

$1 ext{-} 5 ext{-} 1, 6 ext{-} 10 ext{-} 2, 11 ext{-} 15 ext{-} 3$

COURS	E C(ODE	XCSE62		L	Т	P	C			
COURS	E NA	ME	QUEUING THEORY AND MODELLING		3	0	0	3			
C	Р	A	3.0 0.0 0.0		L	Т	Р	H			
		å			3	0	0	3			
COURS	E OI	UTCO	MES	Dom	ain	L	evel				
CO1	Def Fin of c	<i>fine</i> di <i>d</i> the e liscrete	screte and continuous random variables and expected values and moment generating function and continuous distributions.	to ns Cogniti	ve	Reme	nber				
CO2	CO2Explain the standard distribution and Identify the different distributionCognitiveCO3Explain the joint and Marginal distribution and to Find the Correlation and regression.Cognitive										
CO3	CO3Explain the joint and Marginal distribution and to Find the Correlation and regression.CognitiveCO4Explain the Markovian models and to Find the DescriptionCognitive										
CO4Explain the Markovian models and to Find the characteristics of the modelsFind the UncRen UncCO5Explain the basic concepts of queuing theoryCognitiveRen Unc											
CO5	CO5 <i>Explain</i> the basic concepts of queuing theoryCognitiveUNIT IPROBABILITY AND BANDOM VARIABLE										
UNIT I	PRC	i		9							
Axioms variable- generatir	of p Prol ng fu	robabil pability nction a	ity – Conditional probability – Total probability mass function – probability density function – and their properties.	ity – Baye ^s properties	's theo – Mon	orem – nents –	Rano Mor	dom nent			
UNIT II	ST	ANDA	RD DISTRIBUTIONS				9				
Binomia Normal of and its p	l, po distri roper	isson, butions ties	Geometric, Negative Binomial, Uniform, Example and their properties- Function of a random var	ponential, iable. Proba	Gamm ability	a, We density	ibull / func	and tion			
UNIT I	II TV	NO DI	MENSIONAL RANDOM VARIABLES				9				
Joint dis Transfor	tribut matic	tions – on of ra	Marginal and conditional distribution – Covaria ndom variables- Central limit theorem.	nce – Corre	lation a	and reg	gressi	on –			
UNIT IV			9								
Classific Markov	ation chain	– Sta is- tran	tionary process – Markov process –Poisson pasition probabilities – Limiting distributions.	ocess- Birt	h and	death	proce	ss –			
UNIT V	QU	EUEI	NG THEORY				9				
Markovian models – M /M/1, M/M/C, finite and infinite capacity- M/M/8 queues – Finite sou model – M/G/1 queue (steady state solution only) – Pollaczek – Khintchine formula- Special cases.											
			LECTURE			45	Hrs				

TEXT BOOKS

- 1. Ross, S., "A first course in probability ", Sixth Edition, Pearson Education, Delhi, 2002.
- 2. Medhi j., "Stochastic Processes", New Age Publishers, New Delhi, 1994. (Chapters 2,3 &
- 3. Taha, H.A., "Operations Research An introduction", Seventh Edition, Pearson Education Edition Asia, Delhi, 2002.
- 4. Gupta .S.C and Kapoor .V.K, "Fundamentals of Mathematical Statistics", 11th
- 5. extensively revised edition, Sultan Chand & Sons, 2007.
- 6. Veerarajan .T, Probability, "Statistics and Random Processes", Tata McGraw
- 7. Hill,3rd edition, 2008.

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1.Veerarajan. T., "Probability, Statistics and Random. Processes", Tata McGraw – Hill, Second Edition, New Delhi, 2003.

Allen., A.O., "Probability, Statistics and Queuing Theory", Academic press, New Delhi, 1981.
 Gross, D. and Harris, C.M., "Fundamentals of Queuing theory", John Wiley and Sons, Second Edition, New York, 1985.

E REFERENCES

1.Advanced Engineering Mathematics Prof. Soames Kumar.Department of Mathematics, Indian Institute of Technology, Kharagpur.

							РО					
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3	0	0	0	0	0	0	0	1	1	0	1
CO 2	3	0	0	0	0	0	0	0	1	1	0	1
CO 3	3	2	0	0	0	0	0	0	0	1	1	2
CO 4	3	2	0	0	1	0	0	0	1	1	1	2
CO 5	3	2	0	0	1	0	0	0	1	1	1	2
Total	15	6	0	0	2	0	0	0	4	5	3	8
Scaled	3	2			1				1	1	1	2
Value												

Mapping of COs with POs:

$1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

COURSE	CODE	XCSE63		L	Т	P	С						
COURSE	NAME	DISTRIBUTED SYSTEMS		3	0	0	3						
PREREQUISITES L T C P A 3.0 0.0 3 0 COURSE OUTCOMES Domain L T Common Number Common Numer Common Numer													
C P	Α	3.0 0.0 0.0		3	0	0	3						
COURSE	OUTCOM	IES	Domain		Level								
CO1	Describe	basics of Distributed Systems, Trends in Distributed	Cognitive	e	Reme	mber	•						
	Systems a	nd Challenges.											
CO2	Define ir	ter process communication and Explain internet	Cognitive	e	Reme	mber	•						
	protocols			Under	rstand	b							
	communic	cation.											
CO3	<i>Explain</i> p	eer to peer services and <i>illustrate</i> different file system	Cognitive	e	Reme	mber	•						
			Understand		Ŀ								
CO4	Describe S	Synchronization and replication in distributed system.	Cognitive	e	Reme	mber	•						
CO5	<i>Explain</i> 1	Process management and Resource management in	Cognitive	e	Reme	mber	•						
	distributed	l system.											
UNIT I INTRODUCTION Introduction - Examples of Distributed Systems-Trends in Distributed Systems - Focus on resource													
Introduction Challenges	on - Exampl 5. Case study	es of Distributed Systems-Trends in Distributed Systems 7: World Wide Web.	s - Focus o	on re	source	shari	ng -						
UNIT II	COM	MUNICATION IN DISTRIBUTED SYSTEM			9)							
System M representat Remote M Remote pr Publish-su study: Ente	fodel - Int ion and Mu fethod Inve occedure ca bscribe sys erprise Java PEEB	ter process Communication - the API for internet eliticast communication. Network virtualization: Overla cocation and Objects: Remote Invocation - Introduction II - Remote method invocation. Case study: Java RM tems - Message queues - Shared memory approaches Beans -from objects to components TO PEER SERVICES AND FILE SYSTEM	t protoco ay network on - Reque MI – Grou - Distrib	ls - s. Ca est-re up co puted	Exter ase stu eply pr ommun l objec	nal dy: 1 otoco icatio ts - (data MPI ols - on - Case						
) ('	1 11		Л	·•						
overlays. architectur semantics Caches - L	er Systems Overlay ca e - Andrew Naming: DAP.	- Introduction - Napster and its legacy - Peer-to-p se studies: Pastry, Tapestry- Distributed File System File system. File System: Features-File model -File ac Identifiers, Addresses, Name Resolution - Name Sp	seer - Mic s -Introdu cessing m bace Imple	odel eme	vare - n - File s - File ntation	Rou e ser e sha - N	vice ring ame						
UNIT IV	SYNC	CHRONIZATION AND REPLICATION			9								
Introduction clocks - C Elections - concurrence Case study	Introduction - Clocks, events and process states - Synchronizing physical clocks- Logical time and logical clocks - Global states - Coordination and Agreement - Introduction - Distributed mutual exclusion - Elections - Transactions and Concurrency Control- Transactions -Nested transactions - Locks - Optimistic concurrency control - Timestamp ordering - Atomic Commit protocols -Distributed deadlocks - Replication - Case study - Coda.												
UNIT V	PROG	CESS & RESOURCE MANAGEMENT			9)							
Process Implement Assignmen	Manageme ation. Res at Approach	ent: Process Migration: Features, Mechanism - ource Management: Introduction- Features of So - Load Balancing Approach - Load Sharing Approach.	Threads: cheduling	: M Alg	lodels, gorithm	Iss ns -7	ues, ſask						

	LECTURE	TUTORIAL	TOTAL
	45	0	45
TEXT BOOKS:			
1. George Coulouris, Jean Dollimore and Tim Kindberg	g, "Distributed S	Systems Concepts	s and
Design", Fifth Edition, Pearson Education, 2012.			
REFERENCES			
1. Pradeep K Sinha, "Distributed Operating Systems: Co	ncepts and Desi	gn", Prentice Hal	1 of India, 2007.
2. Tanenbaum A.S., Van Steen M., "Distributed System	s: Principles and	d Paradigms", Pea	arson
Education, 2007.			
3. Liu M.L., "Distributed Computing, Principles and Appl	ications", Pearso	on Education, 200	4.
4. Nancy A Lynch, "Distributed Algorithms", Morgan Ka	ufman Publishe	rs, USA, 2003	
E REFERENCES			
1. http://nptel.ac.in/courses/106106107/			
2. https://www.cs.york.ac.uk/rts/books//distribute	edSystems.pdf		

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

						P	0						PS	0
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	3	2	0	0	0	0	0	0	0	0	2	2
CO 2	3	2	3	2	0	0	0	0	0	0	0	0	2	2
CO 3	3	3	2	2	0	0	0	0	0	0	0	0	2	2
CO 4	3	3	2	2	0	0	0	0	0	0	0	0	2	2
CO 5	3	3	2	2	0	0	0	0	0	0	0	0	2	2
Original value	15	13	12	10	0	0	0	0	0	0	0	0	10	10
Scaled value	3	3	3	2	0	0	0	0	0	0	0	0	2	2

 $1 ext{-} 5 ext{-} 1, 6 ext{-} 10 ext{-} 2, 11 ext{-} 15 ext{-} 3$

COURSI	E CODE	XCSE64			L	Т	Р	С
COURSI	E NAME	CRYPTOGRAPHY AND NET	FWORK SECU	RITY	3	0	0	3
PRERE(QUISITES				L	Т	Р	H
C:P:A		3:0:0			3	0	0	3
COURSI	E OUTCOME	S		Domain		Level		
CO1:	<i>Explain</i> the c	ommon network vulnerabilities a	nd attacks	Cognitive		Under	rstand	1
CO2:	<i>Describe</i> and algorithm	compare the security of different	cryptographic	Cognitive		Under	rstanc	1
CO3:	<i>Identify</i> the protect against	possible threats to each mecha at these threats	anism and ways	to Cognitive		Analy	zing	
CO4:	<i>Outline</i> the r authentication	requirements and mechanisms for n.	or identification a	and Cognitive		Under	rstanc	1
CO5:	<i>Explain</i> the related	equirements of real-time commur to the security of web services.	nication security a	nd Cognitive		Under	rstanc	1
UNIT I	INTRODU	CTION		i	L		9)
Basic con Malicious	cepts: confide Software, Der	ntiality, integrity, availability, s nial-of-Service Attacks, Intrusion	ecurity policies, Detection, Intrus	security mecha	anis	ms, as	surai	ice,
UNIT II	CRYPTOG	GRAPHY					9)
Simple D Attacks –	ES – Differenti Primality test -	al cryptanalysis – DES – Modes – factoring.	of operation – Tri	ple DES – AES	5 – I	RC4 –	RSA	. —
UNIT II	I SECURIT	Y MECHANISM					9)
Discrete cryptosys ElGamal	Logarithms – tems – Hash f – DSA	Computing discrete logs – Diff functions – Secure Hash – Birth	ie-Hellman key day attacks - MI	exchange – El D5 – Digital si	Gan gnat	nal Pu tures -	blic - RS	key A –
UNIT IV	NETWOI	RK SECURITY					9)
Authentic security –	ation applicati Web Security	ons – Kerberos, X.509, PKI – – SSL, TLS, SET.	Electronic Mail	security – PC	θP,	S/MIN	Ι /ΙΕ –	· IP
UNIT V	SYSTEM SE	ECURITY					9)
System se	curity – Intrud	ers – Malicious software – viruse	s – Firewalls – Se	ecurity Standard	ls.		<u>[</u>	
			LECTURE	TUTORIAL		тот	4L	
			45	0			45	
TEXT								
1. N 2. V e 3. V e 4. C	letwork Securit Vade Trappe, I d, Pearson, 200 Villiam Stalling d, 2006. Computer Secur	y (2nd edition) by Kaufman, Perl Lawrence C Washington, "Introd 7. gs, "Cryptography and Network S ity: Principles and Practice (2nd I	man, and Specine luction to Crypto ecurity Principles Edition), Pearson	er. ISBN 01304 graphy with co and Practices" Press	601 odin; ', Pe	92. g theo earson/	ry", 1 PHI,	2nd 4th
		m Countageabre These and D.	notice" Deserve	Education Sec.	nd	Editio	n 70	07
1. V 2. C	harles P. Pflee f India, 2006	ger, Shari Lawrence Pfleeger – S	ecurity in compu	ting Third Editi	ona ion -	– Pren	tice I	U7. Hall
E REFE	RENCE							
1. N	PTEL, Cryptog	graphy and Network Security, Dr	.Debdeep Mukho	padhyay, IIT K	hara	agpur		

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

						P	0						PSO	0
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	2	3	0	1	2	0	1	0	1	1	1	2
CO 2	3	2	1	3	0	1	2	0	1	0	1	1	2	2
CO 3	3	2	1	3	0	1	2	1	1	0	1	1	2	2
CO 4	3	2	1	2	0	1	2	1	1	0	1	1	2	2
CO 5	3	2	1	2	0	1	2	0	1	0	1	1	2	1
Original value	15	10	6	13	0	5	10	2	5	0	5	5	9	9
Scaled value	3	2	2	3	0	1	2	1	1	0	1	1	2	2

 $1 ext{-} 5 ext{-} 1, 6 ext{-} 10 ext{-} 2, 11 ext{-} 15 ext{-} 3$

COUI	RSE COD	Е	Σ	KCSE	65											L	Т	۱	P	С
COUL	RSE NAM	E	I	DATA		NINC	3									3	0		0	3
	P	A TEC	1	5.0 U.() Se M		CEI	ЛГ	NIT	CVC	тел				L 2	1		P A	H 2
FREN	EQUISIT	. L ð	1	JAIA	DAS		ANA	GE	VIE	LINI	313	ILIVI				3	U		U	3
COUI	RSE OUT	COME	ES											-	Don	nain	I		Lev	vel
CO1	Describe mining sy	the diff ystems	ffer 5 wi	ent da th data	ta mi abase	ining e syste	techr ems	nique	es ai	nd c	ompa	are da	ita	C	logn	itive	•	Un	dersta	and
CO2	Apply the	e conce	epts	s of pr	e-pro	ocessi	ing ar	nd ch	nara	cter	izatic	on		C	logn	itive	;	Ap	ply	
CO3	Construct algorithm	t a class	ssif	er fro	m the	e give	en dat	taset	by	usin	ıg cla	ssific	ation	C	logn	itive	,	Ар	ply	
CO4	Discover algorithm	cluster: ns	ers f	or a gi	iven o	datab	base b	oy app	plyi	ing c	cluste	ering		C	logn	itive	,	Ap	ply	
CO5	Describe Mining- S	the con Spatial	once 1 M	pts of ining ·	Kno - Ten	wledg npora	ge Mi 1 Mir	lining ning.	g - V	Web	Min	ing –′	Гext	C	logn	itive	•	Un	derst	and
UNIT	– I INTI	RODU	JCI	ION															9	9 Hours
Conce to Dat – Over	pts of Data a Warehou rview of D	a Minir 1se- Ma ata Mir	ing- Iach inin	Issue ine Lo g tech	es and earni inique	d Cha ng –7 es.	alleng Taxor	ges —] nomy	-Dat y of	ta M f Dat	lining ta Mi	g Fun ining	ctiona Tasks	lities- – Ste	- Mi eps i	grat in D	ion ata	of Mi	Data ning l	Mining Process
UNIT	– II DAT	'A PRE	E-I	ROC	ESS	ING	AND) CH	IAF	RAC	TER	RIZA	ΓΙΟΝ						9	Hours
Data (Cleaning -	– Data	a Ir	itegrat	ion a	and 7	Trans	sform	natio	on -	– Da	ta Re	eductio	on –I	Disc	retiz	atio	on a	and C	Concept
Hierar Analy Transa	chy Gener tical Chara actional Da	ration – acteriza atabase	– F atic e an	rimiti n, and d Rela	ves – d Con ationa	– Dat mpari al Dat	ta Mi ison tabas	ining - As se.	g, Q ssoc	uery viatio	/ Lar on Ri	ıguag 1le –	e –Ge Minin	eneral 1g Mu	izat ulti	ion Dim	– S lens	um	mariz al dat	ation – ta from
UNIT	-III CL	ASSIF	FIC	ATIO	N														9	Hours
Classi	fication –	Decisio	ion	Tree	Indu	ction	-Ba	ayesi	ian	Cla	ssific	ation	- SV	M C	lassi	fica	tior	1 —	Predi	ction –
Back I	Propagation	n.	DI) 11
UNII	-IV CL		KI I ring		tor A	nalv	voie 1	км	aan	o Cl	luctor	ina	Higro	rchice	-1 M	[oth	h	D	oncity	Hours
Metho	d – Grid B	Based M	Met	hod –	Outli	ier A	nalys	sis.	lean		lusici	mg–	Incia				Ju -	- D		Daseu
UNIT	$-\mathbf{V}$ ADV	VANCE		TEC	HNI		ES AN	ND A	APP	PLI(IONS)	1 3 4	•••	-	1		9	Hours
Know – Case	e Study (at	ing - W least tv	veb two	M1111).	ng – I	l'ext l	Minir	ng- S	spat	tial N	vlinin	ng - T	empor	al M	1n1n	g- 1	001	s —	Appli	cations
	1000																			
TEXT	BOOK:	Ior M			V		"D	to N	<i>L</i>		C	a a 4 -	or 1 '	Tesl		~~"	۸.	o	. TZ	
1.	Jiawei F	1an, M 118 2000	v1101 00	leime	ĸan	nder,	Da	ua IV	/11111	ing:	Con	cepts	and	recni	mqu	es",	IVI	orga	an Ka	auiman
REFF	RENCES	:																		
1.	Arun K.	Pujari,	i, "I	Data M	lining	g Tec	chniqu	ues",	, Se	econo	d Edi	tion,	Unive	rsities	s Pre	ess, i	201	0.		
2.	K.P. Sor	nan, Sł	Shin	n Diw	akar,	, V.A	.jay, ʻ	"Insi	ight	t into	o Dat	ta Mi	ning -	- The	ory	and	Pra	actio	ce", F	Prentice
	Hall of I	ndia, 20	200	5.																
3.	Usama N in Know	И.Fayya ledge E	yad. Dis	, Greg	ory F y and	Piatet: l Data	sky S a Min	Shapi ning"	iro, ', Tl	Pad he M	hrai : 1.I.T.	Smytl Press	h, Ran s, 1990	nasan 6.	ny U	Jthu	rusa	amy	, "Ad	lvances
4.	4. D. Hand, H. Mannila and P. Smyth. Principles of Data Mining. Prentice-Hall. 2001																			
5.	Alex Ber McGraw	rson, St ⁷ Hill, 2	Step 200	hen S 0.	mith,	, Kur	t The	earlin	ıg, ʻ	"Bui	lding	g Data	ı Mini	ng Aj	ppli	catio	ons	for	CRM	I", Tata
6. 7	Margare I.H. Witt	t Dunha ten and	ham d E	," Dat Franl	ta Mi k. Da	ining: ta Mi	: Intro ining	oduct	tory actic	y and cal M	l Adv Iachi	vance ne Le	d Topi earning	ics",] g Too	Pren ols au	itice nd T	Ha 'ecł	11, 2 mia	2002. ues. N	Morgan
	Kaufmar	nn. 2000	00.	- 1411	<i>D</i> u	1711	6			11				5 - 00				9	J. 20. 1	
8.	E-books	- http://	://w	ww.ko	dnugg	gets.c	com/p	public	cati	ions/	/book	s.htn	nl							
L																				

Table 1: CO Vs PO Mapping

]	PO					PSO	
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	1	2	1	2	2	2	2	3	2	1
CO2	3	2	1	2	1	2	2	2	2	3	2	1
CO3	2	1	1	3	2	1	3	1	1	2	1	2
CO4	3	2	3	3	2	2	3	2	2	3	2	2
CO5	3	2	3	2	3	2	2	1	1	1	1	3
Total	14	9	9	12	9	9	12	8	8	12	8	9
Scaled Value	3	2	2	3	2	2	3	2	2	3	2	2

 $1 ext{-}5 ext{-}1, 6 ext{-}10 ext{-}2, 11 ext{-}15 ext{-}3$

COUF	RSE CO	DE	XCSE66		L	T	Р	С		
COUF	RSE NA	ME	OPTIMIZATION TECHNIQUES		3	0	0	3		
PRER	EQUIS	ITES			L	Т	Р	H		
С	Р	А	3.0 0.0 0.0		3	0	0	3		
COUF	RSE OU	тсом	ES	Domain		Leve		L		
CO1	Under	rs <i>tand</i> t	he basic concepts of linear programming	Cognitiv	e	Reme	mbe	r		
CO2	Defin	e and	Explain the advancements in Linear programming	Cognitiv	e	Reme	mbe	r,		
	techni	ques				Unde	rstan	d		
CO3	Expla	in the r	on-linear programming techniques	Cognitiv	e	Reme	mbe	r,		
				Unde	rstan	d				
CO4Discuss the interior point methods of solving problemsCognitiveRemCO5Describe the dynamic programming methodCognitiveRem										
CO5	Descr	<i>ibe</i> the	Cognitiv	e	Remember					
UNIT	I LINEA		<u>i</u>		9					
Introdu algorit	Introduction – formulation of linear programming model-Graphical solution–solving LPP using simplex algorithm – Revised Simplex Method.									
UNIT	Π	ADVA	ANCES IN LPP				9			
Dualit proble	y theory ms-Trav	- Dual eling sa	simplex method – Sensitivity analysisTranspor les man problem -Data Envelopment Analysis.	tation pro	blem	s– A	ssigr	ıment		
UNIT	III	NON	LINEAR PROGRAMMING				9			
Classif condit	fication ions–Rec	of Nor duced g	Linear programming – Lagrange multiplier methor radient algorithms–Quadratic programming method –	od – Kar Penalty an	ush – d Bar	- Kul rier n	nn T nethc	ucker od.		
UNIT	IV	INTE	RIOR POINT METHODS				9			
Karma algorit	urkar's a' hm.	lgorithn	n-Projection Scaling method-Dual affine algorithm-H	Primal affi	ne al	gorith	ım B	arrier		
UNIT	V	DYNA	AMIC PROGRAMMING				9			
Formu princip Compu	ilation c ple of o utational	of Mult optimal proced	i stage decision problem–Characteristics–Concept ity–Formulation of Dynamic programming–Backw ure–Conversion of final value problem into Initial val	of sub-og ard and ue probler	ptimi Forw n.	zatior ard 1	and and	1 the sion–		
	LECTURE TUTORIAL TOTAL 45 0 45									
ТЕХТ	BOOK	S:	45 0		45)				
1.	Hillier	and Lie	eberman "Introduction to Operations Research", TMH	, 2000.						
2.	R.Pann	eerselva	um, "Operations Research", PHI, 2006							
3.	Hamdy	ATaha	, "Operations Research – An Introduction", Prentice Hall I	ndia, 2003	•					
KEFE	Philips, Ravindran and Solberg, "Operations Research", John Wiley, 2002.									
1. Phil 2. Roi	1ps, Rav1 nald L.R	ındran a ardin, "	nd Solberg, "Operations Research", John Wiley, 2002. Optimization in Operation Research" Pearson Education	on Pvt. Lto	1. Nev	w Del	hi, 2	005.		

Table 1: CO Vs PO Mapping

						Р	0						PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	3	3	1	0	0	0	0	0	0	0	0	2	0
CO 2	3	3	3	2	1	0	0	0	0	0	0	0	1	0
CO 3	3	3	3	0	1	0	0	0	0	0	0	0	3	3
CO 4	3	3	3	2	0	0	0	0	1	0	0	0	3	3
CO 5	3	3	3	2	0	0	0	0	1	0	0	0	3	2
Original value	15	15	15	7	2	0	0	0	2	0	0	0	12	8
Scaled value	3	3	3	2	1	0	0	0	1	0	0	0	3	2

1-5→1, 6-10→2, 11-15→3

COURSE CODE	XCSE67		L	Т	P	C
COURSE NAME	MULTI AGENT INTELLIGENT SYSTEMS		3	0	0	3
СРА	3:0:0		L	T	Р	H
			3	0	0	3
COURSE OUTCON	ЛЕS	Domai	in]	Level	
CO1 Describe the b	pasic concepts of Context Awareness.	Cognitiv	'e	Underst	and	
CO2 Describe the c	concepts in Distributed and Heterogeneous context.	Cognitiv	'e	Remem	ber	
CO3 Describe the p	principles of Dynamic current negotiation	Cognitiv	re	Underst	and	
CO4 Explain the systems	concepts of Context aware mobile and pervasive	Cognitiv	'e	Underst	and	
CO5 Describe the s	security issues in Context aware computing	Cognitiv	'e	Remem	ber	
UNIT I INTRODU	CTION	L	i		9	
Definitions - Fo Heuristics -Constrain	undations - History - Intelligent Agents-P t Satisfaction Problems - Game playing.	roblem	Solvi	ng-Sear	ching	-
UNIT II KNOWLI	EDGE REPRESENTATION AND REASONING				9	
Logical Agents-F Strategies-Knowledg	irst order logic-First Order Inference-Uni e Representation-Objects-Actions-Events.	fication-C	hainii	ng- F	Resolu	tion
UNIT III PLANNI	NG AGENTS				9	
Planning Probler Domains-Conditiona	n-State Space Search-Partial Order Pl l Planning-Continuous Planning-MultiAgent Planning.	anning-G	raphs-	Nondet	ermin	istic
UNIT IV AGENTS	AND UNCERTAINITY				9	
Acting under Networks-Other A Decision Network – (uncertainty – Probability Notation-Bayes Ru approaches-Time and Uncertainty-Temporal M Complex Decisions.	ule and Models-	use Utili	- ity T	Baye heory	sian -
UNIT V HIGHER	LEVEL AGENTS				9	
Knowledge in Reinforcement Future of AI.	Learning-Relevance Information-Statistica Learning-Communication-Formal Grammar	ll Le r-Augmen	earnin ted	g G	Metherramm	ods- ars-
	LE	CTURE		45 Hrs		
TEXT BOOKS	Peter Norvig "Artificial Intelligence - A Modern App	roach" 2n	d			
Edition, Prentice H	Iall, 2002	10ach ,211	u			
REFERENCES: 1. Michael Woo 2. Patrick Henri 3. Nils.J. Nilsson, Pr	oldridge, "An Introduction to Multi Agent Sy ry Winston, Artificial Intelligence, 3rd rinciples of Artificial Intelligence, Narosa Publishing F	vstem", Editio Iouse, 199	John n, 92	Wiley AW,	7, 20 19	002. 999.
E REFERENCES						
 http://cgi.csc http://www.c 	.liv.ac.uk/~trp/COMP310.html s.utexas.edu/~patmac/cs344m/resources/index.html#w	eek14				

						ł	?O						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	2	3	2	3	2	1	0	0	2	1	0	2	3	2
CO 2	2	3	2	3	2	1	0	0	2	1	0	1	3	2
CO 3	1	3	3	2	1	1	0	0	1	1	0	2	3	2
CO 4	2	2	2	2	2	1	0	0	1	1	0	1	3	2
CO 5	2	3	3	1	1	1	0	0	1	1	0	1	3	2
Total	9	14	12	11	8	5	0	0	7	5	0	7	15	10

 $1 ext{-} 5 ext{-} 1, 6 ext{-} 10 ext{-} 2, 11 ext{-} 15 ext{-} 3$

COUR	RSE CODE	XCSE68		L	Т	Р	С
COUR	COURSE CODE ACSEND L I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I <thi< th=""> I I</thi<>						
СРА		3.0 0.0 0.0		L	Т	Р	Н
PRER	EQUISITES	SIGNALS AND SYSTEMS		3	0	0	3
COUR	RSE OUTCOMES		Domain		L	evel	
CO1	Describe how dig	gital images are represented and manipulated	Cognitive	U	nders	tand	
CO2	<i>Explain</i> about va	rious image transforms techniques.	Cognitive	U	nders	tand	
CO3	<i>Apply</i> the knowled techniques in difference	edge of image enhancement and restoration ferent applications.	Cognitive	A	pply		
CO4	Apply the age seg	gmentation methods for a particular	Cognitive	A	pply		
CO5	<i>Compare</i> various	s image compression techniques.	Cognitive	A	pply		
UNIT	– I DIGITAL II		I			8	
Elemen Relation UNIT 1D and SVD tr UNIT	 application — application f Visual Perconships between pix II IMAGE TRA d 2D DFT- DCT- cansform – Slant tra III IMAGE EN 	eption – Image Sensing and Acquisition – xels – color models. ANSFORM Discrete Wavelet Transform – Discrete Hada ansform- Haar transform. IHANCEMENT AND RESTORATION	an image Processin Image Sampling an Imard transform-	g – G nd G Wals	Juant	izatior	$\begin{array}{c} s - \\ 1 - \\ 9 \\ 1 - \\ 10 \\ \end{array}$
and Sh Sharpe Image Band J Geome	arpening Spatial F ning frequency do Restoration - Nois pass Filters – No etric transformation	iltering – Frequency Domain: Introduction to main filters – Ideal, Butterworth and Gaussian e models – Mean Filters – Order Statistics – A tch Filters – Optimum Notch Filtering – I as-spatial transformations.	Fourier Transform filters. daptive filters – Ba nverse Filtering –	1 - S and 1 Wie	reject ener	hing a Filter	ind s – ng-
UNIT	- IV IMAGE SE	GMENTATION	thread ald the	Ia a 1	- 1 d	1	9
method region	based approach – ls – Edge detectio splitting – region r	n, Edge linking via Hough transform -region nerging, split and merge.	based approach –	regi	ion g	rowing	on g —
UNIT	- V IMAGE CO	MPRESSION					9
Need 1 Quanti	for data compress zation, Transform	sion, Huffman, Run Length Encoding, Shif coding, JPEG standard, MPEG.	t codes, Arithmeti	ic co	oding	, Vec	tor
			L TOTAL				
		45 0		45			
TEXT 1.	F BOOK: Rafael C. Gonza Edition, 2010.	llez, Richard E. Woods, "Digital Image Proces	sing", Pearson Edu	icatio	on, T	hird	9
ЛЕГІ 1	Rafael C Gonz	zalez Richard F. Woods Steven I. Edding	"Digital Image				
2.	Processing Usin Anil Jain K. "Fu	g MATLAB", Tata McGraw Hill Pvt. Ltd., undamentals of Digital Image Processing", PH	Fhird Edition, 2011	., 20	11.		

3. Willliam K Pratt, "Digital Image Processing", John Willey, 2002.

- 4. Jayaraman S., Esaki Rajan S., T. Veera Kumar, "Digital Image Processing", Tata McGraw Hill Pvt. Ltd., Second Reprint, 2010.
- 5. Bhabatosh Chanda, Dwejesh Dutta Majumder, "Digital Image Processing and analysis", PHI Learning Pvt. Ltd., Second Edition, 2011.
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- 7. http://eeweb.poly.edu/~onur/lectures/lectures.html
- 8. http://www.caen.uiowa.edu/~dip/LECTURE/lecture.html

Table 1: Mapping of COs with POs

							РО						PSC)
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2	1	3	2	1	2	1	3	2	1	2	3	3
CO2	3	2	1	3	2	1	2	1	3	2	1	2	3	3
CO3	2	1	1	2	1	1	1	1	2	1	1	1	2	2
CO4	3	2	3	2	2	1	2	1	2	2	1	2	2	2
CO5	3	2	3	1	1	1	1	1	1	1	1	1	1	1
	14	9	9	11	11	5	8	5	11	8	5	8	11	1 1
	3	2	2	3	3	1	2	1	2	2	1	2	2	2

$1 ext{-} 5 ext{-} 1, 6 ext{-} 10 ext{-} 2, 11 ext{-} 15 ext{-} 3$

COU	RSE CO	DE	XCSE69			L	Т	P	С	
COU	RSE NA	ME	CONTEXT AWARE COMPUT	ING		3	0	0	3	
С	P	A	3.0 0.0 0.0			L	Т	P	Η	
						3	0	0	3	
COUI	RSE OU	TCON	IES		Domain	1]	Level		
CO1	Descril	be the b	asic concepts of Context Awarenes	S.	Cognitive	F	lemem Inderst	ber, and		
CO2	Descril	be the c	oncepts in Distributed and Heteroge	eneous context.	Cognitive	F	Remem	ber		
CO3	Descril	be the p	rinciples of Dynamic current negot	iation	Cognitive	F U	lemem Inderst	ber, and		
CO4	Explain system	n the c s	oncepts of Context aware mobile	e and pervasive	Cognitive	L	Underst	and		
CO5	Descril	be the s	ecurity issues in Context aware con	nputing	Cognitive	F	lemem	ber		
UNIT	'I INT	RODU	CTION			I		9		
Contex contex	xt Awar xt from n	eness – nultiple	Surrounding Context – Activity o sensors – I Badge- Media cup	on a Street – User	Attention i	in a M	leeting	- Acti	vity	
UNIT	' II DIS INT	STRIBU ELLIC	JTED AND HETEROGENEOUS JENCE	S CONTEXT FO	R AMBIEN	NT		9		
Funda Aligni	mental (ment Ap	Concept proache	s – Ontology Representation and R es – Campus Approach	easoning about Co	ontext – On	tology	,			
UNIT	III DY I	NAMI	C CURRENT NEGOTIATION IN	N WEB ENVIRO	NMENTS			9		
Ubiqu Acqui	itous we sition –	b – Sys Provisio	tem Description – System Deployn oning.	nent – Collaborativ	ve Optimiza	ations-	Conte	ext		
UNIT	IV CO	NTEX	Γ AWARE MOBILE AND PERV	ASIVE SYSTEM	IS			9		
Eleme contex service	ents of a kt for m es – Mol	a conte obile d bile cod	xt aware pervasive system- Arch evice users – Location based Serve e and policy – Multi agent technolo	itecture- Infrastru vices – Ambient ogy.	cture, Mid services –	dlewa contez	re, To at awa	ol Kit re mo	ts – bile	
UNIT	V CON	ITEXT	AWARE SECURITY					9		
Tradit	Fraditional Security issues – models – context aware security systems – context aware safety.									
•				LECTURE			45	Hrs		

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Context aware pervasive Systems-Architecture for a new breed of applications
Sengloke, Auerbach publications, 2006.
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3. Context-Aware Mobile and Ubiquitous Computing for Enhanced Usability: Adaptive Technologies
and Applications: Dragan Stojanović, IGI Global Snippet, 2009
4. Context Management for Distributed and Dynamic Context-Aware Computing, Rocha, Ricardo
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5. Context-Aware Computing: A Special Triple Issue of Human-Computer Interaction, Thomas
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E REFERENCES
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2. https://www.cs.helsinki.fi/group/cbu-ict/SummerSchool09/context-and-location-awaress.pdf

						I	0						PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	2	3	2	3	2	1	0	0	2	1	0	2	3	2
CO 2	2	3	2	3	2	1	0	0	2	1	0	1	3	2
CO 3	1	3	3	2	1	1	0	0	1	1	0	2	3	2
CO 4	2	2	2	2	2	1	0	0	1	1	0	1	3	2
CO 5	2	3	3	1	1	1	0	0	1	1	0	1	3	2
Total	9	14	12	11	8	5	0	0	7	5	0	7	15	10

 $1 ext{-} 5 ext{-} 1, 6 ext{-} 10 ext{-} 2, 11 ext{-} 15 ext{-} 3$

COURS	SE CO	DE	XCSE71		L	Т	Р	C			
COURS	COURSE NAME INFORMATION RETRIEVAL 3 0 0 3 C P A 3.0.000 L T P H 3 0 0 3 0 0 3										
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					3	0	0	3			
COURS	SE OU	TCON	1ES	Domai	in		Leve	1			
CO1	Defi	<i>ne</i> and	Explain document and query structure.	Cognitive	2	Reme	mber				
CO2	<i>Expl</i> anal	<i>lain, 1</i> ysis.	Develop and Estimate query matching and text	Cognitive)	Unde Appli	rstand, cation				
CO3	Expl	<i>lain</i> an	d <i>Measure</i> information retrieval performances.	Cognitive)	Unde Evalu	rstand, ation				
CO4	Expl	<i>lain</i> an	d <i>Estimate</i> performance improvement measures.	Cognitive)	Unde Appli	rstand,				
CO5	Expl	<i>lain</i> we	b search, crawling and link analysis.	Cognitive)	Unde	rstand.				
UNIT I		DO	CUMENT AND QUERY STRUCTURE					9			
<u> </u>	A 1-	-4 4 * -		1 O		-1	4	1-4-			
extende retrieva UNIT I Matchir missing effects term ext – docum	I and d I and d I and d I ang Proc terms of weig traction nent sin	ean qu atabase QU cess: Ro and te ghting n and a milarity	eries – fuzzy queries – probabilistic queries – natura e systems. ERY MATCHING AND TEXT ANALYSIS elevance and similarity measures – Boolean based ma erm relationship – probabilistic matching – fuzzy r – effects of scaling – data fusion. Text Analysis: Ir nalysis – term association – lexical measures of term v – stop lists – stemming.	at language atching – v natching – dexing – l significan	rector prox Matrix ce – c	based i imity 1 k repre locume	matchi matchi sentati ent ana	9 ng – ng – on – lysis			
			AT ORMANCE MEASURES					U			
Binary – operat	versus ting cu	N-ary 1 rves an	neasures – precision and recall – user oriented measu d single measures – expected search length.	res – avera	ige pro	ecision	and re	call			
UNIT I	V	PE	RFORMANCE IMPROVEMENT TECHNIQUES					12			
Relevan - Naive Vector Rocchio than two stateme Hierarcl agglomo	ace feed Bayes space classic classic classic nt - E hical erative	dback a text c classif ficationes - Th Evaluation agglorr cluster	and query expansion - Text classification and Naive H lassification - The Bernoulli model - Properties of H ication: Document representations and measures of n - k nearest neighbor - Linear versus nonlinear class e bias-variance tradeoff - Flat clustering: Clustering on of clustering - K-means - Model-based cluster ing - Centroid clustering - Optimality of HAC - Divi	Bayes: Tex Naive Bayo f relatedno ssifiers - C in informa stering - H nk cluste sive cluste	t class es - F ess in lassifi tion re tierar ring ring -	sification reature ication etrieval chical - Gro Cluste	on prol selection or space with r l - Prol cluster up-ave r label	on - es - nore olem ring: rage ing -			
UNIT V	ematio /	WE	B SEARCH AND LINK ANALYSIS					9			

Web search basics: Background and history - Web characteristics - Advertising as the economic model -The search user experience - Index size and estimation - Near-duplicates and shingling - Web crawling and indexes: Overview - Crawling - Distributing indexes - Connectivity servers - Link analysis: The Web as a graph - PageRank - Hubs and Authorities.

		LECTURE	TOTAL
		45	45
TEXT	BOOKS	•	
1.	Robert R. Korfhage, Information storage and retrieval, John Wiley 1997	v & Sons, Inc., Ne	w York, NY,
2.	C. Manning, P. Raghavan, and H. Schütze, Introduction to Inf	ormation Retrieva	l, Cambridge
	University Press, 2008		
REFE	RENCE BOOKS		
1.	Baeza-Yates and B. Ribeiro-Neto. Modern Information. Retrieval. A	ddison Wesley, 199	99
2.	Gerard Salton and M. J. McGill. Introduction to Modern Informatic Co., New York, 1983.	on Retrieval. McGr	<i>aw Hill</i> Book
3.	C. J. van RIJSBERGEN, The geometry of information retrieval, , Ca	ambridge Universit	y Press, 2004

						PC)						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	2	1	1	1	1	0	0	0	1	1	2	2
CO 2	2	2	1	1	1	0	1	0	0	0	1	1	2	2
CO 3	2	2	2	1	1	1	1	0	0	0	1	1	2	2
CO 4	2	3	2	1	1	0	1	0	0	0	1	1	2	3
CO 5	2	2	2	1	1	1	1	1	0	0	1	1	3	2
Total	11	11	9	5	5	3	5	1	0	0	5	5	11	11
Scaled	3	3	2	1	1	1	1	0	0	0	1	1	3	3
value														

 $1 ext{-} 5 ext{-} 1, 6 ext{-} 10 ext{-} 2, 11 ext{-} 15 ext{-} 3$

COURS	SE CODE		L	T	Р	С			
COURS	SE NAME	CLOUD COMPUTING		3	0	0	3		
С	P A	3.0 0.0 0.0		L	Т	Р	Н		
ļl.				3	0	0	3		
Objectiv	ves:								
cloud en	The Cloud abling tech	computing course objectives are to understand the current trend nologies and cloud security.	and basics	of clo	oud co	omput	ting,		
COURS	E OUTCO	MES	Domair	n T		Lev	'el		
CO1	Describe its servic	and <i>understand the</i> idea of evolution of cloud computing and es available today.	Cognitive	ן ו	Reme Unde	ember rstanc	1		
CO2	<i>Describe</i> computin	Ability to develop, classify and analyze components of cloud g and its business perspective	Cognitive	1	Unde Anal	erstand yze	1		
CO3	Describe tools.	, apply, analyze and evaluate the various cloud development	Cognitive		Unde Appl	erstand y	1		
CO4	<i>Explain,</i> types of i	<i>Analyze</i> , Demonstrate knowledge on services, architecture, nfrastructural models, disaster recovery and Virtualization	Cognitive	Cognitive Understa Analyze					
CO5	Understa the best j based apj	<i>nd, Explain, develop</i> and <i>analyze</i> the case studies to derive practice model to apply when developing and deploying cloud plications.	Cognitive	١	Unde	erstand	1		
UNIT-I	İ	CLOUD COMPUTING FUNDAMENTALS	L			9			
Understa Risks an Evolutio Boundar UNIT –	anding Clou nd Challeng on of Cloud ies, Cloud (II	d Computing: Origins and Influences, Basic Concepts and Terges. Types of cloud, Cloud services: Benefits, challenges an Computing, usage scenarios and Applications - Fundamental C Characteristics, Cloud Delivery Models, Cloud Deployment Mod CLOUD COMPUTING MECHANISMS AND ARCHITE	minology, d issues o oncepts and lels. CTURE	Goals f clou l Moc	and and co lels:	Bene omput Roles 9	fits, ting, and		
Cloud-E Virtualiz Architec Capacity UNIT-I	nabling Te zation Tech ztures: Arch ztures: Arch ztures: L ztures: L ztures: Technology ztures: Technology z	echnology: Broadband Networks and Internet Architectur nology, Web Technology, Multitenant Technology, Service Te itecture - Workload Distribution, Resource Pooling, Dynamic oad Balancing, Cloud Bursting, Elastic Disk Provisioning, Reduce CLOUD SERVICES AND FILE SYSTEM	e, Data C echnology. c Scalabilit ndant Storag	Center Funda y, Ela ge.	Te amen astic	chnol tal Cl Reso	ogy, loud urce 9		
Software Service Sales for UNIT -I	e as a Servio – Commun rce. Introduo V	e - Platform as a Service – Infrastructure as a Service - Databas ication as services. Service providers- Google App Engine, A ction to Map Reduce, GFS, HDFS, Hadoop Framework. WORKING WITH CLOUDS	e as a Servi mazon EC	ce - N 2, Mi	Ionit croso	oring oft Az 9	as a cure,		
Cloud D Cloud C Cost Me	Delivery Mo Consumer, C etrics, Cost N	del Considerations: Cloud Delivery Models: The Cloud Provide Case Study Example. Cost Metrics and Pricing Models: Busine Management - Considerations Email Communication over the Cl	r, Cloud De ess Cost M oud - CRM	eliver etrics Man	y Mo , Clo agem	odels: ud Us ent	The sage		
UNIT -	V	VIRTUALIZATION FOR CLOUD AND SECURITY IN 7	THE CLOU	JD		9			
Need for Virtual Hypervis a-Service Design -	r Virtualiza Machine n sors – Xen, e Security - Data Secu	tion – Pros and cons of Virtualization – Types of Virtualizati nonitor – Virtual machine properties - Interpretation and b KVM, VMWare, Virtual Box, Hyper-V - Cloud Security Chall – Security Governance – Risk Management – Security Moni rity – Application Security – Virtual Machine Security	on –System inary trans enges and H toring – So	n Vm lation Risks ecurit	, Pro , HI – So y Ar	cess L V ftware chitec	VM, M - >-as- >ture		
<u> </u>		LEUIUKE	INAUI	UAL	<u>ا</u>	IVI	. AL		

		45	_	45
TEXT	BOOKS			10
1.	Thomas Erl and RicardoPuttini "Cloud Computing- Conceptedition 2013.	ots, Technology	& Architecture," Pe	arson, 1st
2.	Cloud Computing" A Practical Approach" Anthony T. McGraw-Hill.	Velte, Toby	J. Velte, Robert E	lsenpeter.
3.	Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distri Processing to the Internet of Things", Morgan Kaufmann Pub	buted and Clou blishers, 2012.	d Computing, Fron	n Parallel
4.	John W. Rittinghouse and James F. Ransome, "Cloud Co Security", CRC Press, 2010.	omputing: Imple	ementation, Manager	ment, and
5.	James E Smith, Ravi Nair, "Virtual Machines", Morgan Kau	fmann Publisher	s, 2006.	
REFE	RENCES			
6.	Barrie Sosinsky, "Cloud Computing Bible," Wiley India Pvt	Ltd, 1st edition,	2011.	
7.	Rajkumar Buyya, James Broberg and Andrzej Goscinski, ' john Wiley and sons, 2011.	'Cloud computin	ng principles and pa	radigms,"
8.	Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Con Kumar Saurabh, "Cloud Computing – insights into New -Era	nputing, A Prac Infrastructure",	tical Approach", TM Wiley India,2011	4H, 2009.
9.	Haley Beard, "Cloud Computing Best Practices for Manag Computing", Applications and Data Centers in the Cloud wit	ing and Measur h SLAs, Emerec	ing Processes for O Pty Limited, July 20	n-demand)08
E REF	ERENCES			
10.	http://cloud-standards.org/wiki/index.php?title=Main_Page			
11.	webpages.iust.ac.ir/hsalimi//89/Cloud%20Common%20s	standards.pptop	ennebula.org,	
12.	www.cloudbus.org/cloudsim/, http://www.eucalyptus.com/	_		

						PC)						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	2	1	1	1	1	0	0	0	1	1	2	2
CO 2	2	2	1	1	1	0	1	0	0	0	1	1	2	2
CO 3	2	2	2	1	1	1	1	0	0	0	1	1	2	2
CO 4	2	3	2	1	1	0	1	0	0	0	1	1	2	3
CO 5	2	2	2	1	1	1	1	1	0	0	1	1	3	2
Total	11	11	9	5	5	3	5	1	0	0	5	5	11	11
Scaled	3	3	2	1	1	1	1	0	0	0	1	1	3	3
Value														

1-5→1, 6-10→2, 11-15→3

COUR	SE COD	E	XCSE73			L	Т	P	С				
COUR	SE NAN	1E	FAULT TOLERANCE COMPUTING			3	0	0	3				
PRERI	EQUISI	ГES				L	Т	Р	Н				
С	Р	A	3.0 0.0 0.0			3	0	0	3				
COUR	SE OUI	COMES			Doma	in	Leve	l					
CO1	Explai	<i>n</i> the defin	ition, fundamentals and application of fault	tolerance.	Cogn	itive	Rem	embe	r				
CO2	Descri	be the avai	lability, safety and fault prevention against t	the system.	Cogn	itive	Unde Anal	erstan ysis	d,				
CO3	<i>Identif</i> mechai	y the possi	ble failure rate and the process to clear the ss.	failure by the	Cogn	itive	Rem Appl	embe y	r,				
CO4	<i>Outlin</i> redund	e the sche ancy.	mes of redundancy, evaluation and techn	iques to avoid	Cogn	itive	Unde Appl	erstan y	d,				
CO5	<i>Explai</i> toleran	<i>n</i> the fault ce	tolerance techniques and programming to a	void the fault	Cogn	itive	Unde Appl	erstan y	d,				
UNIT I INTRODUCTION													
Definiti	on of fau	ult toleranc	e, Redundancy, Applications of fault-tolerations	nce, Fundamen	tals of de	ependa	ability.						
UNIT I	I AT	TRIBUTE	S						9				
Reliabil forecast	lity, avai ing	lability, sat	ety, Impairments: faults, errors and failures	, Means: fault j	preventio	on, ren	noval a	ind					
UNIT	III DI	EPENDAE	BILITY EVALUATION						9				
Commo	on measu es.	res: failure	s rate, mean time to failure, mean time to re	pair, etc. Relia	bility blo	ock dia	igrams	,Mar	'kov				
UNIT I	V R	EDUNDA	NCY						9				
Hardwa Codes: redunda	re redur linear, H ancy	ndancy, Re lamming, c	dundancy schemes, Evaluation and compa- cyclic, unordered, arithmetic, etc. ,Encoding	arison, Applica g and decoding	tions, I techniqu	nform 1es ,A	ation 1 pplicat	redun tions	dancy, , Time				
UNIT V	V PRO	GRAMM	ING						9				
Softwar blocks,	e fault to self-cheo	olerance, S cking softw	pecific features, Software fault tolerance tec vare, etc.	hniques: N-vei	sion pro	gramn	ning, r	ecove	ry				
			LEC	ΓURE TU	TORIA	L	тот	'AL					
теут	BUUK			45	0		<u> </u>	45					
1 EA 1	Anderso	n Tand	P A Lee Fault-Tolerant Principles and Pra	ctices Prentice	-Hall								
2. 3. 4.	Hwang, Jalote, I Fault-To	K., and F. Olerance in	A. Briggs, Computer Architecture and Paral Distributed Systems, ISBN 0-13-301367-7.	lel Processing, Prentice-Hall,	McGrav	v-Hill.							
REFE	RENCES	5											
1. 2. 3. 4.	Johnson Levesor Pradhan Pradhan	a, B.W., De a, Nancy G a, D.K., Fau a, Dhiraj K.	sign and Analysis of Fault-Tolerant System , Safe ware, system safety and computers, A Ilt-Tolerant Computing — Theory and Tech , Fault-Tolerant Computer System Design,	s, Addison We Addison Wesel miques, (2 Vol ISBN 0-13-057	sely y. umes), P 7887-8, F	rentice rentic	e-Hall. e-Hall						

						Р	0						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	2	3	0	1	2	0	1	0	1	1	1	2
CO 2	3	2	1	3	0	1	2	0	1	0	1	1	2	2
CO 3	3	2	1	3	0	1	2	1	1	0	1	1	2	2
CO 4	3	2	1	2	0	1	2	1	1	0	1	1	2	2
CO 5	3	2	1	2	0	1	2	0	1	0	1	1	2	1
Total	15	10	6	13	0	5	10	2	5	0	5	5	9	9
Scaled Value	3	2	2	3	0	1	2	1	1	0	1	1	2	2

 $1 ext{-} 5 ext{-} 1, 6 ext{-} 10 ext{-} 2, 11 ext{-} 15 ext{-} 3$

COURSE CODEXCSE74LTPCCOURSE NAMECOMPUTER GRAPHICS3003													
	ENAME		3 T	U T	U D	5 Ц							
		5.0 0.0 0.0	3	 ()	1 0	3							
Prerequi	isites	Computer Fundamentals, Principles of Computer Programming, Problem Solving Methodologies			1								
COURS	E OUTCO	MES Do	main		Lev	el							
CO1	Illustrate algorithm	the working of appropriate drawing and clipping s for 2D objects.	nitive	e	App	ly							
CO2Produce an object after applying the required 2D/ 3D transformation techniques.CognitiveCO3Explain different color models like RGB and CMYK.Cognitive													
CO3Explain different color models like RGB and CMYK.CognitiveUnderstand													
CO4Identify the visible and invisible surfaces of 3D objects by applying a suitable surface detection algorithm.CognitiveOnderstand Cognitive													
a suitable surface detection algorithm.CognitiveApplyCO5Develop 2D/3D animation for a given scenario by applying the principles of animation.CognitiveApply													
UNIT –	I INTRO	DUCTION TO COMPUTER GRAPHICS			91	Hours							
Graphics Algorith Algorith	types and i n, Midpoi n, Boundar	its applications, Points and Lines, Line Drawing Algorithms- E nt Circle drawing Algorithm, Ellipse generating Algorithm, S y Fill Algorithm, Flood Fill Algorithm.	DA, can L	Bres Line F	enham Polygor	Line 1, Fill							
UNIT –	II 2D AN	D 3D GEOMETRIC TRANSFORMATIONS	Ĩ		91	Hours							
Basic Tr	ansformation	ons- Translation, Rotation, Scaling, Reflection, Shearing, Comp	osite '	Frans	formati	ons							
UNIT –	III 2D VI	EWING AND CLIPPING			91	Hours							
Viewing Operation Sutherlar	Pipeline, W ns- Point nd Hodgema	Vindow to view-port coordinate Transformation, Clipping Clipping, Cohen Sutherland Line Clipping, Liang B an Polygon Clipping, Weiler - Atherton Polygon Clipping, Curv	arsky e and	Lin Text	e Clip Clippi	oping, ng							
UNIT –	IV 3D VI	EWING AND OBJECT REPRESENTATION			91	Hours							
Projectio Surfaces, Scan line	ns – Paral Visible S Method	lel and Perspective Projection, Bezier Curves and Surfaces, Surface Detection Algorithms- Back-Face Detection Algorithm,	B-Sp Dept	oline h But	Curves ffer Me	and and thod,							
UNIT –	V COLOF	R MODELS AND ANIMATION			91	Hours							
RGB Col Animatic Simulatir	lor Model, ` on - Princip ng Accelera	YIQ Color Model, CMY Color Model, HSI Color Model, les of animation, Design of Animation Sequences, Key Frame S tions, Motion Specifications.	/stem	s - M	lorphin	g and							
TEXT B	OOK:												
	1. Dor Edit	ald Hearn and M. Pauline Baker: Computer Graphics, PHI/Pears tion, 2004.	on Ed	ucatio	on, Sec	ond							
REFER	ENCES:												
	 F.S. Hill, Computer Graphics using OPENGL, Second edition, Pearson Education,2003. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics- Principles and practice, Second Edition in C, Pearson Education, 2007. Zigang Xiang and Roy A.Plastock "Schaum"s Outline of Computer Graphics" Second Edition, McGraw -Hill 2000. D. F. Rogers, J. A. Adams – "Mathematical Elements for Computer Graphics (2nd Ed.)" – Thus 												
	1 1/1	11											

						P	0						PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2	1											
CO2	3	2	1											
CO3	2	1	1											
CO4	3	2	3											
CO5	3	2	3					1	1	1		1	1	1
	14	9	9											
	3	2	2					1	1	1		1	1	1

 $1 ext{-}5 ext{-}1, 6 ext{-}10 ext{-}2, 11 ext{-}15 ext{-}3$

COURSE CODE	XCSE75		L	T	Р	С
COURSE NAME	ADVANCED OPERATING SYSTEM		3	0	0	3
C P A	3.0 0.0 0.0		L	Т	Р	Н
			3	0	0	3
Objective:		l	-			-
Objective of A	Advanced Operating systems course are to learn	the funda	ment	tals (of Ope	rating
Systems, to gain know	vledge on distributed operating system concepts th	at include	es are	chite	cture, n	nutual
exclusion algorithm	ns. deadlock detection algorithms a	nd ag	reem	ent	pro	tocols
and to gain insig	ht on to the distributed resource manage	ment co	mpor	nents	viz.	the
algorithms for im	plementation of distributed shared memor	v. recov	verv	an	d co	mmit
protocols		, 1000	u j			
COURSE OUTCOME	78	Domai	n		Lev	vel
CO1 Describe the	various synchronization scheduling and memory	Cognitive		Rer	nemhei	r
management i	ssues	coginave		Und	lerstan	d
CO2 Demonstrate	the mutual evolution deadlock detection and	Cognitive		Cro	oto	
CO2 Demonstrate	the mutual exclusion, deadlock detection and	Cognitive	2	Δng	aluze	
Distributed	protocols of			1 1116	ary ZC	
Distributed op	berating system	a		~		
CO3 Discuss the va	arious resource management techniques issues and	Cognitive	•	Rer	nembei	r, J
various dead	lock detection algorithm and resolution for				alv	u
distributed sys	stems.			- Abl	JIY	
CO4 <i>Describe</i> and solutions.	analyze the various agreement problems and	Cognitive		Rer Und	nembei derstan	r, d
CO5 Understand a	and <i>explain</i> the various Mechanisms for building	Cognitive)	Rer	nember	r,
Distributed Fi	le Systems, Design issues and install open source			Uno	derstan	d,
kernel modif	y existing open source kernels in terms of			Ana	alyze,	
functionality of	or features used.			Apj	oly.	•
UNII-I FUNDAN	IENTALS OF OPERATING SYSTEMS	da Dr	~~~~	~ C	-h-d-1	9
Deadlocks: Detection	Prevention and Recovery – Models	of Reso	urces	5 30	- Me	ing –
Management Technique	es.	01 10050	urce	3	IVIC	mory
UNIT –II DISTRIB	UTED OPERATING SYSTEMS					9
Issues in Distribut	ed Operating System – Architecture – Co	ommunica	tion	Pr	imitive	s –
Lamport's Logical c	locks - Causal Ordering of Messages - I	Distributed	M	utual	Excl	usion
Algorithms - Cent	ralized and Distributed Deadlock Detection	Algorith	ms	_	Agree	ement
Protocols.						-
UNIT-III DISTRIB	UTED RESOURCE MANAGEMENT			A 1	•.1	9
Distributed File System	ls – Design Issues - Distributed Shared	Memory	-	Algo	Schod	IOr
Algorithms – Svr	ochronous and Asynchronous Check Pointing	and \mathbf{R}	ig ecov	– erv		Fault
Tolerance – Two-Phase	e Commit Protocol.		ccov	Cry		I dult
UNIT -IV REAL T	TIME AND MOBILE OPERATING SYSTEMS					9
Basic Model of Real	Time Systems - Characteristics- Applications	of Real	Ti	me	Syster	ns –
Real Time Task Sc	heduling - Handling Resource Sharing - M	Iobile O	perat	ing	System	ns –
Micro Kernel Design	n - Client Server Resource Access – Processe	es and [Threa	ıds	- Me	mory
Management - File syst	em.					~
UNIT V CASE ST	UDIES	٦.4		4 A	1 1 1.	9
Linux System: Desi	gn rinciples - Kernel Modules - Process	Manage	emen	ιδ	uneduli Intorna	ng -
Communication iOS	and Android. Architecture and SDK Fram	e system	- N	/ledia	nneipr I av	occss er -
Services Laver - Core C	S Laver - File System.		11	10010	. Lay	~ -
	LECTURE	PRAC'	TIC	4L	ТО	TAL

	45	0	45
REFERENCES			
 Mukesh Singhal and Niranjan G. Shivaratri Distributed, Database, and Multiprocess 2011. 	, "Advanced Co or Operating S	oncepts in Operating systems", Tata Mc	g Systems Graw-Hill,
2. Abraham Silberschatz; Peter Baer Galvin; Seventh Edition, John Wiley & Sons, 2012	Greg Gagne,	"Operating System	Concepts",
3. Daniel P Bovet and Marco Cesati, "Ur O'Reilly, 2005	iderstanding the	Linux kernel", 3rd	d edition,
4. Rajib Mall, "Real-Time Systems: Theory and Pra	ctice", Pearson Ed	lucation India, 2006.	
5. Neil Smyth, "iPhone iOS 4 Development I media, 2011.	Essentials – Xco	ode", Fourth Edition	n, Payload
E REFERENCES			
6. https://nptel.ac.in/courses/106108101/			
7. https://www.researchgate.net/publication/295979	5_Advanced_Ope	erating_Systems	

							PO						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	1	0	0	0	0	0	0	0	0	0	1	0	0	0
CO 2	1	3	2	0	0	1	3	0	0	0	0	1	2	0
CO 3	1	3	0	0	0	1	0	0	0	0	1	3	3	0
CO 4	1	3	0	0	0	0	0	0	0	0	1	3	3	0
CO 5	1	0	0	0	3	1	1	0	0	0	2	3	0	0
Total	5	9	2	0	3	3	4	0	0	0	5	10	8	0
Scale d value	1	2	1	0	1	1	1	0	0	0	1	2	2	0

1-5→1, 6-10→2, 11-15→3

COURSE CODE XCSE76						Τ	Р	С			
COURS	E NAME	VIRTUALIZATION	VIRTUALIZATION					3			
PREREC	QUISITES	CLOUD COMPUTING	CLOUD COMPUTING					Н			
C:P:A		3:0:0			3	0	0	3			
COURS	E OUTCOME	S		Domain		Leve	el				
CO1	CO1 Deploy legacy OSs on virtual machines Cognitiv						Understand				
CO2	CO2 Understand the intricacies of server, storage, network, desktop Cognitive Und and application virtualizations							tand			
CO3	Design new n	nodels for virtualization		Cognit	ive	Uı	nderst	tand			
CO4	Design and platforms	develop cloud applications on	virtual machine	Cognit	ive	Uı	nderst	tand			
CO5	Design new n	nodels for Bigdata processing in a	cloud	Cognit	ive	Uı	nderst	tand			
LEARNI	NG OBJECT	IVES									
 To understand the need of virtualization, Explore the types of virtualization To understand the concepts of virtualization and virtual machines To understand the practical virtualization solutions and enterprise solutions To understand the security issues in cloud computing 											
UNIT I	INTRODUCT	TION TO VIRTUALIZATION						9			
Basics of Machine Machines	Virtualization Virtualization	 Virtualization Types – Model of Application Virtualization – 	of Virtualization - Goals of Virtua	- Layers of alization –	Virtu Taxo	alizati nomy	on – S of V	Server Virtual			
UNIT II	VIRTUAL	ZATION INFRASTRUCTUR	E					9			
Hardware Server Po Virtualiza	e Virtualization poling - Types c ation Platform	- Virtual Hardware Overview – V of Server Virtualization – Busines	/irtual Machine F ss cases for Sever	Products - So Virtualizat	ever (ion –	Consol Select	idatio	on – erver			
UNIT II	I NETWORI	X VIRTUALIZATION						9			
Virtual F Virtualizi	ile Systems – P ng the Campus Routing – Cas	rocess Virtualization – Layers in WAN Design – - Routing Protoc	Virtualization – cols- Virtualizatio	Players in V on Aware R	virtual outing	lizatio g - Mu	n - Ilti-				
UNIT IV	DESKTOP	VIRTUALIZATION AND STO	ORAGE VIRTU	ALIZATIO	ON			9			
Virtualiza Securing	ation- Preparin iSCSI – SAN I	g a Virtualization Machine Hospackup and recovery techniques	st- Storage Virtu – RAID – SNIA	alization - Shared Stor	iSCS rage N	SI Arc Model	hitec – Cla	ture – assical			
UNIT V	Storage Model – Virtual Information Systems. UNIT V SECURITY							9			
Secure Virtual Infrastructure- Protect Virtual Infrastructure-Prepare Business Continuity -Update Management Structure											
LECTURE TUTORIAL TOTA											
45 0 4 TEXT BOOK											
1. Dan Kusnetzky, "Virtualization: A Manager's Guide". O'Reily 2011											
REFERI	ENCES										
1. Danielle Ruest, Nelson Ruest," Virtualization: A Beginner's Guide", McGraw Hill, 2009											
2. Chiris 2 wohr, Erick M. Halter, Virtualization. From Desktop to the Enterprise, A Fress, 2000											

E REFERENCE

- 1. http://www.ss.pku.edu.cn/vs/style/resources/Introduction%20to%20Virtualization.pdf
- 2. http://www.vmware.com/in/virtualization
- 3. http://bradhedlund.com/2013/01/28/network-virtualization-a-next-generation-modular-platform-forthe-virtual-network/
- 4. http://en.wikipedia.org/wiki/Desktop_virtualization

Mapping of COs with POs:

	РО										PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	2	3	0	1	2	0	1	0	1	1	1	2
CO 2	3	2	1	3	0	1	2	0	1	0	1	1	2	2
CO 3	3	2	1	3	0	1	2	1	1	0	1	1	2	2
CO 4	3	2	1	2	0	1	2	1	1	0	1	1	2	2
CO 5	3	2	1	2	0	1	2	0	1	0	1	1	2	1
	15	10	6	13	0	5	10	2	5	0	5	5	9	9
	3	2	2	3	0	1	2	1	1	0	1	1	2	2

$1\text{-}5{\rightarrow}1, 6\text{-}10{\rightarrow}2, 11\text{-}15{\rightarrow}3$

COUR	SE CODE	XCSE77	L	Т	P	С				
COUR	SE NAME	MACHINE LEARNIN	3	0	0	3				
C:P:A	= 3:0:0									
					3 0		0	3		
COUR	SE OUTCO	MES		Doma	nin		Leve	1		
CO1	Classify sup	pervised, unsupervised, se	emi-supervised	Cognitiv	ve	Reme	ember			
	machine learning approaches.						rstand	l		
CO2	Explain the	Cognitiv	ve	Remember						
~~~		·		· ·		Understand				
CO3	Explain the	various Tree and Probab	ilistic models.	Cognitiv	ve	Reme Unde	ember rstand	I		
<b>CO4</b>	<i>Explain</i> the	e various Dimensionali	ty Reduction	and Cognitiv	ve	Reme	ember			
	Evolutionary models.					Unde	rstand	l		
CO5	<i>Illustrate</i> th	e graphical models of ma	chine learning	Cognitiv	ve	Reme	ember			
	algorithms.					Unde	rstand	l		
UNIT I		ODUCTION			•			9		
Learnin	g - Types of	f Machine Learning – Si	upervised Lear	ning – The B	rain a	nd the	Neur	on –		
Design	a Learning S	System – Perspectives an	d Issues in Ma	achine Learnin	.g – C	oncept	Lear	ning		
Task –	and the Can	lidate Elimination Algor	illig a Maxilli ithm Linear	Discriminants	пуро Рог	mesis ·	- ver	SIOII		
Senarah	allu tile Callo vility – Linear	r Regression	iunn – Lineai	Discriminants	- 1 01	ception	I - LI	псаі		
UNIT I	I LINE	AR MODELS						9		
Multi-la	ver Perceptr	on – Going Forwards – (	Going Backwar	ds: Back Pron	agatic	on Erro	r - M	ulti-		
layer P	erceptron in	Practice – Examples o	f using the M	ILP – Overvi	ew –	Deriv	ing B	ack-		
Propaga	ation – Radi	al Basis Functions and	Splines – Cor	ncepts – RBF	Netv	vork –	Curs	e of		
Dimens	ionality – Int	erpolations and Basis Fu	nctions – Supp	ort Vector Ma	chines	5.				
UNIT I	II TREE	AND PROBABILISTI	C MODELS					9		
Learnin	g with Tree	s – Decision Trees – (	Constructing I	Decision Trees	– C	lassific	ation	and		
Regress	sion Trees –	Ensemble Learning – E	Boosting – Bag	gging – Differ	ent w	vays to	Com	bine		
Classifi	ers – Probab	ility and Learning – Da	ta into Probab	ilities – Basic	Stati	stics –	Gaus	ssian		
Mixture	$\sim$ Models – N	earest Neighbor Methods	s – Unsupervise	ed Learning –	K mea	ans Alg	gorithi	ns –		
	Quantization	- Self Organizing Featur	e Map.		A D 37	MOD	ET C	•		
Dimono	V DINE	INSIGNALITY REDUC	inont Analysis	Dringingl	AKI	MODI		<b>9</b>		
Factor	Analysis Ir	uction – Linear Discrim	Analysis I o	– Principal C	,ompe mbed	ding	Isom	515 — an		
Least S	auares Optin	vization – Evolutionary I	earning – Gen	etic algorithm	s = G	enetic (	Offeni	ap – ring:		
- Gene	tic Operators	- Using Genetic Algo	orithms – Reir	forcement Le	arning	p = 0	vervie	w –		
Getting	Lost Exampl	le – Markov Decision Pro	ocess.		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
UNIT	V GRAPH	HICAL MODELS						9		
Markov	Chain Mon	te Carlo Methods – Sa	mpling – Pro	posal Distribu	tion -	- Mark	tov C	hain		
Monte	Carlo – Graj	phical Models – Bayesia	an Networks -	- Markov Ran	dom	Fields	– Hic	lden		
Markov Models – Tracking Methods.										
LECTURE TUTORIAL						TO	ΓAL			
			45	-		4	5			
TEXT	BOOKS				-		-			
1. Step	hen Marslan	d, —Machine Learning	– An Algorit	hmic Perspect	tivel,	Secon	d Edi	tion,		
Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.										
2.10m	IVI IVIITCHEII,	-iviachine Learning, Fi	ist Edition, Mc	Graw Hill Edu	icatioi	u, 2013	)			
NLT LI	VITIOTS									

- 1. Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Datal, First Edition, Cambridge University Press, 2012.
- 2. Jason Bell, —Machine learning Hands on for Developers and Technical Professionals^{II}, First Edition, Wiley, 2014.
- 3. Ethem Alpaydin, —Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series) I, Third Edition, MIT Press, 2014,

#### **E-RESOURCES**

https://www.coursera.org/learn/machine -learning/home/info

### Mapping of COs with POs:

	РО												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	1	1	1	1	1	1	1	0	0	0	2	2	1	1
CO 2	2	2	2	1	2	1	1	0	0	0	1	1	3	2
CO 3	2	2	2	1	2	1	1	0	0	0	1	1	3	2
<b>CO 4</b>	2	2	2	1	2	1	1	0	0	0	1	1	3	2
CO 5	2	2	2	1	2	1	1	0	0	0	1	1	3	2
Total	9	9	9	5	9	5	5	0	0	0	6	6	13	9
Scaled Value	2	2	2	1	2	1	1	0	0	0	2	2	3	2

#### $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

COURS	L 2	T	P	C 2					
		3:0:0		э L	T	U P	э Н		
<b>C.I.</b>				3	0	0	3		
COURS		Level							
CO1	Rem Und	ember erstan	r, d						
CO2	Cognitive	Rem	Remember						
CO3	Describe the d	Cognitive	Rem Und	Remember, Understand					
CO4	Explain the TC	P issues in adhoc networks.	Cognitive	Und	erstan	d	,		
CO5	Describe the a networks.	rchitecture and protocols of wireless sensor	Cognitive	Rem	ember	ſ			
UNIT I	INTRODUCT	ION				9			
Fundam Radio p network Hoc and	entals of Wi ropagation Me (MANETs) an I Sensor network	reless Communication Technology – chanisms – Characteristics of the W d wireless sensor networks (WSNs) :concepts s. Design Challenges in Ad hoc and Sensor N	The Electroma ireless Channe and architecture etworks.	gnetic l -m es. Apj	Spe obile olicatio	ctrum ad ons of	hoc f Ad		
UNIT I	I MAC PROT	OCOLS FOR AD HOC WIRELESS NETV	VORKS			9			
Issues i Content Mechan	n designing a ion based proto isms – Multi cha	MAC Protocol- Classification of MAC Pr cols with Reservation Mechanisms- Conten nnel MAC-IEEE 802.11	otocols- Conten- tion based proto	tion b ocols v	ased p with So	protoc	ols- ling		
UNIT NETW	IN AD HOC W	IRELESS 9							
Issues in routing Networl	n designing a rou (on-demand), hy ks.	iting and Transport Layer protocol for Ad ho brid routing- Classification of Transport Lay	c networks- proa er solutions-TCP	ctive 1 over 2	outing Ad hoo	g, reac c wire	tive: tive: tive:		
UNIT I	V WIRELESS	SENSOR NETWORKS (WSNS) AND MA	C PROTOCOL	<b>.S</b> 9					
Single node architecture: hardware and software components of a sensor node – WSN Network architect typical network architectures-data relaying and aggregation strategies -MAC layer protocols: so organizing, Hybrid TDMA/FDMA and CSMA									
UNIT V	WSN ROUTI	NG, LOCALIZATION & QOS				9			
Issues i and rela Transpo	Issues in WSN routing – OLSR- Localization – Indoor and Sensor Network Localization-absolute and relative localization, triangulation-QOS in WSN-Energy Efficient Design-Synchronization-Transport Layer issues.								
		LECTUR	E		45	Hrs			
TEXT BOOKS									
C. Siva Ram Murthy, and B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols ", Prentice Hall Professional Technical Reference, 2008									
REFER									
1. Carlo Applica 2. Fens	Networks: Theory and mpany, 2006. Publication – 2002								
2. Teng Endo and Leonides Odiods, Whereas Sensor Networks, Elsevier Fubilitation 2002.									
3. Holger Karl and Andreas Willig "Protocols and Architectures for Wireless Sensor Networks", Wiley, 2005 4. Kazem Sohraby, Daniel Minoli, & Taieb Znati, "Wireless Sensor Networks-Technology, Protocols, and Applications", John Wiley, 2007. Designs", 5. 2003. Anna Hac, "Wireless Sensor Network John Wiley, 8 **E REFERENCES** 1. https://lecturenotes.in/subject/396/adhoc-and-sensor-network-asn

#### Mapping of COs with POs:

	РО												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	2	3	2	3	2	1	0	0	2	1	0	2	3	2
CO 2	2	3	2	3	2	1	0	0	2	1	0	1	3	2
CO 3	1	3	3	2	1	1	0	0	1	1	0	2	3	2
CO 4	2	2	2	2	2	1	0	0	1	1	0	1	3	2
CO 5	2	3	3	1	1	1	0	0	1	1	0	1	3	2
Total	9	14	12	11	8	5	0	0	7	5	0	7	15	10

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$ 

COURSE CODE	XCSE79	L	Т	Р	С
COURSE NAME	EMBEDDED SYSTEMS	3	0	0	3
СРА	3.0 0.0 0.0	L	Т	Р	Η
		3	0	0	3

#### **Objective:**

Objective of Embedded systems course are to know the building blocks of embedded system, to educate in various embedded development strategies, to Introduce bus communication in processors, input/output interfacing. And to impart knowledge in various processor scheduling algorithms, basics of real time operating system tool.

COURSI	E OUTCOMES	Domain	Level
CO1	<i>Discuss</i> the structural units in Embedded processor.	Cognitive	Remember, Understand
CO2	Understand and apply the embedded networking	Cognitive	Understand, Analyze
CO3	<i>Discuss</i> the development environment of embedded systems.	Cognitive	Remember, Understand
CO4	<i>Describe</i> the real time operating system based embedded system design.	Cognitive	Understand, Apply
CO5	<b>Understand</b> and <b>develop</b> embedded system applications.	Cognitive	Understand, Create
UNIT-I	INTRODUCTION TO EMBEDDED SYSTEMS		9

Introduction to Embedded Systems - The build process for embedded systems- Structural units in Embedded processor, selection of processor & memory devices- DMA – Memory management methods-Timer and Counting devices, Watchdog Timer, Real Time Clock, In circuit emulator, Target Hardware Debugging.

#### UNIT –II EMBEDDED NETWORKING

Embedded Networking: Introduction, I/O Device Ports & Buses- Serial Bus communication protocols -RS232 standard - RS422 - RS485 - CAN Bus -Serial Peripheral Interface (SPI) - Inter Integrated Circuits (I2C) –need for device drivers.

9

9

9

9

#### UNIT-III EMBEDDED FIRMWARE DEVELOPMENT ENVIRONMENT

Embedded Product Development Life Cycle- objectives, different phases of EDLC, Modeling of EDLC; issues in Hardware-software Co-design, Data Flow Graph, state machine model, Sequential Program Model, concurrent Model, object oriented Model.

#### UNIT -IV **RTOS BASED EMBEDDED SYSTEM DESIGN**

Introduction to basic concepts of RTOS- Task, process & threads, interrupt routines in RTOS, Multiprocessing and Multitasking, Preemptive and non-preemptive scheduling, Task communicationshared memory, message passing - Inter process Communication - synchronization between processessemaphores, Mailbox, pipes, priority inversion, priority inheritance, comparison of Real time Operating systems: Vx Works, RT Linux.

#### UNIT V **EMBEDDED SYSTEM APPLICATION DEVELOPMENT**

Case Study of Washing Machine- Automotive Application- S	Study of Washing Machine- Automotive Application- Smart card System Application           LECTURE         PRACTICAL         TOTAL							
	LECTURE	PRACTICAL	TOTAL					
	45	0	45					
ΤΕΥΤ ΒΛΛΚς								

1. Rajkamal, 'Embedded System-Architecture, Programming, Design', Mc Graw Hill, 2013.

2. Peckol, "Embedded system Design", John Wiley & Sons, 2010

3. Lyla B Das," Embedded Systems-An Integrated Approach", Pearson, 2013

#### REFERENCES

- 1. Shibu. K.V, "Introduction to Embedded Systems", Tata Mcgraw Hill, 2009.
- 2. Elicia White," Making Embedded Systems", O' Reilly Series, SPD, 2011.
- 3. Tammy Noergaard, "Embedded Systems Architecture", Elsevier, 2006.
- 4. Han-Way Huang, "Embedded system Design Using C8051", Cengage Learning, 2009.
- 5. Rajib Mall "Real-Time systems Theory and Practice" Pearson Education, 2007.

#### **E- REFERENCES**

1. https://nptel.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Embedded%20systems

		PO												50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO 2	0	0	0	0	0	0	0	0	0	0	0	1	0	0
CO 3	1	0	3	3	0	0	1	0	0	0	2	1	2	0
CO 4	2	2	0	0	0	0	0	0	0	0	1	1	2	0
CO 5	1	3	0	0	1	1	3	0	0	0	3	3	3	0
Total	4	5	3	3	1	1	4	0	0	0	6	6	7	0
Scale d	1	1	1	1	1	1	1	0	0	0	2	2	2	0

#### Mapping of COs with POs:

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$ 

COUR	SE CODE	XC	SE7A L T P						C
COUR	SE NAME	PA	RALLEL AND DISTRIBU	JTED SYSTEN	1S	3	0	0	3
C P A	L	3.0	0.0 0.0			L	Т	Р	Η
PRER	EQUISITE	CO	MPUTER NETWORKS			3	0	0	3
COURS	E OBJECTIV	ES							
• To le	arn about oper	ation	al procedures of parallel and	l distributed syst	tems				
• To kr	now about the	challe	enges in parallel and distribu	ited systems					
• To le	arn about the c	clock	synchronization techniques						
• To ur	nderstand paral	llel aı	nd distributed programming	environments					
COURS	E OUTCOM	E: Af	ter the completion of the co	ourse, students	Doma	in		Leve	el
will be at	ole to				C or P o	or A			
CO1	<b>Define</b> parall	lel an	d distributed systems		Cognitive		Rem	ember	
CO2	<i>Explain</i> para	llel p	rocessing architecture and th	neir hazards	Cognitive		Und	erstanc	1
CO3	<i>Explain</i> dis weakness	stribu	ted computing with its	strength and	Cognitive		erstanc	1	
CO4	Discuss abou	ıt syn	chronization and buffering r	nechanism	Cognitive		Und	erstand	ł
CO5	<i>Explain</i> abou	ıt par	allel and distributed program	nming	Cognitive		Und	erstand	1
COURS	E CONTENT								
UNIT I									9
complexi levels of advantage issues.	ty, throughout parallelism in es, and tightly	, spe prog y-cou	edup, measures, data deper rams. Program flow-control pled loosely-coupled syste	idence, resource flow, data flow ms. Hardware	e dependen v, Distribute and softwa	ce, Ben ed syste ire re	rnstein ems – quiren	i's con Introd nents,	ditions luction, design
Derellel	Drocossing	Sterr	atura & Organization, To	wonomy of n	rallal pro	000000	aron	1 ority	hasia
architectu design, A schedulin	rocessing – ires, multiproc Arithmetic pip	eline	s, vector processors, pipelin, Instruction pipeline, Pipe	eline hazards a	as well as r nd their so	ion line olution,	er pipe resei	eline, or vation	ptimal table,
UNIT II	[							9	)
Distribute evolution Computin Cluster:- cluster, L Introduct	ed Computing- , reasons for ing: Minicomp definitions, rea- linux cluster; ion to DCE, ar	-intro its po uter a asons Using chite	duction, definition, its histo pularity, Strength and weak model, workstation model, for its popularity cluster co g cluster, distributed Comp cture of Distributed Applica	ory; Distributed cnesses of distri- workstation s mputer system a uting System m tions	Computing buted comp erver mode architecture nodels: Dist	systen outing, l, Proc , Wind ributec	n defi Diffe cessor ows cl l oper	nition rent fo pool luster, ating s	and its orms of Model; Solaris system,
UNIT IV	,							9	)
Clock: Ty stamps, N by Mess message	ypes of Clock, Message passir age passing, data, Process a	, Syn ng:- in syncl iddres	chronization of clocks, type ntroduction, desirable featur nronization, Buffering, Mu ssing, Failure handling, IPC,	s of Clock sync res of a good m iltidatagram me Distributed Ele	chronizatior essage pass essages, En ction, types	algori ing system coding of elect	thms, stem, and ction a	lampo Issues decod lgorith	ort time in IPC ling of nms.
UNIT V								9	)
Parallel asynchron programm	& Distribute nous programming, VAL etc.	ed H ming, ,. MP	Programming: Parallel Pr modulla-2, occamm, FOR I, Open MP	ogramming en TRAN, DAP F	vironments ORTRAN,	s, mo C-linda	dels, a, Act	synch us, da	ta flow
			LECTURE	TUTOR	IAL		ТО	TAL	
			45	-			4	45	

#### **TEXT BOOKS**

- 1. Michael Quinn, Parallel Computing: Theory and Practice, , 2nd Edition, 2018, ISBN13: 978-0070495463
- 2. Kai Hwang, "Advanced Computer Architecture Parallelism, Scalability, Programmability", McGraw Hill Inc, 2008.
- 3. Wilkinson, "Parallel Programming using networked computer", Pearson Education India, 2006.

#### **REFERENCE BOOKS**

- 1. S. G. Akl, "The Design and Analysis of parallel algorithms", Englewood Cliffs, NJ, 1989.
- 2. S. Tanenbaum, "Modern Operating System", PHI, 1996.
- 3. R. H. Perrott, "Parallel Programming", Addison Wesley, 1987.
- 4. T. G. Lewie and H. Ele-Revini, "Introduction to Parallel computing", PHI, NJ, 1992.
- 5. S. Lakshmivardhan and S.K. Dhall, "Analysis and design of parallel algorithm arithmetic and matrix problems", McGraw Hill, 1990.
- 6. J. M. Crichlow, "An introduction to distributed and parallel computing", PHI, 1988.

#### **E-REFERENCES**

- 1. https://www.confluent.io/learn/distributed-systems/
- 2. Distributed Systems: By Prof. Rajiv Misr, IIT Patna, https://onlinecourses.nptel.ac.in/noc22_cs66/preview

	РО													<b>SO</b>
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	1	1	0	0	2	0	0	0	0	0	1	1	1	1
CO 2	1	2	0	0	2	0	0	0	0	0	1	1	1	1
CO 3	1	2	1	2	2	0	0	0	0	0	1	1	1	1
CO 4	1	1	1	2	2	0	0	0	0	0	1	1	1	1
CO 5	1	1	1	0	1	0	0	1	0	2	1	1	1	1
Total	5	7	3	4	9	0	0	1	0	2	5	5	5	5
Scale d Valu e	1	2	1	1	2	0	0	1	0	1	1	1	1	1

#### Mapping of COs with POs:

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$ 

COURSE CODEXCSE81LT								С	
COURS	E NAME	BIG DATA ANALYTIC	S		3	0	0	3	
C:P:A		3:0:0			L	Т	Р	Н	
					3	0	0	3	
COURS	E OUTCOMES			Domain		T	evel	.1	
C01	<b>Describe</b> the cha	aracteristics of Big Data a	nd the issues	Cognitive	Re	ememt	ber		
	involved and desc	cribe the evolution of analyt	ical process	0	Uı	ndersta	and		
CO2	<i>Demonstrate</i> vari	ous data analysis methods	·····	Cognitive	Re	ememt	ber		
					Uı	ndersta	and		
~~~				~	Aj	oply			
CO3	Describe and den	nonstrate stream computing	g in Big Data	Cognitive	Re	ememt	ber		
	Analytics				Apply				
CO4	Parform marke	t backet analysis and	domonstrato	Cognitive	A Re	opry memł	Der		
0.04	clustering technic	mes	ucmonstrate	Coginave	U	ndersta	and		
	•••••••••••••••	1			A				
CO5	<i>Explain</i> the Bi	g Data Framework and	visualization	Cognitive	Uı	and			
	methods	-							
UNIT I	INTRODUCTI					9			
Evolutio	n of Big data- Big	data characteristics: Volun	ne. Velocity. V	variety – Iss	sues –	Nuts	and b	olts	
of Big da	ata - Security, Com	pliance, auditing and produ	ction.						
Evolutio	n of Analytical Pro	ocess – Enterprise Sandbox	- Analytical	Data Set –	Enterp	orise A	Analy	tical	
Data Set									
		10					I		
UNIT II	DATA ANALYS	15						9	
Stastical	concepts: Samp	ling distributions, resamp	ling, statistic	al inferenc	e, pr	edictio	on ei	rror.	
Regressi	on modeling-Mult	ivariate analysis-Bayesian	modeling-Supp	port vector	and k	ernel	meth	ods-	
Analysis	of time series: lin	ear systems analysis, nonli	near dynamics	s, Neural ne	etwork	s: lea	rning	and	
generaliz	ation, competitive	learning.							
UNIT II	I MINING DATA	STREAMS						9	
Introduc	tion to Streams (Concepts – Stream data m	odel and arc	hitecture –	Strea	m Co	mnut	ting	
Samplin	g data in a stream	– Filtering streams – Count	ting distinct el	ements in a	strea	m – E	stima	ting,	
moments	s – Counting one	ness in a window – Deca	ying window	- Realtime	e Ana	lytics	Platf	orm	
(RTAP)	applications - case	studies - real time sentime	nt analysis, sto	ck market p	redict	ions.			
UNIT IV	FREQUENT IT	EMSETS AND CLUSTER	KING					У	
Mining 1	Frequent itemsets -	– Market based model – A	priori Algorith	ım – Handl	ing la	rge da	ta set	ts in	
Main m	emory – Limited	Pass algorithm – Counting	ng frequent i	temsets in	a stre	eam (Cluste	ring	
– Ereque	es – Hierarchical -	- K- Means – Clustering mg	ering in non-e	uclidean sr		Clust	KUCI	$_{\rm LUS}$	
streams	and Parallelism.	nustering methods – Clust	ing in non-c	achacan sp		Clusi	ering	, 101	
UNIT V	FRAMEWORKS	S AND VISUALIZATION						9	
MapRed	uce – Hadoop. Hiv	ve, MapR – Sharding – Nos	SQL Database	s - S3 - Ha	doop	Distri	buted	file	
systems	- Visualizations -	– Visual data analysis tec	hniques, inter	action tech	niques	; Sys	tems	and	
applicati	ons:	•	• ·		•	•			
		[]	LECTURE	TUTORIA	L	TOT	AL		
			45	0			45		

TEXT BOOKS

1. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.

REFERENCES

- 1. Frank J Ohlhorst, "Big Data Analytics: Turning Big Data into Big Money", Willey and SAS Business Series, 2012.
- 2. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", Wiley and SAS Business Series, 2012.
- 3. Michel Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.

E-REFERENCES

- 1. https://onlinecourses.nptel.ac.in/noc15_mg05/preview NPTEL, Introduction to Data Analytics, Dr. Nandan Sudarsanam, Department of Management Studies, IIT Madras.
- 2. E-PGPathshala course for Data Analytics https://epgp.inflibnet.ac.in/ahl.php?csrno=7

Mapping of COs with POs:

						ŀ	0						PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	1	1	1	2	1	2	2	2		1		3	2	3
CO 2	3	2	3	3	2	3				1		3	2	3
CO 3	3	2	3	3	2	3				1		3	2	3
CO 4	3	2	3	3	2	3			1	1		3	2	3
CO 5	2	2	3	3	3	3				1		3	2	3
Total	12	9	13	14	10	14	2	2	1	5		15	10	15
Scale														
d	3	2	3	3	2	3	1	1	1	1		3	2	3
Value														

 $1 \text{-} 5 \rightarrow 1, 6 \text{-} 10 \rightarrow 2, 11 \text{-} 15 \rightarrow 3$

COURS	E CODE	L	Т	P	С		
COURS	E NAME	SOFT COMPUTING		3	0	0	3
C:P:A		3:0:0		L	Т	Р	Н
				3	0	0	3
COURS	E OUTCOMES		Do	main		Leve	el
CO1	Illustrate the nu	ance of soft computing and <i>depict</i> the	Cogni	tive	Und	lerstand	
	Genetic Algorithm	1 concepts	C				
CO2	explain the evol	ution of Artificial Neural Network and	Cogni	tive	Und	lerstand	
	various types of n	eural networks	C				
CO3	Recognize the sup	pervised learning method and unsupervised	Cogni	tive	Und	lerstand	
	learning methods	and demonstrate it in various applications	U		App	oly	
CO4	<i>Comprehend</i> the	fuzzy systems and its hybrid methods and	Cogni	tive	Und	lerstand	
	demonstrate it in	various applications	U		App	oly	
CO5	Describe the Swar	m Intelligence usage	Cogni	tive	Und	lerstand	
	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~					1	-
UNIT I:	SOFT COMPUTI	NG AND GENETIC ALGORITHM					9
What is	soft computing?	Differences between soft computing and	hard co	omputin	g, Sof	t Com	outing
constitue	nts, Methods in soft	computing, Applications of Soft Computing	g.				
Introduct	ion to Genetic Alg	orithms (GA), Representation, Operators in	n GA, F	itness fu	unction	i, popul	ation,
building	block hypothesis	and schema theorem; Genetic algorithms	operate	ors- me	thods	of sele	ction,
crossover	and mutation, sim	ole GA(SGA), other types of GA, generation	n gap, ste	eady sta	te GA,	Applic	ations
of GA							
UNIT II	NEURAL NETW	ORKS					9
Neural N	etwork Concept, b	iological neural system, Evolution of neura	l netwo	rk, McC	Culloch	-Pitts n	euron
model, a	ctivation functions,	feedforward networks, feedback network	s, learni	ng rules	s – He	bbian,	Delta,
Percepro	n learning and Wind	drow-Hoff, winner-take-all.					
UNIT II	I: SUPERVISED A	AND UNSUPERVISED LEARNING					9
Perceptro	on learning, single l	layer/multilayer perceptron, linear separabi	lity, hide	den laye	rs, bac	k popag	gation
algorithm	n, Radial Basis Fun	ction network; Unsupervised learning - Ko	honen, S	SOM, C	ounter	-propag	ation,
ART, Re	inforcement learning	ng, adaptive resonance architecture, applica	tions of	neural	networ	ks to p	attern
recogniti	on systems such as	character recognition, face recognition, app	lication of	of neura	l netwo	orks in	image
processin	g.						
UNIT IV	: FUZZY SYSTE	MS					9
Basic de	finition and termin	ology, set-theoretic operations, Fuzzy Sets	, Operat	ions on	Fuzzy	v Sets,	Fuzzy
Relations	, Membership Fur	nctions, Fuzzy Rules & Fuzzy Reasoning	, Fuzzy	Inferen	ce Sys	stems,	Fuzzy
Expert S	Systems, Fuzzy D	ecision Making; Neuro-fuzzy modeling-	Adaptiv	ve Neu	ro-Fuz	zy Infe	erence
Systems,	Coactive Neuro-	Fuzzy Modeling, Classification and Re	egressior	n Trees	, Dat	a Clus	tering
Algorithr	ns, Rulebase Struc	ture Identification and Neuro-Fuzzy Con	trol , A	pplicati	ons of	neuro-	fuzzy
modeling							
UNIT V	SWARM INTELI	JGENCE		9			
What is	swarm intelligence	? Various animal behaviour which have t	een use	d as ex	amples	s, ant c	olony
optimizat	ion, swarm intellig	ence in bees, flocks of birds, shoals of fish	, ant-ba	sed rout	ing, pa	article s	warm
optimizat	ion						
_		LECTURE T	J TORI A	L '	ГОТА	L	
		45	0			45	
TEXT B	OOKS						
1. S.N. S	hivanandam, Princi	ple of soft computing, Wiley. ISBN13: 9788	1265274	410 (201	1)		
2. Jyh-Sh	ing Roger Jang, Ch	uen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy	and Soft	Compu	ting",	Prentice	:-Hall

of India, 2003.

3. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.

4. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.

REFERENCES

1. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.

2. David E. Goldberg, Genetic Algorithms in Search, Optimization & Machine Learning, Addison Wesley, 1997.

Mapping of COs with POs:

						F	90						PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	3	3	2	1		1			1		1	2	3
CO 2	2	2	2	2	1		1			1		1	2	3
CO 3	3	3	3	2	1		1			1		1	2	3
CO 4	3	3	3	2	1		1			1		1	2	3
CO 5	3	3	3	2	1		1			1		1	2	3
Total	14	14	14	10	5	0	5	0	0	5	0	5	10	15
Scaled Value	3	3	3	2	1	0	1	0	0	1	0	1	2	3

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

COURS	OURSE CODE XCSE83			L	Т	P	С	
COURS	E NAME	INTERNET OF THINGS		3	0	0	3	
C:P:A		3:0:0		L	Т	Р	H	
				3	0	0	3	
COURS	E OUTCO	MES	Domain		Level			
CO1	Get an ide of Things of	a of some of the application areas where Internet can be applied.	Cognitive		Under	stand		
CO2	Understan	<i>d</i> the Standardization Protocol for IoT	Cognitive		Under	stand		
CO3	Understan	<i>d</i> the concepts of Web of Things.	Cognitive		Under	stand		
CO4	Understan on Mobile	<i>d</i> the concepts of Cloud of Things with emphasis cloud Computing.	Cognitive		Unders			
CO5	 5 Understand the basic concepts of aspect oriented software development 		Cognitive		Under	stand		
UNIT I	INTI	RODUCTION	•••••••••••••••••••••••••••••••••••••••				9	

Definitions and Functional Requirements –Motivation – Architecture - Web 3.0 View of IoT– Ubiquitous IoT Applications – Four Pillars of IoT – DNA of IoT - The Toolkit Approach for End-user Participation in the Internet of Things. Middleware for IoT: Overview -Communication middleware for IoT –IoT Information Security.

UNIT II IoT PROTOCOLS

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus – KNX – Zigbee Architecture – Network layer – APS layer – Security.

8

10

9

8

UNIT III WEB OF THINGS

Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence. Cloud of Things: Grid/SOA and Cloud Computing – Cloud Middleware – Cloud Standards – Cloud Providers and Systems – Mobile Cloud Computing – The Cloud of Things Architecture.

UNIT IV IoT MODELS

Integrated Billing Solutions in the Internet of Things Business Models for the Internet of Things - Network Dynamics: Population Models – Information Cascades - Network Effects - Network Dynamics: Structural Models - Cascading Behavior in Networks - The Small-World Phenomenon.

UNIT V APPLICATION

The Role of the Internet of Things for Increased Autonomy and Agility in Collaborative Production Environments - Resource Management in the Internet of Things: Clustering, Synchronization and Software Agents. Applications - Smart Grid – Electrical Vehicle Charging.

LECTURE	TUTORIAL	TOTAL
45	-	45
•		

REFERENCES

The Internet of Things in the Cloud: A Middleware Perspective - Honbo Zhou - CRC Press - 2012.
 Architecting the Internet of Things - Dieter Uckelmann; Mark Harrison; Florian Michahelles- (Eds.) - Springer - 2011
 Networks Crowds and Markets: Reasoning About a Highly Connected World - David Fasley and

3. Networks, Crowds, and Markets: Reasoning About a Highly Connected World - David Easley and Jon Kleinberg, Cambridge University Press - 2010

4. The Internet of Things: Applications to the Smart Grid and Building Automation by - Olivier Hersent,

Omar Elloumi and David Boswarthick - Wiley -2012 5. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things – Key applications and Protocols", Wiley, 2012.

Mapping	of COs	with	POs:
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			PSO											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	1	3	0	0	0	0	0	0	0	0	0	0	1	0
CO 2	1	3	0	0	0	0	0	0	0	0	0	0	2	0
CO 3	1	3	0	1	1	0	0	0	0	0	0	0	3	0
CO 4	1	3	0	2	0	0	0	0	0	0	0	0	1	0
CO5	1	0	0	1	0	0	0	0	0	0	0	0	1	0
Total	5	12	0	4	1	0	0	0	0	0	0	0	8	0
Scaled Value	1	3	0	1	1	0	0	0	0	0	0	0	2	0

 $1 \text{-} 5 \rightarrow 1, 6 \text{-} 10 \rightarrow 2, 11 \text{-} 15 \rightarrow 3$

COURSE	CODE	XCSE84	L	Т	P	С
COURSE	NAME	REAL TIME SYSTEMS	3	0	0	3
PREREQU	JISITES	OPERATING SYSTEM CONCEPTS				
C:P:A		3:0:0	L	T	P	H
COUDCE		20	3	0	0	3
COURSE	OUICOMI	79	Dom	ain	L	evel
CO1	<i>Describe</i> t issues & T	he real time operating system concepts, the associated echniques.	Cogn	itive	K	nowledge
CO2	Understan	d the fundamentals of Scheduling and features of	Cogn	itive	K	nowledge,
	programmi	ng languages	-	••	U	nderstand
CO3	Discuss the	e concepts of Real Time Databases.	Cogn	itive	K	nowledge,
CO4	<i>Explain</i> th	e fundamentals of real time communication	Cogn	itive	K	nowledge
CO5	Understan	<i>d</i> the evaluation techniques present in Real Time System.	Cogn	itive	K U	nowledge nderstand
UNITI	REAL	TIME SYSTEM AND SCHEDULING				9
Introductio Classes, times. T UniProcess Tolerant So	n - Issue Performand ask Assig sor schedu cheduling.	es in Real Time Computing, Structure of a ee Measures for Real Time Systems, E nment and Scheduling - Classical Uniprocesso lling of IRIS Tasks, Task Assignment, Mo	Real stimati or sc de C	Time ng heduli hange	Syst Progr ng s, a	em. Task am Run algorithms, and Fault
UNIT II	PROC	RAMMING LANGUAGES AND TOOLS				9
Programmi Control (Exception) programmi Run-time S	ng Langu structures) Error ng, Tas upport.	age and Tools – Desired Language char , Facilitating Hierarchical Decomposition, handling, Overloading and Generics, M k scheduling, Timing Specifications, Pro	racteris P ultitask ogramn	tics, ackage ting, ning	Data es, Lo En	a Typing, Run-time w Level vironments,
UNIT III	REAL	TIME DATABASES				9
Real time Memory Issues, Maintainin	e Database Databases Disk Sch g Serializatio	s - Basic Definition, Real time Vs General , Transaction priorities, Transaction Aborts eduling Algorithms, Two-phase Approach to on Consistency, Databases for Hard Real Time systems.	Purpo , C imj	se D oncurr orove	ataba ency Pre	ses, Main Control edictability,
UNIT IV	COMN	IUNICATION				9
Real-Time Fault Tol Error co handling.	Commu lerant Rou ontainment	nication - Communications Media, Network ting. Fault Tolerance Techniques - Fault Type Redundancy, Data Diversity, Reversal Cho UATION TECHNIQUES AND CLOCK SYNCHRONI	t To s, Fa ecks, ZATIO	opolog ult I Integ	ies Detect grated	Protocols, ion. Fault Failure 9
Dolighiliter	Evoluctio	n Tachniquas Obtaining Daramatar Valuas	Dali	- ·	٦л	odals for
Hardware Nonfault-T Synchroniz	Evaluatio Redundar olerant cation in Har	A rechniques - Obtaining Parameter Values, acy, Software Error models. Clock Synchro Synchronization Algorithm, Impact of F dware, Fault Tolerant Synchronization in Software	Kell onizatio Faults,	aonity on Fa	M - C ault	Clock, A Tolerant
		LECTURE TUT	ORIAI	L 1	OTA	L
TEXT BO	OKS	45	0			45

1. C.M. Krishna, Kang G. Shin, "Real-Time Systems", McGraw-Hill International Editions, 1997.

REFERENCES

- 1. Stuart Bennett, "Real Time Computer Control-An Introduction", Second edition Perntice Hall PTR, 1994.
- 2. Peter D. Lawrence, "Real time Micro Computer System Design An Introduction", McGraw Hill, 1988.
- 3. S.T. Allworth and R.N. Zobel, "Introduction to real time software design", Macmillan, II Edition, 1987.
- 4. R.J.A Buhur, D.L. Bailey, "An Introduction to Real-Time Systems", Prentice-Hall International, 1999.
- 5. Philip.A.Laplante "Real Time System Design and Analysis" PHI, III Edition, April 2004.

Mapping of COs with POs:

		РО														
	1	2	3	4	5	6	7	8	9	10	11	12	1	2		
CO 1	3	1	3	0	0	0	0	0	1	0	0	1	1	2		
CO 2	3	3	3	1	0	0	0	0	0	0	1	2	1	3		
CO 3	2	3	3	1	1	0	0	0	1	0	1	2	1	3		
CO 4	3	2	0	1	1	1	1	0	1	0	0	2	0	3		
CO 5	3	2	0	1	1	1	1	0	1	0	0	2	0	3		
Total	14	11	9	4	3	2	2	0	4	0	2	9	3	14		
Scaled Value	3	3	2	1	1	1	0	0	1	0	1	2	1	3		

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

COURS	COURSE CODEXCSE85LTPCCOURSE NAMEINFORMATION SECURITY3003												
COURS	SE NAME	INFORMATION SECURITY			3	0	0	3					
PRERF	EQUISITES				L	Т	P	H					
C:P:A		3:0:0			3	0	0	3					
COURS	SE OUTCOMES			Doma	in	Leve	l	1					
CO1	<i>Explain</i> the basic	s of information security.		Cogni	tive	Re	emem	iber					
CO2	<i>Describe</i> the legal	, ethical and professional issues in informat	ion security	Cogni	tive	Un A	derst analy:	and, sis					
CO3	<i>Explain</i> the aspec	ts of risk management.		Cogni	tive	Re	emem	ıber					
CO4	Describe aware of	various standards in the Information Secur	ity System	Cogni	tive	Re	emem	ıber					
CO5	<i>Describe</i> and <i>Des</i>	ign implementation of Security Techniques	•	Cogni	tive	Un	derst Appl	and, y					
UNIT I INTRODUCTION													
History, what is Information Security? Critical Characteristics of Information, NSTISSC Security Mod Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, T Security SDLC													
Security SDLCUNIT IISECURITY INVESTIGATION9													
Need for Comput Hybrid	or Security, Busing ter Security - Acces policies	ess Needs, Threats, Attacks, Legal, Ethicass Control Matrix, Policy-Security policies,	al and Professio , Confidentiality	onal Iss policie	ues - s, Inte	An C grity J)vervi polici	iew of es and					
UNIT	III SECURITY	ANALYSIS						9					
Risk M Mechan	anagement: Identiti	ying and Assessing Risk, Assessing and Flow and Confinement Problem	Controlling Ris	sk - Sy	stems	: Acc	ess C	Control					
UNIT I	V LOGICAL	DESIGN						9					
Blueprin VISA Ir	nt for Security, Inf nternational Securit	ormation Security Policy, Standards and y Model, Design of Security Architecture, H	Practices, ISO 1 Planning for Con	7799/B tinuity	S 779	99, NI	ST M	lodels,					
UNIT V	/ PHYSICAL DE	SIGN						9					
Security Security	Technology, IDS, and Personnel	Scanning and Analysis Tools, Cryptograp	hy, Access Cont	rol Dev	vices,	Physic	al Se	curity,					
		LEC	FURE TUT	ORIAI	Ĺ	тот	AL						
45 0 45													
TEXT 1. Michael F. Whiteman and Hashard I. Mattered Definition of Leftmantics, Operational VII, D. 11, 11, 11, 11, 11													
New Delle: 2002													
New Delhi, 2003													
REFER	RENCES					• ~~~	~~						
1.	Micki Krause, Har	old F. Tipton, — Handbook of Information	Security Manage	ement∥,	Vol 1	-3 CR	CPres	SS					
	LLC, 2004.												
2.	Stuart McClure, Jo	el Scrambray, George Kurtz, —Hacking Ex	posed∥, Tata Mc	GrawH	ill, 20	03							
3.	Matt Bishop, —C	omputer Security Art and Sciencel, Pearson	/PHI, 2002.										

Mapping of COs with POs:

		РО														
	1	2	3	4	5	6	7	8	9	10	11	12	1	2		
CO 1	3	2	2	3	0	1	2	0	1	0	1	1	1	2		
CO 2	3	2	1	3	0	1	2	0	1	0	1	1	2	2		
CO 3	3	2	1	3	0	1	2	1	1	0	1	1	2	2		
CO 4	3	2	1	2	0	1	2	1	1	0	1	1	2	2		
CO 5	3	2	1	2	0	1	2	0	1	0	1	1	2	1		
Total	15	10	6	13	0	5	10	2	5	0	5	5	9	9		
Scaled Value	3	2	2	3	0	1	2	1	1	0	1	1	2	2		

1-5→1, 6-10→2, 11-15→3

COMMON SUBJECTS

COURS	E CODE	XUME706		L	Т	Р	С
COURS	E NAME	CYBER SECURITY		3	0	0	3
PRERE	QUISITES			L	Т	Р	H
C:P:A		3:0:0		3	0	0	3
LEARN	ING OBJECT				•		
•]	o understand k	ey terms and concepts in cyber law, intellectual proper	ty and cyb	er ci	rimes,		
t	rademarks and o	domain theft.					
• A	Able to examine	secure software development practices.					
•]	The learner will	be able to incorporate approaches for risk managemen	t and best j	prac	tices.		
•]	To understand th	ne basic knowledge of information security and securit	y threats.				
COURS	E OUTCOME	S	Domain		Leve	l	
CO1:	Able to <i>under</i> Regulations	rstand the Cyber Security Policy, Laws and	Cognitive	e	Rem	embe	r
CO2:	Able to <i>discu</i>	ss the Cyber Security Management Concepts	Cognitiv	e	Unde	erstan	d
CO3:	Able to under	rstand the Cyber Crime and Cyber welfare	Cognitiv	e	Unde	erstan	d
CO4:	Able to <i>discu</i>	ss on issues related to Information Security Concepts	Cognitiv	e	Unde	erstan	ıd
CO5:	Able to <i>under</i>	rstand various security threats	Cognitive	e	Unde	erstan	d
UNITI	INTRODU						9
Cyber Se	ecurity – Cyber	r Security policy – Domain of Cyber Security Polic	y – Laws	and	Regi	ilatio	ns –
Enterpris	e Policy – Tecl	hnology Operations – Technology Configuration - Str	ategy Ver	sus	Policy	$v - C_{2}$	yber
Security	Evolution – Pro	oductivity – Internet – E commerce – Counter Measures	s – Challer	nges			
UNIT II	CYBER SE	ECURITY OBJECTIVES AND GUIDANCE				9	
Cyber Se	curity Metrics	- Security Management Goals - Counting Vulnerabili	ties – Secu	ırity	Fram	lewor	ks –
E Comm	erce Systems –	Industrial Control Systems - Personal Mobile Devices	s – Security	y Po	licy C)bject	ives
– Guidan	ice for Decision	n Makers – Tone at the Top – Policy as a Project– C	yber Secu	rity	Mana	geme	nt –
Arriving	at Goals - Cy	ber Security Documentation - The Catalog Approac	h – Catalo	og F	ormat	- C	yber
Security	Policy Taxonor	ny.					
UNIT I	I CYBER S	ECURITY POLICY CATALOG				9	
Cyber Go	overnance Issue	es - Net Neutrality - Internet Names and Numbers -	Copyright	anc	l Trad	emar	ks –
Email an	d Messaging - (Cyber User Issues - Malvertising - Impersonation – Ap	opropriate	Use	– Cył	ber Ci	rime
– Geo lo	cation – Privac	y - Cyber Conflict Issues – Intellectual property Thef	t – Cyber	Esp	ionage	$e - C_{2}$	yber
Sabotage	– Cyber Welfa	re					
UNIT IV	INFORM	ATION SECURITY CONCEPTS				9	
Informati	on Security Ov	verview: Background and Current Scenario - Types of	Attacks - (Goal	s for	Secur	ity -
E-comme	erce Security - (Computer Forensics – Steganography					
						9	

UNIT V SECURITY THREATS AND VULNERABILITIES

Overview of Security threats -Weak / Strong Passwords and Password Cracking - Insecure Network connections - Malicious Code - Programming Bugs - Cyber crime and Cyber terrorism - Information Warfare and Surveillance

	LECTURE	TUTORIAL	TOTAL	
	45	0	45	
REFERENCES				

1.Jennifer L. Bayuk, J. Healey, P. Rohmeyer, Marcus Sachs , Jeffrey Schmidt, Joseph Weiss "Cyber Security Policy Guidebook" John Wiley & Sons 2012.

2. Rick Howard "Cyber Security Essentials" Auerbach Publications 2011.

3. Richard A. Clarke, Robert Knake "Cyberwar: The Next Threat to National Security & What to Do About

It" Ecco 2010

4. Dan Shoemaker Cyber Security the Essential Body of Knowledge, 1st ed. Cengage Learning 2011

5. Rhodes-Ousley, Mark, "Information Security: The Complete Reference", Second Edition, McGraw-Hill, 2013.

E REFERENCE

- 1. https://www.coursera.org/specializations/cyber-security
- 2. www.nptel.ac.in
- 3. http://professional.mit.edu/programs/short-programs/applied-cybersecurity

Mapping of COs with POs:

		РО														
	1	2	3	4	5	6	7	8	9	10	11	12	1	2		
CO 1	3	2	2	3	0	1	2	0	1	0	1	1	1	2		
CO 2	3	2	1	3	0	1	2	0	1	0	1	1	2	2		
CO 3	3	2	1	3	0	1	2	1	1	0	1	1	2	2		
CO 4	3	2	1	2	0	1	2	1	1	0	1	1	2	2		
CO 5	3	2	1	2	0	1	2	0	1	0	1	1	2	1		
Total	15	10	6	13	0	5	10	2	5	0	5	5	9	9		
Scaled Value	3	2	2	3	0	1	2	1	1	0	1	1	2	2		

$1 \text{-} 5 \rightarrow 1, 6 \text{-} 10 \rightarrow 2, 11 \text{-} 15 \rightarrow 3$

COURSE CO)DE				L	Т	Р	С			
COURSE NA	ME	E-WASTE MANAGEMENT			3	0	0	0			
C:P:A		3:0:0			L	Т	Р	Н			
	ODIE				3	0	0	3			
LEARNING	OBJE occify w	UTIVES:									
• To id	entify w	nethods of waste disposal									
To stu	ıdy vari	ious energy generation methods									
To an	alyze re	ecycling of e-waste									
COURSE OU	JTCON	MES	Doma	ain		Ι	Level				
CO1	Able electr	to find the technologies for waste electrical and onic equipment	Cognitive		Re	mem	ber				
CO2	Able Proce	to explain the methods of Mechanical ssing of waste disposal	Cognitive		Re	mem	ber				
CO3	CO3 Able to classify the sources of Hydrometallurgical Cognitive Remember, Processing Understand										
CO4	Able	to summarize the Electronic Waste Recycling	Cognitive		Re Un	mem derst	ber and	,			
CO5	Able dispo	to demonstrate the methods for Batteries sal	Cognitive		Re: Un	mem derst	ber and	,			
UNIT I								9			
WEEE, WEE Fluids, Biolea	E Manaching.	agement Leaching Processes, Acid and Alkaline	Leaching, I	Leaching	Usi	ng Si	uperc	ritical			
Mechanical F Separation vi Separators, W Ion Bombardu	Processi a Susp Vet Sepa nent, E	ng, Comminution, Size Separation, Density Sep ensions, Jigs, Flowing Film Concentrators, Air arators, Electrostatic Separation, Electrification b ddy Current (Foucault Current)	paration, Sep Separation, by Contact of	paration Magne r Friction	by l tic S 1, E	Dense Sepai lectri	e Me ration ficati	dium, , Dry on by			
UNIT III				_		~		8			
Electrometallu	rgical urgical	Processing:, Liquid-Liquid Extraction, S Processing:, Pyrometallurgical Processing	upercritical	Extract	ion,	Ce	ement	ation,			
UNIT IV								9			
Electronic Wa Mechanical P Processing, M	aste Ree rocessii Ionitors	cycling: Materials Recycling Considerations, Pol ng, Hydrometallurgical Processing, Bio hydro me , Cathode Ray Tube, Liquid Crystal Displays/Lig	ymers, Ceran tallurgical Pr ht Emitting I	mics, Prin rocessing Diodes	nted , Py	Circ ro m	uit Bo etallu	oards, rgical			
UNIT V								9			
Batteries: Nickel–Cadmium (NiCd) Batteries, Manual Sorting, Component Separation by Unity Operations of Mineral Treatment, Pyro metallurgical Route, Hydrometallurgical Route, Nickel Metal Hydride (NiMH) Batteries, Characteristics of Nickel Metal Hydride Batteries—NiMH, Recycling NiMH Batteries, Lithium Ion Batteries, Constituents of Rechargeable Lithium-Ion Batteries (LIBs), Cathode Materials, Anode Materials, Electrolytes, Separator, Recycling LIBs Batteries, Zinc-Manganese Dioxide Systems,											
			ECTURE	TUTO	RIA	L	ΤΟ	ГAL			
			45		-		4	45			
TEXT BOOI	KS										
 Hugo Marcelo Veit Andréa Moura Bernardes ,Electronic Waste Recycling Techniques, Springer International Publishing Switzerland 2015. 											

2. "E-waste in India: Research unit, Rajya Sabha Secretariat, New Delhi, June 2011"

GOOGLE BOOKS:

- e-waste Management: From waste to Resource Klaus Hieronymi, Ramzy Kahnat, Eric williams Tech. & Engg.-2013(Publisher: Earthscan 2013).
- 2. What is the impact of E-waste: Tamara Thompson
- 3. E-waste poses a Health Hazard: Sairudeen Pattazhy

WEB LINKS :

- www.unep.org
- www.routledge.com
- www.amazon.com
- www.bookdepository.com
- www.ecoactiv.com

Course Code : XCSOE1 Course : Web Designing																				
Co	urse		:	1	Web	D	esign	ing												
Na	me																			
Pre	erequ	isite	:]	Nil	-					1		1	1	1	1	_	1		
	L	Т	Р	С				C	P	Α				L	Т	P	Η			
	3	0	0	3				3	0	0				3	0	0	3			
Co	urse	Obje	ectiv	es																
	•	To d	lefin	e th	ne ba	sic	s of v	veb de	sign a	nd HT	ML									
• To learn the basic concepts of CSS																				
• To make own webpage and how to host website																				
Course Outcome: After the completion of the course, Domain Level																				
students will be able to																				
CO1Define the basics in web designCognitiveUnderstand																				
CC	CO2 Visualize the basic concept of HTML Cognitive Understand																			
CO)3	Rec	cogn	ize	the e	elei	ment	s of H	ΓML			C	ogni	tive		App	oly			
CO	94	Int	rodu	ice	the b	oas	ic co	ncepts	of CS	S		C	ogni	tive		App	oly			
CO)5	Dev	eloj	p th	e co	nce	ept of	web p	ublish	ning		С	ogni	tive		Ana	alyze	;		
CO	OURS	SE C	ONT	ΓEN	T															
TIN		r	DA	61/			X/ED	DEGI	CN											0
		L	DA	510	-9 II		VLD	DESI	GN											9
			Bri	ef H	Histo	ory	of Ir	ternet	-What	is We	orld V	Wic	le W	Veb-	Why	, cre	ate a	a we	b site	-
			We	b S	tand	ard	ls-Au	dience	requi	remen	t.									
UN	IT]	Π	IN	ΓR	ODU	JC	ΓΙΟΙ	N TO	HTM	L										9
			Wh	at i	is H	ΓМ	L-H	ГML I	Docum	nents-l	Basic	str	uctu	ire o	f an	HT	ML	docu	iment	-
			Cre	atir	ng a	an	HTN	AL de	ocume	nt-Ma	rk u	ıp	Tag	s-He	eadi	ng-P	arag	raph	s-Lin	e
			Bre	aks	S-HT	MI		gs.												
UN		III	EL		IEN'	TS	OF	HTMI				•	•	1 00		x 7 1	•	•.•	.	9
			Intr Tak	odu Mes	anc anc	nt 1 I	o ele Fram	ments	of HI rking	ML-V with	Vork: Hyne	ıng erli	Wit. nks	h Te Im	ext-V	Nork	ang d M	W1th Iultir	Lists nedia	,
			Wo	rki	ng w	vith	Forr	ns and	contro	ols.	пур		шсэ,	1111	age	, an	u 101	unn	neura	
UN	IT]	IV	IN	ΓR	ODU	JC	ΓΙΟΙ	N TO	CASC	ADIN	IG S	ГΥ	LE	SHF	сет	S				9
			Co	nce	pts	of	CS	S-Crea	ating	Style	She	eet-	CSS	5 P	rope	erties	s-CS	S S	Styling	5
			(Ba	ickg	groui	nd,	Text	Form	at, Coi	ntrollii	ng Fo	onts), W	orki	ing v	with	bloc	k ele	ment	8
			and Mo	i o del	objec (Intr	ts- odi	w ork action	ing v i Bo	order	Prop	and erties	tat	Pad	-Clas ding	SS I P	ia a Trone	na rties		Aargii	к 1
Properties)-CSS Advanced(Grouping, Dimension, Display, Positioning,											,									
			Flo	atir	ng, A	Alig	gn, I	Seudo	class	s, Nav	rigati	on	Bar	, In	nage	Sp	rites,	At	tribut	e
TIN		7	sec	tor)		<u>s c</u>	olor-	Creati	ng pag	ge Lay	out a		Site	Des	agns	3. FTN14	n			0
	11	v	Cre	atir	ου ισ th		Veh 9	Vite-Sa	ving t	r UDL he site		rkir		л П n the		h cit	J e_Cr	eatin	o wal	<u>א</u>
			site	str	uctu	re-(Creat	ing Ti	tles fo	r web	page	s-T	hem	les-F	ubli	shin	g we	b sit	es.	
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	L	Т	Р	Total
	45	0	0	45
TEXT BOOKS				

1. Eric Meyer on CSS: Mastering the Language of Web Design. 2003. Eric Meyer. New Riders Publishing.

2. A. Thomas Powell, "The complete reference – HTML and CSS (Covers HTML5)" McGraw Hill, Fifth Edition, 2010.

3. Kogent Learning Solutions Inc. "HTML5 Black Book: Covers CSS3, JavaScript, XML, XHTML, Ajax, PHP and Jquery – Black Book", Dreamtech Press, 2011.

4. Kogent Learning Solutions Inc "Web Technologies: HTML, JavaScript, PHP, Java, JSP, ASP.Net, XML and AJAX, Black Book", Dreamtech Press, 2009.

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1. Build Your Own Web Site the Right Way Using HTML & CSS, 2nd Edition by Ian Lloyd.

2. The Essential Guide to CSS and HTML Web Design (Essentials) by Craig Grannel.

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1. https://freevideolectures.com/course/3140/internet-technologies

## Mapping of CO with PO's

			1											1	1	
			P01	P02	PO 3	PO 4	PO 5	9 Od	PO 7	PO 8	6 Od	PO 10	PO 11	PO 12	PS01	PSO2
C	01		3	3	3	3	3	0	2	2	1	0	0	2	3	3
C	02		3	3	3	3	3	0	2	2	1	0	0	2	3	3
C	03		2	2	2	3	3	0	2	2	1	0	0	1	2	2
C	04		2	2	2	2	0	0	0	0	0	0	0	0	0	0
C	05		3	2	3	3	3	0	2	2	2	0	0	0	3	2
To	otal		13	12	13	14	12	0	8	8	5	0	0	5	11	10
Sc	aled Valu	ıe	3	3	3	3	3	0	2	2	1	0	0	1	3	2
-																
	Note:		To	otal	0		1-5	i	6-1	0	11-	15				

ote:	Total	0	1-5	6-10	11-15		
	Scaled value	0	1	2	3		
	Relation	No	Low	Medium	High		

Co	Course Code       :       XCSOE2         Course Name       :       Web Design - II																
Co	urse	e Na	me	:	We	b Desig	n - II										
Pro	ereq	uisit	te	:	NII	4											
	L	Т	Р	С			С	Р	Α			L	Т	P	H		
	3	0	0	3			3	0	0			3	0	0	3		
Со	urse	e Ob	ject	ives									<u> </u>	I			
•	To	gain	the	weł	des	ign kno	wledg	e, skil	ls and	projec	t-bas	ed c	reati	vity	is n	eeded for entr	сy
	<u> </u>			sign			· ·	career				. 1			1	1 . 1	•.
•	To des	learr ign f	n to Tirm.	wor	k as	freeland	cers in	web c	lesign	or pre	pare	to be	ecom	ie er	nplo	byed at a webs	site
Co	Course Outcome: After the completion of the course, <b>Domain</b> Level																
stu	dent	s wi	ll be	abl	e to							C o	r P e	or A			
CC	CO1         Describe the Advanced CSS for Webdesign.         Cognitive         Remember																
CC	)2	Des	scril	be a	nd F	Explain	the X	ML.			(	Cogn	itive	¢		Remember	
00	2	D		1	T	<u> </u>	<u> </u>	<b>T</b> 7 1 1				7	•,•			Understand	
	)3	Des	scrii	be th	ie Ja	va Scrij	ot for v	web d	esign.			ogn	itive	,		Remember	
CC	)4	Des	scril	be a	nd E	xplain	jQuery	1			(	Cogn	itive	•		Remember	
																Understand	
CC	)5	Exj	plai	n th	e Bo	otstrap	and <b>de</b>	escrib	e Canv	va	(	Cogn	itive	•		Understand	
CC	OUR	SE (	COI	NTE	ENT												
UN	IT	I	IN	TR	ODU	CTIO	N TO	ADV	ANCE	ED CS	S						9
			CS	S	Adv	anced(	Fround	ησ Γ	Jimon	sion	Dien	lav	Po	sitio	nina	a Floating	
			Ali	ign.]	Pseu	do clas	s. Nav	igatio	n Bar	. Imae	e Sp	rites	. At	tribu	ite s	sector)- CSS	
			Co	lor-	Crea	ating Pa	ge Lay	yout a	nd Sit	e desig	gns		, .			,	
UN	IT	II	IN	TR	ODU	CTIO	N TO	XML									9
			XN	ЛL	: Int	roductio	on, XN	/IL an	d SGI	ML, D	esign	goa	als o	f XI	ML,	Application	
			of	XN	/IL:	Docum	nent A	Applic	ation,	Data	App	olica	tion,	X	ML	Software :	
Browsers, Editors, Parsers, Processor, XML tags, Structure of XML																	
			doo	cum	ents,	XML	eleme:	nt tage	s, Elei	ment n	narku	ıp, A	ttrit	oute	mar	rkup, HTML	
			doc	cum	ent,	adding	scripts	s, Data	a type	s in XI	ML,	XM	LN	ame	spac	ces, working	
			W1	th te	ext a	the D	::WC	orking	with	עוע י מדע	: Intr	odu roti	ction	i, H	1 Ml	L and DTD,	
			De: Fle	nell me	is OI nt na	me Oc	$   \mathbf{D}, \mathbf{S} \mathbf{I} $	ructur ce ind	e of L icator	S Con	necto	raulo	ms c	л v8	u 1a0		
UN	UNIT III     INTRODUCTION TO IAVA SCRIPT     9											9					
			Ba	sics	Va	riables.	Opera	ators.	Data	Types	etc.	Con	trol	Stru	ctur	es - If-Else.	,

while, Do while, For Loops, Logic Building Sessions, Creating Functions												
	Inbuilt Functions - Dates, Strings, Numerics etc, Arrays, Objects, Events,											
	Statements, Regular Expressions, HTML DOM and Alert box											
UNIT IV	INTRODUCTION TO jQUERY	9										
	Basics, Effects, DOM Parsing, Form Validations, Events, functions, Creating											
	Images, Dynamic CSS Programming, Hide and show element											
UNIT V	INTRODUCTION TO BOOTSTRAP and CANVA	9										
Basics, Grid system, Tables, Images, Button, Font Awesome & Glyphic												
Icons, Pagination, Forms, Menu & Navigation Bar, Bootstrap Modals - (pop												
ups), Creating Responsive Websites in Bootstrap, Creating Website Images												
	using CANVA											
	L T P Total											
	45 0 0 45											
TEXT BO	OKS											
1. Ste	ven M. Schafer,"HTML, XHTML, and CSS Bible", Wiley India, fifth Edition, 201	10.										
2. Joh	n Duckett "Beginning HTML, XHTML, CSS, and JavaScript", Wiley India											
REFEREN	REFERENCE BOOKS											
<ol> <li>HTML5 Black Box Covers Covers CSS3, JavaScript, XML, XHTML, AJAX, Pi jQuery) 2Ed. January 2016 by DT Editorial Services</li> </ol>												

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1. https://freevideolectures.com/course/3140/internet-technologies

Mapping	g of CO	with ]	PO's											
	P01	P02	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	1	3	3	1	3	0	1	0	2	2	2	2	2	1
CO 2	2	3	3	2	3	0	1	0	3	2	1	1	3	2
CO 3	2	3	3	2	3	0	1	0	3	2	1	1	3	2
CO 4	3	2	2	1	2	0	1	0	3	2	0	1	3	2
CO 5	3	2	2	1	2	0	1	0	3	2	0	1	3	2
Total	11	13	13	7	13	0	5	0	14	10	4	6	14	9
Scaled Value	3	3	3	2	3	0	1	0	3	2	1	2	3	2
	•				•		•		•		•	•		
Note:	То	tal	0		1-5		6-10		11-15					
	Scaled value	l	0		1		2		3					
	Relation		No		Low	-	Mediur	n	High					

COURS	E CODE	XCSOE3			L	Т	P	С				
COURS	E NAME	DIGITAL MARKETING			3	0	0	3				
<b>C:P:A</b> =	3:0:0				L	Т	Р	Η				
					3	0	0	3				
COURS	E OUTCOM	IES	DOM	AIN	L	EVE	L					
CO1	<i>Describe</i> th	e evolution of marketing.	Cognitiv	ve R	Remem	ber						
CO2	<i>Explain</i> the	e digital world	Cognitiv	ve R	Remem	ber ,I	Jnde	rstand				
CO3	<i>Describe</i> marketing.	the web intelligence and E-mail	Cognitiv	ve R	Remem	ber						
CO4	Describethe social media and online consumer management.CognitiveRemember Understand											
CO5	<i>Explain</i> affiliate marketingCognitiveUnderstand											
UNIT I     INTRODUCTION     9												
The evolution of marketing: The changing face of advertising -The technology behind digital marketing -Enough technology – let's talk about people- Strategic thinking- Why you need a digital marketing strategy -Your business and digital marketing -Defining your digital marketing strategy Understanding the digital consumerUNIT IIWINDOW TO THE DIGITAL WORLD9												
Your we The mair choose a <b>UNIT II</b>	bsite – the hu steps of bu web designe	ab of your digital marketing world -Bu ailding your website -Before you star r or developer-Arranging your informa ITE INTELLIGENCE AND RETUR	ilding an e t -Choosin tion -Writ <b>N ON IN</b>	effective ng your ing effec VESTM	websit domai tive w ENT	e n nan eb con	ne H ntent	ow to 9				
Measurin Measurin Harness t mail -Wh of an e-1 marketing	g your way g what's in he power of at exactly is mail market	to digital marketing success -Getting nportant to you -Testing, investing, online data, and watch your ROI-take e-mail marketing? -Before you start -J ing campaign -Measuring your succ	g started tweaking e off <b>E-m</b> Planning ess -Still	-How inf , reinves <b>ail mark</b> your cam a vital	formati sting s <b>eting-</b> paign compo	Action Action The Dos Donent	mea on st new and of of of	asured ations direct don'ts ligital				
UNIT IVSOCIAL MEDIA AND ONLINE CONSUMER ENGAGEMENT9												
Join the c engageme business limitation	onversation ent -Adding through online turning the	-What is social media? -The different f social media to your own site Fostering ne channels -Monitoring the conversati- tide when things go wrong	Forms of so g a positive on – reput	ocial mec e online i ation ma	lia -Th image nagem	e rule -romo ent D	es of oting Damag	your ge				
UNIT V	AFFILIA	ATE MARKETING AND DIGITAL	MEDIA	CREAT	IVE			9				
Recogniz counts -V yourself -	ing opportun Vhat advertis Digital creat	ities for strategic partnership -What is ers should do Creative application of d ive: what works and what doesn't	affiliate n igital med	narketing lia -Using	? -The g an Ag	click gency	that -Do	really ing it				
		LE	CTURE	TUTO	RIAL	]	T <b>OT</b> A	4L				

	45	0	45
TEXT BOOKS	I		1
<ol> <li>Understanding Digital Marketing -Marketing strat</li> <li>Damian Ryan and Calvin Jones, 2009</li> </ol>	egies for engaging	g the digital ger	neration
REFERENCES			
<ol> <li>Digital Foundations: Intro to Media Design with burrough ,Michael Mandiberg.2009.</li> <li>Web Intelligence- Zhong, Ning, Liu, Jiming, Y</li> </ol>	the Adobe Creati ao, Yiyu-2003	ve Suite 1st Ed	ition- xtine
E-REFERENCE			
<ol> <li>http://www.slideshare.net/narendrasharma/dig</li> <li>http://www.slideshare.net/priyanka2512dolly/</li> <li>https://www.google.co.in/?gfe_rd=cr&amp;ei=fPT</li> <li>YCgBO&amp;gws_rd=ssl#q=digital+marketing_ppt</li> </ol>	gital-marketing-pp digital-marketing- WV9uGFOXQ-A0	t basics-and-trer DI-	nds

4. https://www.youtube.com/watch?v=IaiVtB5X8B8

# Mapping of COs with POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PS 0 1	PS O 2
CO 1	1	3	3	1	3				2	2	2	2	2	1
CO 2	2	3	3	2	3				3	3	1	1	3	2
CO 3	2	3	3	2	3				3	3	1	1	3	2
CO 4	3	2	2	1	2				3	3		1	3	2
CO 5	3	2	2	1	2				3	3		1	3	2
Total	11	13	13	7	13				14	14	4	6	14	9
Scale d value	3	3	3	2	3	0	0	0	3	3	1	2	3	2

Co	Course Code     : XCSOE4       Course Name     . Multimedia Design and Development																								
Co	urse	e Na	me	:	Mı	ultimed	lia De	sign a	nd De	velop	m	ent													
Pre	ereq	uisi	te	:	NI	L																			
	L	Т	Р	С			С	Р	Α				L	Т	P	Η									
	3	0	0	3			3	0	0				3	0	0	3									
Co	urse	e Ob	jecti	ves																					
•	To	impa	art th	le ba	isic c	concept	s of el	ements	s of m	ultim	edi	a.													
•	To	unde	erstai	nd b	asic	concep	ts abou	ıt mul	timedi	a and	its	s apj	plica	tion	S										
•	Effe	ectiv	vely i	nco	rpora	ate ima	ge, auc	lio, an	imatio	n, an	d to	ext 1	nedi	a in	to a	mult	imedia								
Co	urse	Out	tcom	e: A	fter i	er the completion of the course, students <b>Domain</b> Leve								Level											
wil	l be	able	e to	-			-	, i i i i i i i i i i i i i i i i i i i																	
CC	)1	Des	scribe the multimedia applications. Cognitive Remember										Remember												
CC	CO2         Describe and Explain the Digital Media.         Cognitive         Remember																								
CO2 Describe and Explain the Digital Media. Cognitive Remember Understand																									
CC	CO3Describe the graphics and image.CognitiveRemember														<i>cribe</i> the graphics and image. Cognitive Remembe										
CO3Describe the graphics and image.CognitiveRememberCO4Describe and Explain audio technologyCognitiveRemember																									
						-								-			Understand								
CC	)5	Exp	plain	the	vide	eo techi	nology	and <i>d</i>	escrib	e anii	na	tion	С	ogni	tive		Understand								
CC	OUR	SE	CON	JTE	NT																				
UN		[	IN	ГRC	)DU	CTIO	N											9							
			Mu	ltim	edia	- Flen	ients	of M	ultime	dia	Fe	atu	rec	of	Mul	time	dia system								
			Ap	plica	tion	s of M	ultime	lia. M	ultime	dia fi	le	forn	nats.	Mu	ltim	edia	applications								
			in t	ousir	ness,	educat	ion and	d enter	rtainm	ent.							TT								
UN		Π	DI	GIT	TAL MEDIA									9											
			Me	dia	and	Digital	Tech	nologie	es- Dig	gital	En	viro	nme	nt, ]	New	and	Old Media,								
			Co	mmı	inica	ation re	volutio	n and	new r	nedia	ι—	Net	wor	ked	socie	ety –	- New media								
			and	l pi	iblic	spher	e. Ar	1alogu	e and	l dig	gita	ulii	nfor	mati	on,	Dig	ital Media-								
			Technologies Virtual reality augment reality Mixed reality																						
UN		ш	GR			$\frac{cs}{S}$ AND		$\frac{\mathrm{Inty, } a}{\mathrm{GE}}$	uginei	n ica	iity	, IVI	IACU	Tea	iity.			9							
	Color Models, Image file formats and how and where it is used, Morphing,												-												
			Kin	nema	atics,	, twee	ning,	Motic	on caj	pture,	, 1	mod	eling	g, s	speci	al	effects, and								
			con	npos	siting	g, Vide	o Conf	erenci	ng, W	eb St	rea	amir	ng, V	/ide	o Sti	eam	ing, Internet								
TIN	י דידו	137	Tel	epho	ony.	IDIO												•							
UN			SO	UN	U / A		1 1	<u>.</u>	• •							-		9							
			the	cept spe	ion o ed o	or soun of sou	a, nea nd. m	rıng se easurii	ng the	ity, fi sou	req nd	uen , m	cy ra usic	ange al s	, sou ounc	ınd- ls, r	wavelength, noise signal.								

dynamic range, pitch, harmonics-equalization reverberation time, Sound												
isolation and room acoustics- treatments- studio layout –room dimensions. The Basic set-up of recording system: The production chain and												
	isolation and room acoustics- treatments-	studi	o layout	–room d	imensions.							
	The Basic set-up of recording system	n; Л	The prod	uction of	chain and							
	responsibilities. Microphones types -phanton	m po	wer, noise	, choosin	ng the right							
	mike; Mixing console; Input devices; Ou	tput	devices;	Audio fo	ormats and							
	Publishing											
UNIT V VIDEO AND ANIMATION												
Different types of video camera including Handy Camera, Tape Formats,												
Analog Editing, Editing Equipment's and Consoles, Video Signal, Video												
Format, Video Lights - Types and Functions. Uses of Tripod- Types.												
Clapboard- Usage. Light meter. Other Useful Accessories. History of												
Clapboard- Usage. Light meter. Other Useful Accessories. History of animation: Types of animation Principles of animation,2D and 3D animation												
L     T     P     Total												
$\begin{array}{c c c c c c c c c c c c c c c c c c c $												
45         0         0         45           TEXT BOOKS												
3. Paranjoy Guha Thakurta, Dr.M.ManzoorAlam, R Mansukhani , R Mnaqlcolm, Moh												
Н	laque "Media in our Globalizing World", Gen	uine	Publicatio	ons and M	Media Pvt I	Ltd;						
F	irst Edition edition, 2015.											
4. R	ajan Parekh "Principle of Multimedia" Tata Mc	Graw	' Hill,New	delhi, 20	006							
5. M	Iultimedia Systems Design by Prabhat K. Andle	igh a	nd Kiran [	Гhakrar-I	PHI							
p	ublication,1996											
6. N	Iultimedia systems by John F. Koegal Buford-Pe	earso	n Educatio	on. 2009								
7. Fundamentals of multimedia by Ze-Nian Li and MS Drew. PHI EEE edition.2008.												
REFERENCE BOOKS												
1. Jane Kirtley "Media Law Handbook", Bureau of International Information Programs												
United States Department of State, Published in 2010.												
E-REFE	RENCES											
1h	http://www.humber.ca/program/multimedia-desig	gn-ar	d-develop	oment								

Mapping of	Mapping of CO with PO's													
	P01	P02	PO 3	PO 4	PO 5	9 O	PO 7	PO 8	9 O G	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	1	3	3	1	3	0	0	0	2	2	2	2	2	1
CO 2	2	3	3	2	3	0	0	0	3	3	1	1	3	2
CO 3	2	3	3	2	3	0	0	0	3	3	1	1	3	2
CO 4	3	2	2	1	2	0	0	0	3	3	1	1	3	2
CO 5	3	2	2	1	2	0	0	0	3	3	1	1	3	2
Total	11	13	13	7	13	0	0	0	14	14	6	6	14	9
Scaled Value	3	3	3	2	3	0	0	0	3	3	1	2	3	2

ode				)1	)2	)3	)4	)5	)6	70	80	90	)10	011	)12	01	02				
C	C	Р	A	PC	PC	PC	Sd	S	Γ	T	4	C									
Core Course																					
XCP102	3	1	0	3	2	1	1	3	0	0	1	0	1	2	3	2	0	3	0	1	4
XCS302	3	1.0	1.0	3	3	3	2	3	3	3	1	0	0	0	0	2	1	3	0	2	5
XCS303	4.0	1.0	0.0	3	2	1	2	2	1	0	0	0	1	0	2	3	2	3	0	2	5
XCS304	4.0	1.0	1.0	3	3	3	3	3	2	2	2	2	0	0	1	2	1	3	1	1	5
XCS402	4.0	1.0	1.0	3	2	3	2	2	1	2	0	0	0	2	1	3	1	3	0	0	3
XCS403	4.0	1.0	0.0	3	2	2	1	1	1	1	0	1	1	1	2	3	1	3	0	1	4
XCS404	4.0	1.0	1.0	3	3	3	1	1	1	1	0	1	0	1	1	2	3	3	1	1	5
XCS501	3.0	0.0	0.0	3	3	3	2	3	3	3	1	0	0	0	0	2	1	3	0	0	3
XCS502	3.0	0.0	0.0	3	2	1	2	2	1	0	0	0	1	0	2	3	2	3	0	0	3
XCS503	4.0	1.0	1.0	3	3	3	3	3	2	2	2	2	0	0	1	2	1	3	0	2	5
XCS504	4.0	1.0	1.0	2	3	2	1	2	2	1	1	1	1	2	2	3	2	3	0	2	5
XCS601	2.8	0.8	0.4	1	3	3	3	2	1	0	0	2	1	0	2	3	2	3	0	2	5
XCS602	3.8	1	0.2	2	2	1	0	0	0	1	0	0	0	0	0	2	0	3	0	2	5
XUMC706	3	0	0	3	3	3	3	2	1	2	2	2	0	0	0	2	2	3	0	0	3
Professiona   Electivo																					
XCSE51	3	0	0	3	3	3	2	3	0	0	0	3	3	1	2	3	2	2	1	0	3
XCSE52	3	0	0	1	3	0	1	1	0	0	0	0	0	0	0	2	0	2	1	0	3
XCSE53	3	0	0	3	3	3	2	2	1	2	0	0	0	2	2	3	1	3	0	0	3
XCSE54	3	0	0	3	0	1	2	2	0	1	1	0	0	0	0	1	1	2	1	0	3
XCSE61	3	0	0	2	2	2	1	0	1	0	1	0	0	0	1	1	2	3	0	0	3
XCSE62	3	0	0	1	2	1	1	1	0	0	0	0	0	0	0	2	1	3	0	0	3
XCES63	3	0	0	1	2	1	0	0	1	0	0	0	1	0	1	2	2	3	0	0	3
XCSE64	3	0	0	2	3	2	0	0	1	0	1	0	0	0	1	1	1	3	0	0	3
XCSE66	3	0	0	1	3	0	1	1	0	0	0	0	0	0	0	2	0	3	0	0	3
XCSE67	3	0	0	1	3	0	1	1	0	0	0	0	0	0	0	2	0	3	0	0	3
XCSE68	2.7	0	0.2	1	0	0	0	0	3	2	1	0	0	0	1	0	0	3	0	0	3
XCSE69	3	0	0	1	3	0	1	1	0	0	0	0	0	0	0	2	0	3	0	0	3
XCSE6A	3	0	0	1	3	0	1	1	0	0	0	0	0	0	0	2	0	3	0	0	3
XCSE6B	3	0	0	2	1	2	1	2	0	1	0	0	1	0	0	1	1	3	0	0	3
XCSE71	3	0	0	2	1	1	1	1	1	1	0	0	0	0	0	2	1	3	0	0	3
XCSE72	3	0	0	2	2	1	1	0	0	0	0	0	0	0	0	2	0	3	0	0	3
XCSE73	2.6	0	0.4	3	3	1	2	3	0	0	0	3	3	0	2	3	3	3	0	0	3
XCSE74	3	0	0	3	3	2	1	1	1	1	0	0	0	1	1	3	3	3	0	0	3
XCSE75	3	0	0	3	3	2	1	1	1	1	0	0	0	1	1	3	3	3	0	0	3
XCSE76	3	0	0	1	3	0	1	1	0	0	0	0	0	0	0	2	0	3	0	0	3

XCSE77	3	0	0	3	2	2	1	1	1	1	2	1	2	1	1	3	1	3	0	0	3
XCSE78	3	0	0	3	3	3	2	2	1	2	0	0	0	2	2	3	1	3	0	0	3
XCSE79	3	0	0	3	3	3	2	2	1	2	0	0	0	2	2	3	1	3	0	0	3
XCSE7A	3	0	0	3	3	3	2	2	1	2	0	0	0	2	2	3	1	3	0	0	3
XCSE81	3	0	0	3	3	2	1	1	1	1	0	0	0	1	1	3	3	3	0	0	3
XCSE82	3	0	0	3	3	2	1	1	1	1	0	0	0	1	1	3	3	3	0	0	3
XCSE83	3	0	0	1	3	0	1	1	0	0	0	0	0	0	0	2	0	3	0	0	3
XCSE84	3	0	0	3	2	2	1	1	1	1	2	1	2	1	1	3	1	3	0	0	3
XCSE85	3	0	0	3	3	3	2	2	1	2	0	0	0	2	2	3	1	3	0	0	3
				1																	
				0	10	7	6	6	3	3	1	1	1	2	4						
				0	7	4	7	4	7	9	8	9	8	5	1	99	52				

## <u>Guidelines for UG Engineering & Technology Curriculum 2015-16</u> Curriculum Structure for B.Tech. (Full time) Degree Programmes offered by PMU

S. No.	Category	AICTE Recommen	PMIST adoption	PMIST credits	Deviation %	Number of courses
1.	Humanities and Social Sciences (HS), including Management;	5 to 10	5.68 %	11	0	4
2.	Basic Sciences(BS) including Mathematics, Physics, Chemistry, Biology;	15 to 20	15.91 %	23	0	6
3.	Engineering Sciences (ES), including Materials, Workshop, Drawing, Basics of Electrical/Electronics/Mechanical /Computer Engineering, Instrumentation;	15 to 20	13.64 %	24	0	6
4.	Professional Subjects-Core (PC), relevant to the chosen specialization/branch; (May be split into Hard (no choice) and Soft (with choice), if required;)	30 to 40	39.20 %	56	0	13
5.	Professional Subjects – Electives (PE), relevant to the chosen specialization/ branch;	10 to 15	10.23 %	18	0	6
6.	Open Subjects- Electives (OE), from other technical and/or emerging subject areas;	5 to 10	5.11 %	12	0	4
7.	Project Work, Seminar and/or Internship in Industry or elsewhere	10 to 15	10.23 %	14	0	3
8.	Mandatory Courses (MC); Non-Credit 8 units (UGC Mandatory) [*]	-	-	-	-	2
10.	Non Credit Course – ELS	-	-	-	-	
11.	NCC/NSS/YRC/RRC/Sports	-	-	-	-	
			100%	160		47

Branch	C1	C2	C3	C4	CS	C6
Aero	MA-I	EM	BE-I	AP	SS	U-MAN-I
Bio	MA-I	СР	BE-I	AP	SS	U-MAN-I
Civil	MA-I	EM	BE-I	AP	SS	U-MAN-I
Chem	MA-I	СР	BE-I	AP	SS	U-MAN-I
ECE	MA-I	EM	BE-I	AP	SS	U-MAN-I
CSE	MA-I	СР	BE-II	AC	SS	U-MAN-I
EEE	MA-I	СР	BE-II	AC	SS	U-MAN-I
IT	MA-I	СР	BE-II	AC	SS	U-MAN-I
Mech	MA-I	СР	BE-II	AC	SS	U-MAN-I

S No	Decomintion	Courses		Cre	edits			]	Hours		
5. 110.	Description	Courses	L	Т	Р	Total	L	Т	Р	S.S.	Total
1.	MA-I	Algebra, Differential Calculus and their applications	3	1	0	4	3	2	0	0	5
2.	EM	Engineering Mechanics	3	1	0	4	3	2	0	0	5
	СР	Computer Programming	3	0	1	4	3	0	2	0	5
3.	BE-I/BE- II	Electrical and Electronics Engineering Systems (BEE Lab included)	3	1	1	5	3	2	2	0	7
		Mechanical and Civil Engineering Systems (Workshop Practice included)	3	1	1	5	3	2	2	U	7
4.	AP/AC	Applied Physics (Physics Lab included)	3	1	1	5	3	2	2	0	7
		Applied Chemistry (Chemistry Lab included)	3	1	1	5	3	2	2	0	7
5.	SS	Study skills and Language Laboratory	1	0	0	1	1	0	2*	0	3
6.	U-MAN-I	Human Ethics, Values, Rights and Gender Equality	1	0	0	1	1	0	0	2*	3
		Total	14	4/3	2/3	20	14	8/6	8/10	2	30

#### SEMESTER II

Branch	CI	C	ΰ	C4	CS	C6
Aero	MA-II	СР	BE-II	AC	EG	SC
Bio	MA-II	BT	BE-II	AC	EG	SC
Civil	MA-II	СР	BE-II	AC	EG	SC
Chem	MA-II	EM	BE-II	AC	EG	SC
ECE	MA-II	СР	BE-II	AC	EG	SC
CSE	MA-II	EM	BE-I	AP	EG	SC
EEE	MA-II	EM	BE-I	AP	EG	SC
IT	MA-II	EM	BE-I	AP	EG	SC
Mech	MA-II	EM	BE-I	AP	EG	SC

S No	Decomintion	Courses		Cr	edit	S		Η	ours	
<b>5.</b> INO.	Description	Courses	L	Т	Р	Total	L	Т	Р	Total
1.	MA-II	Calculus and Laplace Transforms	3	1	0	4	3	2	0	5
2.	EM	Engineering Mechanics	3	1	0		3	2	0	
	BT	Basic Thermodynamics	3	1	0	4	3	2	0	5
	СР	Computer Programming	3	0	1		3	0	2	
3.	BE-I/BE-II	Electrical and Electronics Engineering Systems (BEE Lab included)	3	1	1		3	2	2	
		Mechanical and Civil Engineering Systems (Workshop Practice included)	3	1	1	5	3	2	2	7
4.	AP/AC	Applied Physics (Physics Lab included)	3	1	1	5	3	2	2	7
		Applied Chemistry (Chemistry Lab included)	3	1	1	5	3	2	2	/
5.	EG	Engineering Graphics	2	0	1	3	2	0	2	4
6.	SC	Speech Communication	1	0	0	1	1	0	2*	3
		Total	15	4/3	3/4	22	15	8/6	8/10	31

Branch	C1	C2	C3	C4	C5	C6	C7	C8
Aero	MA-III	СТ	СР	СТР	MS/EM	MNGT-I	IPC	IPT-I
Bio	MA-III	СТ	СР	СТР	MS	MNGT-I	IPC	IPT-I
Civil	MA-III	СТ	СР	СТР	MS	MNGT-I	IPC	IPT-I
Chem	MA-III	СТ	СР	СТР	MS/EM	MNGT-I	IPC	IPT-I
ECE	MA-III	СТ	СР	СТР	MS	MNGT-I	IPC	IPT-I
CSE	MA-III	СТ	СР	СТР	MS	MNGT-I	IPC	IPT-I
EEE	MA-III	СТ	СР	СТР	MS	MNGT-I	IPC	IPT-I
IT	MA-III	СТ	СР	СТР	MS	MNGT-I	IPC	IPT-I
Mech	MA-III	СТ	СР	СТР	MS/EM	MNGT-I	IPC	IPT-I

S No	Decomintion	Courses		Cr	edit	s	Hours					
<b>5.</b> INU.	Description	Courses	L	Т	Р	Total	L	Т	Р	S.S.	Total	
1.	MA-III	Transforms and Partial Differential	3	1	0	4	3	2	0	0	5	
		Equations / Discrete Mathematics	5	1	0	+	5	2	0	0	5	
2.	СТ	Core with Tutorial	3	1	0	4	3	2	0	0	5	
3.	СР	Core with PRACTICAL	3	0	1	4	3	0	2	0	5	
4.	СТР	Core with Tutorial and PRACTICAL	3	1	1	5	3	2	2	0	7	
5.	MS/EM	Material Science / Engineering Materials	3	0	0	3	3	0	0	0	3	
6.	MNGT-I	Entrepreneurship Development	2	0	0	2	2	0	0	1*	3	
7.	IPC	Interpersonal Communication	0	0	0	0	0	0	<b>?</b> *	0	2	
		(Non credit course)	U	0	0	0	U	0	4	0	2	
8.	IPT-I	In-plant Training - I		-	-	1	-	-	-		-	
		Total		3	2	23	17	6	6	1	30	

#### SEMESTER IV

Branch	C1	C3	C3	C4	CS	C6	C7	C8
Aero	MA-IV	С	СР	СТР	СТ	MNGT-II	TC	EC
Bio	MA-IV	С	СР	СТР	СТ	MNGT-II	TC	EC
Civil	MA-IV	С	СР	СТР	CT	MNGT-II	TC	EC
Chem	MA-IV	С	СР	СТР	СТ	MNGT-II	TC	EC
ECE	MA-IV	С	СР	СТР	СТ	MNGT-II	TC	EC
CSE	MA-IV	С	СР	СТР	CT	MNGT-II	TC	EC
EEE	MA-IV	С	СР	СТР	CT	MNGT-II	TC	EC
IT	MA-IV	С	СР	СТР	СТ	MNGT-II	TC	EC
Mech	MA-IV	С	СР	СТР	СТ	MNGT-II	TC	EC

S. No. Description	Courses		Cr	edit	5	Hours				
5. 110.	Description	Courses	L	Т	Р	Total	L	Т	Р	Total
1.	MA-IV	Probability and statistics / Probability and								
		queuing theory / Random processes /	2	0	0	2	2	0	0	2
		Operations Research / Statistics and	5	0	0	3	3	0	0	3
		Operations Research								
2.	С	Core	3	0	0	3	3	0	0	3
3.	СР	Core with PRACTICAL	3	0	1	4	3	0	2	5
4.	СТР	Core with Tutorial and PRACTICAL	3	1	1	5	3	2	2	7
5.	СТ	Core with Tutorial	3	1	0	4	3	2	0	5
6.	MNGT-II	Economics for Engineers	3	0	0	3	3	0	0	3
7.	TC	Technical Communication	1	0	0	1	1	0	2*	3
8.	EC	Extracurricular activities -	_	_	_	_	_	_	_	_
		NCC/NSS/YRC/RRC/Sports		-	-	_	-	-	-	
		Total	19	2	2	23	19	4	6	29

SEMESTER V														
Branch	CI	C3	ຮ	C4	CS	C6	C7	C8						
Aero	MA-IV	СТ	СР	СТР	PE-I	C-TQM	BC	IPT-II						
Bio	С	CT	СР	СТР	PE-I	C-TQM	BC	IPT-II						
Civil	MA-IV	СТ	СР	СТР	PE-I	C-TQM	BC	IPT-II						
Chem	MA-IV	СТ	СР	СТР	PE-I	C-TQM	BC	IPT-II						
ECE	MA-IV	CT	СР	СТР	PE-I	C-TQM	BC	IPT-II						
CSE	MA-IV	CT	СР	СТР	PE-I	C-TQM	BC	IPT-II						
EEE	MA-IV	CT	СР	СТР	PE-I	C-TQM	BC	IPT-II						
IT	MA-IV	СТ	СР	СТР	PE-I	C-TQM	BC	IPT-II						
Mech	MA-IV	СТ	СР	СТР	PE-I	C-TQM	BC	IPT-II						

S. No.	Description	Common		Cr	redit	S	Hours			
		Courses	L	Т	Р	Total	L	Т	P	Total
1.	MA-V	Numerical Methods	2	1	0	3	2	2	0	4
	С	Core (Biotech)	4	T						
2.	СТ	Core with Tutorial	2	1	0	3	2	2	0	4
3.	СР	Core with PRACTICAL	3	0	1	4	3	0	2	5
4.	СТР	Core with Tutorial and PRACTICAL	3	1	1	5	3	2	2	7
5.	PE-I	Professional Elective - I (with tutorial)	2	1	0	3	2	2	0	4
б.	C-TQM	Total Quality Management	3	0	0	3	3	0	0	3
7.	BC	Business Communication	1	0	0	1	1	0	2*	3
8.	IPT-II	In-plant Training - II	-	-	-	1	-	-	-	-
		Total	16	4	2	23	16	8	6	30

#### SEMESTER VI

Branch	CI	C2	C3	C4	C5	C6	C7	C8	
Aero	OE-I	C	СР	СТР	СТ	PE-II	U-MAN-II	AW	
Bio	OE-I	C	СР	СТР	СТ	PE-II	U-MAN-II	AW	
Civil	OE-I	С	СР	СТР	СТ	PE-II	U-MAN-II	AW	
Chem	OE-I	С	СР	СТР	СТ	PE-II	U-MAN-II	AW	
ECE	OE-I	С	СР	СТР	СТ	PE-II	U-MAN-II	AW	
CSE	OE-I	С	СР	СТР	СТ	PE-II	U-MAN-II	AW	
EEE	OE-I	С	СР	СТР	СТ	PE-II	U-MAN-II	AW	
IT	OE-I	С	СР	СТР	СТ	PE-II	U-MAN-II	AW	
Mech	OE-I	С	СР	СТР	СТ	PE-II	U-MAN-II	AW	

S. No.	Description	Courses	Credits				Hours			
		Courses		Т	Р	Total	L	Т	Р	Total
1.	OE-I	Open Elective - I	3	0	0	3	3	0	0	3
2.	С	Core	3	0	0	3	3	0	0	3
3.	СР	Core with PRACTICAL	3	0	1	4	3	0	2	5
4.	CTP	Core with Tutorial and PRACTICAL	3	1	1	5	3	2	2	7
5.	CT	Core with Tutorial	3	1	0	4	3	2	0	5
6.	PE-II	Professional Elective - II	3	0	0	3	3	0	0	3
7.	U-MAN-II	Environmental Studies (Non credit course)	0	0	0	0	3*	0	0	3
8.	AW	Academic writing (Non credit course)	0	0	0	0	0	0	2*	2
		Total	18	2	2	22	21	4	6	31
SEMESTER VII

<b>n</b> 1	<b>C1</b>		~	<b>~</b> 4	~-	<i><i><b>C</b></i>(</i>	~-	GO	Ga
Branch	CI	C2	<b>C</b> 3	C4	C5	C6	<b>C</b> 7	C8	C9
Aero	OE-II	CP	CTP	PE-III	PE-IV	U-MAN-III	P-I	CDS	IPT-III
Bio	OE-II	CP	CTP	PE-III	PE-IV	U-MAN-III	P-I	CDS	IPT-III
Civil	OE-II	CP	CTP	PE-III	PE-IV	U-MAN-III	P-I	CDS	IPT-III
Chem	OE-II	СР	CTP	PE-III	PE-IV	U-MAN-III	P-I	CDS	IPT-III
ECE	OE-II	СР	СТР	PE-III	PE-IV	U-MAN-III	P-I	CDS	IPT-III
CSE	OE-II	СР	CTP	PE-III	PE-IV	U-MAN-III	P-I	CDS	IPT-III
EEE	OE-II	СР	CTP	PE-III	PE-IV	U-MAN-III	P-I	CDS	IPT-III
IT	OE-II	СР	CTP	PE-III	PE-IV	U-MAN-III	P-I	CDS	IPT-III
Mech	OE-II	СР	CTP	PE-III	PE-IV	U-MAN-III	P-I	CDS	IPT-III
								02.5	
	1								

S No	Description	Courses		Credits				Hours			
<b>D.</b> 140.	Description	Courses	L	Т	Р	Total	L	Т	Р	Total	
1.	OE-II	Open Elective - II	3	0	0	3	3	0	0	3	
2.	СР	Core with practical		0	1	4	3	0	2	5	
3.	СТР	Core with Tutorial and practical		1	1	5	3	2	2	7	
4.	PE-III	Professional Elective - III		0	0	3	3	0	0	3	
5.	PE-IV	Professional Elective - IV	3	0	0	3	3	0	0	3	
6.	U-MAN-III	Cyber Security (Non Credit Course)	0	0	0	0	3*	0	0	3	
7.	P-I	Project Phase - I	0	0	2	2	0	0	4	4	
8.	CDS	Career Development Skills (Non credit	0	0	0	0	0	Δ	1*	1	
		course)	0	0	0	0	0	0	1	1	
9.	IPT-III	In-plant Training - III		-	-	2	-	-	-	-	
		Total	15	1	4	22	18	2	9	29	

* Non-credit

Branch	C1	C2	C3	C4				
Aero	OE-III	PE-V	PE-VI	P-II				
Bio	OE-III	PE-V	PE-VI	P-II				
Civil	OE-III	PE-V	PE-VI	P-II				
Chem	OE-III	PE-V	PE-VI	P-II				
ECE	OE-III	PE-V	PE-VI	P-II				
CSE	OE-III	PE-V	PE-VI	P-II				
EEE	OE-III	PE-V	PE-VI	P-II				
IT	OE-III	PE-V	PE-VI	P-II				
Mech	OE-III	PE-V	PE-VI	P-II				

SEMESTER VII	SEN	<b>AESTER</b>	VIII
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S No	Description	Courses	Credits				Hours			
S. INO. Description		Courses		Τ	Р	Total	L	Т	Р	Total
1.	OE-III	Open Elective - III	3	0	0	3	3	0	0	3
2.	PE-V	Professional Elective - V	3	0	0	3	3	0	0	3
3.	PE-VI	Professional Elective - VI	3	0	0	3	3	0	0	3
4.	P-II	Project Phase - II	0	0	12	12	0	0	24	24
		Total	9	0	12	21	9	0	24	33

## Summary of the credits and hours

Semester	<b>Total Credits</b>	Total Hours / Week	No. of courses
Ι	20	26	5
II	18	24	5
III	20	29	7
IV	22	28	5
V	24	30	9
VI	22	27	7
VII	15	28	8
VIII	15	21	4
I - VIII	156 Credits	-	50

## The salient features of this curriculum are as follows.

- 1. For all B.Tech. programmes 160 credits is mandatory. In addition to 160 credits, students can register additional Audit courses choosing from professional electives or open electives. *[Audit Courses: Students to be able to register for Courses outside the prescribed range of Credits for audit only, when interested to supplement their knowledge/skills; Optional for students to appear/pass in Continual Internal Examination(CIE), Semester End Examinations(SEE) of these students and the statement of the the stateme*
- courses and/or seek their inclusion in the Grade cards or Transcripts issued.
- 2. The average load per semester is about 22 credits.
- 3. The main Project is split up into 2 phases. 2 credits for phase I in the 7th Semester and 12 credits for phase II in the 8th Semester.

Course type		Credits					Contact Hours					
		Т	Р	Total	L	Τ	Р	Total				
Lecture course	3	0	0	3	3	0	0	3				
Lecture + practical course		0	1	4	3	0	2	5				
Lesture   Tutorial course		1	0	4	3	2	0	5				
Lecture + Tutomar course	2	1	0	3	2	2	0	4				
Lecture + Tutorial + practical course	3	1	1	5	3	2	2	7				

4. The credit distribution is followed as per the guidelines given by AICTE/UGC

Note:

- 1. Evaluation and Assessment must be done for all non credit courses.
- 2. Apart from academic workload, the following academic sessions must be included in the time table to maintain 35 hours / week.

Counseling – 1 hour, Academic mentor – 1 hour, Library – 1 hour.

3. The course teacher should maintain records for assessment of Self Study (SS).