JERUSALEM COLLEGE OF ENGINEERING

(An Autonomous Institution)
(Approved by AICTE, Affiliated to Anna University
Accredited by NBA and NAAC with 'A' Grade)
Velachery Main Road, Pallikaranai,Chennai 600 100

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION OF THE INSTITUTION

Jerusalem College of Engineering is committed in emerging as an international institution of excellence in imparting the finest quality engineering, technology and management education rooted in ethical and societal values through various academic programmes, multi-disciplinary research, consultancy and entrepreneurship activities, and hence in contributing towards social transformation and nation building

MISSION OF THE INSTITUTION

- Generating abundant resources and making conducive policies, the management led by the Chief Executive Officer strives towards promoting globally competitive academic programmes augmented with value added courses, in-plant training, co-curricular activities and ambience that support intellectual growth and skill acquisition.
- Promoting collaborative trans-border research programmes, continuing education in synergy with academia, industries and research organizations leading to real time solutions and lifelong learning
- Transforming young men and women into competent professionals and entrepreneurs motivated by a passion for professional excellence, driven by human values and proactively engaging in the betterment of the society through innovative practices and academic excellence
- Facilitating effective interaction among faculty and students, and fostering network of alumni, industries, institutions and other stakeholders for successful career gain and placement.

VISION OF THE DEPARTMENT

The Department of Computer Science and Engineering is dedicated to be a center of excellence, in producing graduates as ethical engineers, innovative researchers, dynamic entrepreneurs and globally competitive technocrats.

MISSION OF THE DEPARTMENT

- To craft the students to be competent professionals with value based education, innovative teaching and practices
- To enhance student's soft skill, personality and ethical responsibilities by augmenting in-plant training, value added courses, co curricular and extracurricular activities
- To facilitate the students as researchers by widening their professional knowledge through continuous learning and innovative projects
- To produce dynamic entrepreneur through interaction with network of alumni, industry and academia

PROGRAM OUTCOMES(POs)

PO1:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2:Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7:Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8:Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Graduates will apply engineering basics, laboratory and job oriented experiences to devise and unravel engineering problems in computer science engineering domain.

PEO2: Graduates will be multi faceted researchers and experts in fields like computing, networking, artificial intelligence, software engineering and data science.

PEO3: Graduates will be dynamic entrepreneurs and service oriented professionals with ethical and social responsibility.

PEO4: Graduates will ingress and endure in core and other prominent organization across the globe and will foster innovation.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO-I: The ability to understand, analyze and to develop the design, related to real-time system such as IOT, Secured Automated Systems, Machine Vision, Computer Vision And Cognitive Computing with various complexities , providing orientation towards green computing environment.

PSO-II: The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product

PSO-III: The ability to innovate, introduce and produce socially relevant products to facilitate transformation of society into a digitally empowered knowledge economy, thereby to chart a successful career with a new dimension to entrepreneurship.

JERUSALEM COLLEGE OF ENGINEERING

(AN AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI)

B.E. COMPUTER SCIENCE AND ENGINEERING

REGULATION 2019

CHOICE BASED CREDIT SYSTEM

I TO VIII SEMESTERS CURRICULUM

COURSE SUMMARY SHEET

S.No	Category	Credits as per Semester								Total Credits
		1	2	3	4	5	6	7	8	
1	HS	3	3	-	-	1	-	-	-	7
2	BS	10	6	3	3	-	-	-	-	22
3	ES	10	13	5	-	-	-	-	-	28
4	PC	-	-	11	16	12	11	8	-	58
5	PE	-	-	-	-	3	6	3	-	12
6	OE	-	-	-	3	3	3	3	-	12
7	EEC	-	-	-	1	-	3	7	10	21
TOTAL (B.E)		23	22	19	23	19	23	21	10	160

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CHOICE BASED CREDIT SYSTEM

I TO VIII SEMESTERS CURRICULUM AND SYLLABI

SEMESTER 1

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JHS1121	Communicative English and Soft Skills I	HS	4	2	0	2	3
2	JMA1101	Matrices and Calculus	BS	4	2	2	0	3
3	JPH1101	Engineering Physics	BS	3	3	0	0	3
4	JCY1101	Engineering Chemistry	BS	3	3	0	0	3
5	JGE1101	Engineering Basics	ES	3	3	0	0	3
6	JGE1102	Programming in C	ES	3	3	0	0	3
PRACTICALS								
7	JPC1111	Physics and Chemistry Laboratory	BS	2	0	0	2	1
8	JGE1112	Programming in C Laboratory	ES	4	0	0	4	2
9	JGE1111	Design Appreciation Laboratory	ES	4	0	0	4	2
TOTAL				**30**	**16**	**2**	**12**	**23**

SEMESTER 2

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JHS1221	Technical English and Soft Skills II	HS	4	2	0	2	3
2	JMA1201	Vector Calculus and Complex Analysis	BS	4	2	2	0	3
3	JBE1223	Applied Science for Electronics and information Engineering	BS	4	2	0	2	3
4	JGE1201	Python Programming	ES	3	3	0	0	3
5	JEC1204	Digital Logic Fundamentals	ES	3	3	0	0	3
6	JGE1202	Engineering Graphics & Design	ES	5	1	0	4	3
7	JNC1261	Environmental Science	NCM	3	3	0	0	0
PRACTICALS								
8	JGE1211	Python Programming Laboratory	ES	4	0	0	4	2
9	JEC1214	Digital Logic Fundamentals Laboratory	ES	4	0	0	4	2
TOTAL				**34**	**16**	**2**	**16**	**22**

SEMESTER 3

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JMA1303	Discrete Mathematics and Number Theory	BS	4	2	2	0	3
2	JCS1301	Data Structures	ES	3	3	0	0	3
3	JCS1302	Database Management Systems	PC	3	3	0	0	3
4	JCS1303	Computer Architecture	PC	3	3	0	0	3
5	JCS1321 (Integrated)	Object Oriented Programming	PC	4	2	0	2	3
PRACTICALS								
6	JPT1001	Soft Skill and Aptitude- I	EEC	2	0	0	2	*
7	JCS1311	Data Structures Laboratory	ES	4	0	0	4	2
8	JCS1312	Database Management Systems Laboratory	PC	4	0	0	4	2
TOTAL				27	13	2	12	19

***Only Internal Assessment**

SEMESTER 4

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JMA1403	Applied Probability and Queuing Theory	BS	4	2	2	0	3
2	JCS1401	Computer Networks	PC	3	3	0	0	3
3	JCS1402	Operating Systems	PC	3	3	0	0	3
4	JCS1403	Design and Analysis of Algorithms	PC	3	3	0	0	3
5	JCS1404	Software Engineering	PC	3	3	0	0	3
6		Open Elective-I	OE	3	3	0	0	3
PRACTICALS								
7	JPT1001	Soft Skills and Aptitude-II	EEC	2	0	0	2	1
8	JCS1411	Networks Laboratory	PC	4	0	0	4	2
9	JCS1412	Operating Systems Laboratory	PC	4	0	0	4	2
TOTAL				29	17	2	10	23

SEMESTER 5

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JCS1501	Internet Programming	PC	3	3	0	0	3
2	JCS1502 (Integrated)	Object Oriented Analysis and Design	PC	4	2	0	2	3
3	JCS1503	Theory of Computation	PC	5	3	2	0	4
4		Professional Elective - I	PE	3	3	0	0	3
5		Open Elective-II	OE	3	3	0	0	3
PRACTICALS								
6	JPT1002	Technical Skills and Aptitude-I	EEC	2	0	0	2	*
7	JHS1511	Professional Communication	HS	2	0	0	2	1
8	JCS1511	Internet Programming Laboratory	PC	4	0	0	4	2
TOTAL				26	14	2	10	19

***Only Internal Assessment**

SEMESTER 6

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JCS1601	Compiler Design	PC	3	3	0	0	3
2	JIT1602	Artificial Intelligence	PC	3	3	0	0	3
3	JCS1603	Cryptography and Network Security	PC	3	2	1	0	3
4		Professional Elective - II	PE	3	3	0	0	3
5		Professional Elective - III	PE	3	3	0	0	3
6		Open Elective - III	OE	3	3	0	0	3
PRACTICALS								
6	JPT1002	Technical Skills and Aptitude-II	EEC	2	0	0	2	1
7	JCS1611	Compiler Design Laboratory	PC	4	0	0	4	2
8	JCS1621	Mini Project	EEC	2	0	0	2	1
9	JCS1641	Internship	EEC	-	-	-	2	1
TOTAL				26	18	0	10	23

**Internship of two weeks must be undertaken in Industry through semesters 3,4,5 leading to award of 1 credit in Semester VI

SEMESTER 7

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JCS1701	Big Data Analytics	PC	3	3	0	0	3
2	JCS1702 (Integrated)	Cloud Computing	PC	4	2	0	2	3
3		Professional Elective - IV	PE	3	3	0	0	3
4		Open Elective -IV	OE	3	3	0	0	3
5	JNC1361	Essence of Indian Traditional Knowledge	NCM	3	3	0	0	0
PRACTICALS								
6	JBA1711	Entrepreneurship for Engineers	EEC	2	0	0	2	1
7	NMS0001	Professional Readiness for Innovation ,Employability and Entrepreneurship	EEC	6	0	0	6	3
8	JCS1711	Big Data Analytics Laboratory	PC	4	0	0	4	2
9	JCS1731	Project work – Phase I	EEC	6	0	0	6	3
TOTAL				34	14	0	20	21

SEMESTER 8

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JNC1861	Indian Constitution	NCM	3	3	0	0	0
PRACTICALS								
2	JCS1851	Comprehension and Technical Seminar	EEC	2	0	0	2	1
3	JCS1832	Project work – Phase II	EEC	18	0	0	18	9
TOTAL				23	3	0	20	10

PROFESSIONAL ELECTIVES

PROFESSIONAL ELECTIVE 1 – SEMESTER 5

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JCS1001	Computer Hardware and Interfacing	PE	3	3	0	0	3
2	JCS1002	Electronic Commerce	PE	3	3	0	0	3
3	JCS1003	Mobile Computing	PE	3	3	0	0	3
4	JCS1004	Software Quality Assurance	PE	3	3	0	0	3
5	JCS1005	System Software	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE 2 – SEMESTER 6

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JIT1002	Agile Methodologies	PE	3	3	0	0	3
2	JCS1006	Multimedia tools and Techniques	PE	3	3	0	0	3
3	JCS1007	Augmented Reality and Virtual Reality	PE	3	3	0	0	3
4	JCS1008	Web Design and Management	PE	3	3	0	0	3
5	JCS1009	Data Warehousing and Data Mining	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE 3 – SEMESTER 6

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JCS1010	Cyber Security and Digital Forensics	PE	3	3	0	0	3
2	JIT1601	Internet of Things	PE	3	3	0	0	3
3	JCS1011	Business Intelligence	PE	3	3	0	0	3

4	JCS1012	Adhoc and Sensor Networks	PE	3	3	0	0	3
5	JCS1013	Advanced Database Technology	PE	3	3	0	0	3
6	JEI1002	Digital Signal Processing	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE 4 – SEMESTER 7

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JCS1014	Information Retrieval Techniques	PE	3	3	0	0	3
2	JGE1001	Professional Ethics in Engineering	PE	3	3	0	0	3
3	JGE1004	Intellectual Property Rights	PE	3	3	0	0	3
4	JCS1015	Operations Research	PE	3	3	0	0	3
5	JBA1038	Principles of Management	PE	3	3	0	0	3
6	JCS1016	Software Testing	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE 5 – SEMESTER 7

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JIT1006	Block Chain Technology	PE	3	3	0	0	3
2	JCS1017	Green Computing	PE	3	3	0	0	3
3	JIT1009	Natural Language Processing	PE	3	3	0	0	3
4	JIT1004	Social Network Analysis	PE	3	3	0	0	3
5	JCS1018	Cognitive Computing	PE	3	3	0	0	3

OPEN ELECTIVES

OPEN ELECTIVE 1 – SEMESTER 4

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JCS9001	An Introduction to System Software	OE	3	3	0	0	3
2	JCS9002	Basics of Object Oriented Programming	OE	3	3	0	0	3
3	JCS9003	User Interface Design	OE	3	3	0	0	3

OPEN ELECTIVE 2 – SEMESTER 5

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JCS9004	Introduction to Web Design	OE	3	3	0	0	3
2	JCS9005	Programming Tools and Techniques	OE	3	3	0	0	3
3	JCS9006	High Performance Networks for Beginners	OE	3	3	0	0	3

OPEN ELECTIVE 3 – SEMESTER 6

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JCS9007	Essentials of Software Project Management	OE	3	3	0	0	3
2	JCS9008	Fundamentals of Big Data	OE	3	3	0	0	3
3	JCS9009	Security Practices	OE	3	3	0	0	3

OPEN ELECTIVE 4 – SEMESTER 7

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JCS9010	Software Testing	OE	3	3	0	0	3
2	JCS9011	Introduction to Enterprises Resources Planning	OE	3	3	0	0	3
3	JCS9012	Basics of Machine Learning	OE	3	3	0	0	3

MANDATORY COURSES

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JNC1261	Environmental Science	NCM	3	3	0	0	0
2	JNC1361	Essence of Indian Traditional Knowledge	NCM	3	3	0	0	0
3	JNC1861	Indian Constitution	NCM	2	2	0	0	0

HUMANITIES AND SOCIAL SCIENCES (HS)

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JHS1121	Communicative English and Soft Skills I	HS	4	2	0	2	3
2	JHS1221	Technical English and Soft Skills II	HS	4	2	0	2	3
3	JHS1511	Professional Communication	HS	2	0	0	2	1

BASIC SCIENCES (BS)

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JMA1101	Matrices and Calculus	BS	4	2	2	0	3
2	JPH1101	Engineering Physics	BS	3	3	0	0	3
3	JCY1101	Engineering Chemistry	BS	3	3	0	0	3
4	JPC1111	Physics and Chemistry Laboratory	BS	2	0	0	2	1
5	JMA1201	Vector Calculus and Complex Analysis	BS	4	2	2	0	3
6	JBE1223	Applied Science for Electronics and information Engineering	BS	4	2	0	2	3
7	JMA1303	Discrete Mathematics and Number Theory	BS	4	2	2	0	3
8	JMA1403	Applied Probability and Queuing Theory	BS	4	2	2	0	3

ENGINEERING SCIENCES (ES)

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JGE1101	Engineering Basics	ES	3	3	0	0	3
2	JGE1102	Programming in C	ES	3	3	0	0	3
3	JGE1112	Programming in C Laboratory	ES	4	0	0	4	2
4	JGE1111	Design Appreciation Laboratory	ES	4	0	0	4	2

5	JGE1201	Python Programming	ES	3	3	0	0	3
6	JEC1204	Digital Logic Fundamentals	ES	3	3	0	0	3
7	JGE1202	Engineering Graphics & Design	ES	5	1	0	4	3
8	JGE1211	Python Programming Laboratory	ES	4	0	0	4	2
9	JEC1214	Digital Logic Fundamentals Laboratory	ES	4	0	0	4	2
10	JCS1301	Data Structures	ES	3	3	0	0	3
11	JCS1311	Data Structures Laboratory	ES	4	0	0	4	2

PROFESSIONAL CORE (PC)

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JCS1302	Database Management Systems	PC	3	3	0	0	3
2	JCS1303	Computer Architecture	PC	3	3	0	0	3
3	JCS1321 (Integrated)	Object Oriented Programming	PC	4	2	0	2	3
4	JCS1312	Database Management Systems Laboratory	PC	4	0	0	4	2
5	JCS1401	Computer Networks	PC	3	3	0	0	3
6	JCS1402	Operating Systems	PC	3	3	0	0	3
7	JCS1403	Design and Analysis of Algorithms	PC	3	3	0	0	3
8	JCS1404	Software Engineering	PC	3	3	0	0	3
9	JCS1411	Networks Laboratory	PC	4	0	0	4	2
10	JCS1412	Operating Systems Laboratory	PC	4	0	0	4	2

10	JCS1501	Internet Programming	PC	3	3	0	0	3
11	JCS1502	Object Oriented Analysis and Design	PC	4	2	0	2	3
12	JCS1503	Theory of Computation	PC	5	3	2	0	4
13	JCS1511	Internet Programming Laboratory	PC	4	0	0	4	2
14	JCS1601	Compiler Design	PC	3	3	0	0	3
15	JIT1602	Artificial Intelligence	PC	3	3	0	0	3
16	JCS1603	Cryptography and Network Security	PC	3	3	0	0	3
17	JCS1611	Compiler Design Laboratory	PC	4	0	0	4	2
18	JCS1701	Big Data Analytics	PC	3	3	0	0	3
19	JCS1702	Cloud Computing	PC	4	2	0	2	3
20	JCS1711	Data Analytics Laboratory	PC	4	0	0	4	2

EMPLOYMENT ENHANCEMENT COURSES (EEC)

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1	JCS1621	Mini Project	EEC	2	0	0	2	1
2	JCS1641	Internship	EEC	-	-	-	2	1
3	JBA1711	Entrepreneurship for Engineers	EEC	2	0	0	2	1
4	NMS0001	Professional Readiness for Innovation , Employability and Entrepreneurship	EEC	6	0	0	6	3
5	JCS1731	Project work – Phase I	EEC	6	0	0	6	3

6	JCS1851	Comprehension and Technical Seminar	EEC	2	0	0	2	1
7	JCS1832	Project work – Phase II	EEC	18	0	0	18	9
8	JPT1001	Soft Skill and Aptitude- I	EEC	2	0	0	2	*
9	JPT1001	Soft Skills and Aptitude-II	EEC	2	0	0	2	1
10	JPT1002	Technical Skills and Aptitude-I	EEC	2	0	0	2	*
11	JPT1002	Technical Skills and Aptitude-II	EEC	2	0	0	2	1

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SYSTEM COMMON TO ALL BRANCHES

SEMESTER I

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JHS1121	Communicative English and Soft Skills I	HS	4	2	0	2	3
2	JMA1101	Matrices and Calculus	BS	4	2	2	0	3
3	JPH1101	Engineering Physics	BS	3	3	0	0	3
4	JCY1101	Engineering Chemistry	BS	3	3	0	0	3
5	JGE1101	Engineering Basics	ES	3	3	0	0	3
6	JGE1102	Programming in C	ES	3	3	0	0	3
PRACTICALS								
7	JPC1111	Physics and Chemistry Laboratory	BS	2	0	0	2	1
8	JGE1112	Programming in C Laboratory	ES	4	0	0	4	2
9	JGE1111	Design Appreciation Laboratory	ES	4	0	0	4	2
TOTAL				**30**	**16**	**2**	**12**	**23**

JHS1121	COMMUNICATIVE ENGLISH & SOFT SKILLS I (Common to all B.E / B. Tech Programmes)	L	T	P	C
		2	0	2	3

COURSE OBJECTIVES:

- To enable the students of Engineering and Technology to develop their listening skill by learning the key techniques for comprehending information
- To facilitate the learners to speak effectively while exchanging ideas in academic and social domains
- To develop their skills in reading and understanding texts through practice
- To expose them to the correct usage of language to develop their writing skill
- To train the students to use appropriate vocabulary in academic and technical writings

UNIT I Basic Grammar I and Reading for information 9

Parts of speech - Sentence patterns – Tenses - Wh- questions - Yes/no questions - Countable and Uncountable nouns - Affixation – word formation; Reading short comprehension passages - practice in skimming and scanning for specific information and note-making, Critical reading - finding key information in a given text - shifting facts from opinions and paraphrasing

SOFT SKILLS LAB 3

Listening to documentaries, inspiring speeches of great leaders, news bulletins, Ted talks, telephonic conversations

UNIT II Basic Grammar I and Sharing Information 9

Pronouns - Adjectives - Adverbs - Imperatives - Direct and indirect questions - Compound words - Guessing meaning of words in contexts – one word substitutes; Autobiographical writing (writing about one's leisure time activities, hometown, favourite place and school life) – Biographical writing (place, people), Letter writing (informal letters)

SOFT SKILLS LAB 3

Self-introduction, peer introduction, picture description, JAM

UNIT III Basic Grammar III and Free Writing I 9

Conjunctions – Prepositions - Articles - Degrees of comparison – Discourse markers - Reference words; Process description, Coherence and cohesion in writing cause and effect / compare & contrast / narrative / analytical paragraphs

SOFT SKILLS LAB 9

Language functions: Giving reasons, talking about future plans, comparing and contrasting, making suggestions

UNIT IV Basic Grammar IV and Language Development 9

Subject-verb agreement - Modal verbs - Phrasal verbs - Single word substitutes - Use of abbreviations & acronyms - Cloze reading - Interpreting visual material, Jumbled sentences

SOFT SKILLS LAB 3

Interpersonal Skills: role play, group discussion, debate, conduct of meeting

UNIT V Basic Grammar V and Free Writing II 9

Clause - Direct and indirect speech – Correction of errors - Word association (connotations) - Lexical items (fixed / semi fixed expressions) - Essay writing – different types of essays, dialogue writing

SOFT SKILLS LAB 3

Creative writing and speaking skills: Poster making and description, project proposals

TOTAL: 60 PERIODS

Course Outcomes:

At the end of the course, students will be able to

- Listen to different talks and lectures and understand them easily
- Communicate their thoughts confidently using communicative strategies
- Read and grasp different genres of texts effortlessly
- Write grammatically correct academic, business and technical texts
- Apply the language skills efficiently in all forms of communication

Text books:

1. Board of Editors, Department of English, Anna University, Chennai. Using English: A Course Book for Undergraduate Engineers and Technologists, Orient Black Swan: Chennai, 2017.
2. Dhanavel, S.P. English and Communication Skills for Students of Scienceand Engineering. Orient Black Swan Publications, Chennai, 2011.
3. Raman, Meenakshi & Sangeetha Sharma, Technical Communication: English Skills for Engineers. Oxford University Press, New Delhi. 2011.

Reference Books:

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2. Rizvi M, Ashraf. Effective Technical Communication. Tata McGraw-Hill Publishing Company Limited, New Delhi, 2007.
3. Rutherford, Andrea J. Basic Communication Skills for Technology. Pearson Edition (II Edition), New Delhi, 2001.
4. Mandel, Steve. *Effective Presentation Skills*. New Delhi: Viva Books Pvt. Ltd., 2004.
5. Writing Cover Letters-Kilmet, Stephen. "Cover Letter," and "Enclosures and Attachments." In Writing for Design Professionals. New York.

Web Links:

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2. https://edu.gcfglobal.org/en/grammar
3. https://www.talkenglish.com/grammar/grammar.aspx
4. https://learnenglish.britishcouncil.org/skills
5. https://www.myenglishlanguage.com

Extensive Reading:

Kalam, Abdul. The Wings of Fire, Universities Press, Hyderabad. 1999

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	1	2	3	-	2
CO2	-	-	-	-	-	-	-	1	2	3	-	2
CO3	-	-	-	-	-	-	-	1	2	3	-	2
CO4	-	-	-	-	-	-	-	1	2	3	-	2
CO5	-	-	-	-	-	-	-	1	2	3	-	2
AVG	-	-	-	-	-	-	-	1	2	3	-	2

JMA1101	MATRICES AND CALCULUS	L	T	P	C
	(Common to all B.E /B.Tech Programmes)	2	2	0	3

COURSE OBJECTIVES:

- To equip students with the knowledge of matrices required for applications in engineering.
- To enable students to understand the concepts of multivariable functions and its calculus.
- To familiarize students on concepts of differential calculus and its applications.
- To introduce concepts of integral calculus as tools required for applications in engineering.
- To introduce ordinary differential equations which is widely used in problem solving and engineering applications.

UNIT I MATRICES 12

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley-Hamilton theorem – Diagonalization of matrices by similarity and orthogonal transformations – Reduction of a quadratic form to canonical formNature of quadratic forms.

UNIT II FUNCTIONS OF SEVERAL VARIABLES 12

Partial differentiation – Total derivative – Jacobians – Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT III APPLICATIONS OF DIFFERENTIAL CALCULUS 12

Curvature and radius of curvature – Circle of curvature – Evolutes – Envelopes – Evolute as envelope of normals.

UNIT IV APPLICATIONS OF INTEGRAL CALCULUS 12

Multiple integrals: Double integrals – Change of order of integration – Change of variables – Area enclosed by plane curves – Triple integrals – Volume of solids.

Improper integrals: Beta and Gamma Integrals – Definitions and properties – Simple problems.

UNIT V ORDINARY DIFFERENTIAL EQUATIONS 12

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Method of undetermined coefficients - Homogeneous equation of Euler's and Legendre's type – System of simultaneous first order linear differential equations with constant coefficients.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able

- To understand applications of matrix theory in quadratic forms
- To use calculus for problems and applications dealing with functions of several variables
- To apply differential calculus in practical problem solving in the area of geometry
- To gain insight on the applications of multiple integrals in area and volume problems
- To solve ordinary differential equations that occur in many physical and engineering applications

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.
2. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
3. P.Anuradha and V.Sudhakar, "Matrices and Calculus", Scitech Publications, 1st Edition, Chennai, 2019.

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1. Anton, H, Bivens, I and Davis, S, "Calculus", Wiley, 10th Edition, 2016.
2. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 3rd Edition, 2007.
3. Srimantha Pal and Bhunia, S.C, "Engineering Mathematics" Oxford University Press, 2015.
4. Weir, M.D and Joel Hass, "Thomas Calculus", 12th Edition, Pearson India, 2016.

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2.https://nptel.ac.in/courses/111/107/111107108/
3.https://nptel.ac.in/courses/111/104/111104144/
4.https://nptel.ac.in/courses/111/105/111105122/
5.https://nptel.ac.in/courses/111/107/111107111/

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	-	-	2	-	-	2
CO2	3	3	2	2	-	-	-	-	2	-	-	2
CO3	3	3	2	2	-	-	-	-	2	-	-	2
CO4	3	3	2	2	-	-	-	-	2	-	-	2
CO5	3	3	2	2	-	-	-	-	2	-	-	2
AVG	3	3	2	2	-	-	-	-	2	-	-	2

JPH1101	ENGINEERING PHYSICS (Common to all B.E /B.TechProgrammes)	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To enable the students to understand the basics in crystals structure
- To enable the students to understand the basic concepts in properties of matter
- To impart knowledge in ultrasonic inspections
- To introduce the principles of quantum mechanics
- To impart knowledge of laser and fiber optic communication

UNIT I CRYSTAL PHYSICS 9

Single crystal, Polycrystalline and Amorphous materials – Single Crystals: Unit cell, Crystal systems, Bravais lattices, Directions and Planes in a crystal, Miller indices – Inter planar distances – Coordination number and Packing factor for SC, BCC, FCC, HCP and Diamond structures - Crystal imperfections: Point defects, Line defects – Burgers vector, Stacking faults

UNIT II PROPERTIES OF MATTER 9

Elasticity – Stress-strain diagram and its uses - factors affecting elastic moduli and tensile strength – torsional stress and deformations – twisting couple - torsion pendulum: theory and experiment - bending of beams - stress due to bending in beams - bending moment – cantilever: theory and experiment – uniform and non-uniform bending: theory and experiment

UNIT III ULTRASONICS 9

Production of ultrasound by Magnetostriction effect and Piezoelectric effect Detection of ultrasonic wave – Properties of ultrasonic wave – Acoustic grating - Industrial applications – Drilling, Welding, Soldering and Cleaning – SONAR - Non Destructive Testing – Pulse echo system through Transmission and Reflection modes- A, B and C–scan displays.

UNIT IV PHOTONICS AND FIBRE OPTICS 9

Spontaneous and stimulated emission-Population inversion -Einstein's A and B coefficients derivation – Laser Principle - Semiconductor lasers (homojunction & heterojunction)- Optical Fiber: types (material, refractive index, mode) - Propagation of light in optical fibers – Numerical aperture and Acceptance angle –attenuation, dispersion, bending -Fiber Optical Communication system (Block diagram) -Active and passive fiber sensors- Endoscope.

UNIT V QUANTUM PHYSICS 9

Black body radiation –Planck's theory (derivation) –Deduction of Wien's displacement law and Rayleigh –Jeans' Law from Planck's theory –Compton effect-theory –Properties of Matter waves –G.P Thomson experiment -Schrödinger's wave equation –Time independent and time dependent equations –Physical significance of wave function –Particle in a one dimensional box -Scanning electron microscope -Transmission electron microscope

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Students will be able

- To enhance knowledge on properties of matter
- To assess the properties of ultra sonics and imaging devices
- To understand and to compute problems in Quantum Physics.
- To learn the use of modern optical fiber communication systems and tools in real life applications.
- To gain more insight on the functioning of optical materials for optoelectronics.

TEXT BOOKS:

1. Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015.
2. Gaur, R.K. & Gupta, S.L. "Engineering Physics". Dhanpat Rai Publishers, 2012.
3. Dr.Beula Shanthi John , Dr.P.mani," Engineering Physics", Dhanam Publications, First Edition, 2019.

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1. Halliday, D., Resnick, R. & Walker, J. "Principles of Physics". Wiley, 2015.
2. Serway, R.A. & Jewett, J.W. "Physics for Scientists and Engineers". Cengage Learning,2010.
3. Tipler, P.A. &Mosca, G. "Physics for Scientists and Engineers with Modern Physics'.W.H.Freeman, 2007
4. Rajendran V, "Engineering Physics", Tata McGraw Hill, 2009.
5. John D.Cutnell, "Cutnell and Johnson Physics", Willey Publications, 2018.

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2.https://nptel.ac.in/noc/courses/noc18/SEM2/noc18-ce18/
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5.https://nptel.ac.in/courses/108/104/108104113/

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	-	-	1	-	-	1	-	1	-
CO2	2	1	1	-	-	1	-	-	1	-	1	-
CO3	2	1	1	-	-	1	-	-	1	-	1	-
CO4	2	1	1	-	-	1	-	-	1	-	1	-
CO5	2	1	1	-	-	1	-	-	1	-	1	-
AVG	2	1	1	--	-	1	-	-	1	-	1	-

JCY1101	ENGINEERING CHEMISTRY	L	T	P	C
	(Common to all B.E /B.TechProgrammes	3	0	0	3

COURSE OBJECTIVE

- To acquaint the student with concepts of photochemistry and analytical techniques.

- To make the students conversant with boiler feed water and water treatment techniques.
- To make the students acquire sound knowledge in corrosion of materials.
- To understand polymer chemistry and the principle of energy in batteries.
- To impart knowledge on the basics of nano materials and engineering materials.

UNIT I: PHOTOCHEMISTRY AND ANALYTICAL TECHNIQUES 9

Photochemistry- Laws of photochemistry - Grotthuss–Draper law, Stark–Einstein law and Lambert-Beer Law (problems). Photo processes - Internal Conversion, Inter-system crossing, Fluorescence and its applications in medicine – Phosphorescence-Chemiluminescence and Photo-sensitization.

Analytical Techniques – UV-visible spectroscopy – principles – instrumentation (block diagram only) – Colorimetry- Principle-Instrumentation, estimation of iron by colorimetry – Flame photometry – principle – Instrumentation – estimation of sodium by Flame photometry.

UNIT II WATER TECHNOLOGY 9

Hardness-Units of Hardness- Temporary hardness-Permanent hardness- Estimation hardness by EDTA method- Alkalinity – Types- water quality parameters (pH, EC, TDS, DO, BOD, COD) –- Boiler feed water-requirements- boiler troubles (scale and sludge-caustic embrittlement-boiler corrosion-priming and foaming) - softening of hard water - external treatment (zeolite and demineralization) - internal treatment (phosphate, calgon, carbonate, colloidal) -- desalination of brackish water –reverse osmosis.

UNIT III ELECTROCHEMISTRY AND CORROSION 9

Electrochemistry- Electrochemical cell - redox reaction, electrode potential- oxidation potential- reduction potential, measurement and applications - electrochemical series and its significance - Nernst equation (derivation and problems).

Corrosion- causes- types-chemical, electrochemical corrosion- galvanic corrosion-differential aeration corrosion (pitting, waterline, wire fence, pipeline, crevice, stress corrosion), Factors influencing the rate of corrosion- corrosion control - material selection and design aspects – cathodic protection methods (sacrificial anode and impressed current cathodic methods)- Electroplating of Copper and electroless plating of nickel-corrosion inhibitors (anodic and cathodic inhibitors).

UNIT IV POLYMER , COMPOSITES AND ENERGY STORAGE DEVICES 9

Introduction- Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization.. Biodegradable polymer- Types-synthetic methods – applications of biodegradable polymers. Polymer composites and its application.

Energy Storage Devices - Batteries and fuel cells: Types of batteries – primary battery (dry cell) secondary battery (lead acid battery, nickel-cadmium battery, lithium-ion-battery). Fuel cell – H_2-O_2 fuel cell- solid oxide fuel cell - polymer electrolyte membrane fuel cell (PEMFC) applications.

UNIT V ENGINEERING MATERIALS AND NANOCHEMISTRY 9

Engineering Materials- Refractories – classification – acidic, basic and neutral refractories – properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling) – manufacture of alumina, magnesite and zirconia bricks. cement-

manufacture and properties - setting and hardening of cement, special cement- waterproof and white cement–properties and uses.

Nanochemistry– Introduction – distinction between molecules, nanoparticles and bulk materials; Synthesis: precipitation, thermolysis, hydrothermal, solvothermal, electrodeposition, chemical vapour deposition, laser ablation; Properties and applications.

TOTAL: 45 PERIODS

COURSE OUTCOMES

Students will be able to

- Understand laws of photochemistry and principles of instrumentation and their applications in various fields.
- To understand the basic principle of water treatment and techniques involved in the purification process for future learning.
- Apply electrochemical reactions on the process of corrosion and its prevention methods.
- Gain knowledge on biodegradable polymers and understand the principle of batteries for development of new energy resources .
- Gain knowledge on engineering materials and understand the unique behavior of nanomaterials.

TEXT BOOKS:

1. Jain P.C. and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2010.
2. R.Gopalan, D.Venkayya, SulochnaNagarajan,Textbook of Engineering Chemistry, Vikas publishing pvt ltd, 4th edition, 2013.
3. Dr.N.JohnJebarathinamDr.R.VaidyanathanMs.A.U.AjishaDr.A.Ravikrishna n, Engineering Chemistry, Sri Krishna Publications,First edition 2019.

REFERENCES:

1. O.G.Palanna, Engineering Chemistry, McGraw Hill, 2017
2. Dara S.S, Umare S.S, "Engineering Chemistry", S. Chand & Company Ltd., New Delhi 2013.
3. Gowariker V.R. , Viswanathan N.V. and Jayadev Sreedhar, "Polymer Science", New Age International P (Ltd.,), Chennai, 2006.
4. Ozin G. A. and Arsenault A. C., "Nanochemistry: A Chemical Approach to Nanomaterials", RSC Publishing, 2005.
5. B.R.Puri, L.R.Sharma, Madan S.Pathana, Principle of physical chemistry, 47th edition, Vishal publishing Co, 2017.

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2. https://www.samcotech.com/what-is-a-boiler-feed-water-treatment-system-how-does-it-work/
3. https://nptel.ac.in/courses/113/101/113101098/
4. https://nptel.ac.in/courses/112/107/112107221/
5. https://nptel.ac.in/courses/113/106/113106093/

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	1	1	-	-	-	1	1
CO2	1	1	1	1	1	1	1	-	1	1	1	-
CO3	1	1	1	1	1	1	1	-	1	1	1	-
CO4	1	1	1	1	1	1	1	1	1	1	1	1
CO5	1	1	1	1	1	1	1	-	1	1	1	1
AVG	1	1	1	1	1	1	1	1	1	1	1	1

JGE1101	ENGINEERING BASICS (Common to all B.E /B.TechProgrammes)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To impart knowledge on the basics of Civil Engineering to the students.
- To impart knowledge on the basics of Mechanical Engineering to the students.
- To impart knowledge on the electric circuits and working principles of Electrical Machines.
- To impart knowledge on the Principles and characteristics of various electronic devices.
- To impart knowledge on the basics of various measuring instruments.

UNIT 1 BASICS OF CIVIL ENGINEERING 11

Introduction to Civil Engineering, Types of buildings, Components of a residential building, Building Materials, Types of slabs, beam, column, lintel, floor and foundation - Types of roofs.

Surveying and Levelling - Linear and Angular Measurements - Introduction to transport system, role of transportation in society - Green Highway. Sources of water, Hydrological cycle, Irrigation Engineering, Rain water harvesting, Environmental pollution, Greenhouse gas emission, Ozone depletion, Global warming - Green building concepts.

UNIT 2 BASICS OF MECHANICAL ENGINEERING 11

Introduction to the concepts of Mechanization and Automation, Robotics - Manufacturing methods - casting, machining, forming operations, Introduction to IC Engine - Working principles of four stroke petrol and diesel engines, Types of power plants - Hydel power plant and thermal power plant, Steam generators - Fire tube boiler and water tube boiler, Thermal systems - Heat exchangers, Radiator and oil cooler, Design of ingenious mechanisms - Parts feeding mechanism.

UNIT 3 ELECTRIC CIRCUITS AND ELECTRICAL MACHINES 7

Basic circuit components - Ohms Law - Kirchhoff's Law-Introduction to AC circuits-waveforms and RMS value - Power and power factor-Principles of operation and characteristics of DC

machines-Transformers-Three phase and single-Phase inductionmotors.

UNIT 4 ELECTRONIC DEVICES & CIRCUITS 7

Types of Materials - Silicon & Germanium - N type and P type materials - Construction and Characteristics: PN Junction diode - Zener Diode - Bipolar Junction Transistor - Field effect Transistors - IGBT - Introduction to operational amplifier - Inverting Amplifier - Non-inverting Amplifier.

UNIT 5 MEASUREMENTS & INSTRUMENTATION 9

Elements of generalized measurement system - Basic terminologies: Accuracy, precision, resolution, sensitivity, linearity, span and range - Errors in measurement - Standards of measurement - calibration - Operating forces: Deflection force, controlling force, damping force - Classification of instruments.

TOTAL 45 PERIODS

COURSE OUTCOMES

The students will be able to

- Gain knowledge on the various fields of Civil Engineering.
- Know the fundamentals of Mechanical Engineering.
- Understand the basic concepts of electric circuits and working principles of electrical machines.
- Gain knowledge on the basics of electronics and apply them in practical situations.
- Choose appropriate instruments for electrical measurement for a specific application.

TEXT BOOKS

1. Shanmugam G and Palanichamy MS, " Basic Civil and Mechanical Engineering", Tata McGraw Hill publishing Co., 2016
2. Venugopal K. and Prahu Raja V., Basic Mechanical Engineering, Anuradha Publishers, Kumbakonam,2000.
3. D P Kothari and I.J Nagarath, Electrical Machines - Basic Electrical and Electronics Engineering , McGraw Hill Education (India) Private Limited, Third Reprint, 2016.

REFERENCES:

1. Palanikumar, K. Basic Mechanical Engineering, ARS Publications, 2010.
2. RamamruthamS.,Basic Civil Engineering, Dhanpat Rai Publishing Co.(P) Ltd.1999.
3. Thereja .B.L., Fundamentals of Electrical Engineering and Electronics , S. Chand & Co. Ltd., 2008.
4. A.K. Sawhney, A Course in Electrical & Electronic Measurements & Instrumentation, Dhanpat Rai and Co, New Delhi, 2010.
5. H.S. Kalsi, Electronic Instrumentation, Tata McGraw-Hill, New Delhi, 2010.

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2. https://nptel.ac.in/courses/105/102/105102088/
3. https://nptel.ac.in/courses/108/105/108105155/
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CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	-	-	-	-	-	-	-
CO2	1	1	1	1	1	-	-	-	-	-	-	-
CO3	1	1	1	1	1	-	-	-	-	-	-	-
CO4	1	1	1	1	1	-	-	-	-	-	-	-
CO5	1	1	1	1	1	-	-	-	-	-	-	-
AVG	1	1	1	1	1	-	-	-	-	-	-	-

JGE1102	PROGRAMMING IN C	L	T	P	C
		3	0	0	3

Course Objectives

- To learn Fundamentals of computing
- To be able to use file operations in C
- To implement programs using basic features of C
- To learn to use C pointers and dynamically allocated memory techniques
- To learn advanced features of the C programming language

UNIT I INTRODUCTION TO PROBLEM SOLVING 9

Simple model of a Computer – Hardware – Software – Data Representation, Problem Solving Techniques – Bottom up design and top down design - applications, Introduction to Algorithms and Flow Chart - Notion of memory, addresses, variables, instructions, execution of instruction- Operating system commands, file editing, compiling, linking, executing a program.

UNIT II C PROGRAMMING 9

Introduction to 'C' programming – structure of a 'C' program – compilation and linking processes. Conversion of simple algorithm to program-Constants, Variables – Data Types – Expressions using operators in 'C' – Managing Input and Output operations – Decision Making and Branching – Looping statements – solving simple scientific and statistical problem

UNIT III ARRAYS AND STRINGS 9

Arrays – Initialization – Declaration – One dimensional and two dimensional arrays - String- String operations –Arrays of strings.

UNIT IV FUNCTIONS AND USER DEFINED DATA TY 9

Function – definition of function – Declaration of function – Pass by value - Pass by reference–Command Line Argument in C-- Recursion - Enumerators – Structures - Unions.

UNIT V POINTERS AND FILES 9

Macros - storage classes - Pointers- Definition – Initialization – Pointers arithmetic – Double Pointers, Basic file operations-Example problems.

TOTAL: 45 Periods

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Design and represent solutions to problems as algorithm and flow chart
- Write simple C Programs using loops and conditional statements
- Write simple C Programs using arrays
- Write simple C Programs using functions
- Write simple C codes using pointers, structures and union

TEXT BOOKS:

1. PradipDey, ManasGhosh, "Programming in C", First Edition, Oxford University Press, 2018
2. Byron S Gottfried, “Programming with C”, Schaum’s Outlines, Third Edition, McGraw- Hill, 2010.

REFERENCES:

1. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2015.
2. Yashavant P. Kanetkar. “Let Us C”, BPB Publications, 2011.
3. Paul J Deitel,Dr.Harvey M.Deitel,"C How to Program", Seventh Edition, Pearson Education, 2016.
4. E. Balagurusamy, “Computing Fundamentals and C Programming”, McGraw-Hill Publishing Company Limited, (2008).
5. Brian W. Kernighan and Rob Pike, “The Practice of Programming” (Chap 1), Pearson Education, 2008

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3. https://www.studytonight.com/c/string-and-character-array.php
4. https://www.tutorialspoint.com/cprogramming/c_functions.htm
5. https://www.guru99.com/c-pointers.html

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	-	-	-	-	3	3	3	-	3
CO2	3	3	3	-	-	-	-	3	3	3	-	3
CO3	3	3	3	-	-	-	-	3	3	3	-	3
CO4	3	3	3	-	-	-	-	3	3	3	-	3
CO5	3	3	3	-	-	-	-	3	3	3	-	3
AVG	3	3	3	-	-	-	-	3	3	3	-	3

JPC1111	Physics and Chemistry Laboratory (Common to all B.E /B.Tech Programmes)	L	T	P	C
		0	0	2	1

OBJECTIVES:

To provide students the firsth and experience of verifying various concepts learnt in theory courses.

LIST OF EXPERIMENTS:

Physics

1. Determination of Young's modulus for the given uniform bar by uniform bending method
2. Determination of wavelength of the diode laser and hence determine the size of the coated powder particle
3. Determination of velocity of Ultrasound using Ultrasonic interferometer and also find the compressibility of the given liquid
4. Determination of moment of inertia of the given circular disc and rigidity modulus of the metal wire using torsional pendulum
5. Determination of Planck' constant using different color filters
6. Determination of Wavelength of spectral lines in mercury spectrum using spectrometer
7. Analysis of I-V Characterization of Solar cell

TOTAL:15 PERIODS

LIST OF EXPERIMENTS

Chemistry

1. Estimation of HCl using Na_2CO_3 as primary standard and Determination of alkalinity in water samples.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper in brass by Iodometry.
6. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.

TOTAL:15 PERIODS

OUTCOMES:

Students will be able

1. Acquire experience in analyzing the elastic materials.
2. Understand the acoustic properties of various liquids.
3. Acquire knowledge in optical properties of solids.
4. Make the student acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
5. Acquaint the students with the determination of molecular weight of a polymer by viscometry

REFERENCES:

1. Practical Fiber Optics, D. Bailey and E. Wright, 2003
2. Jerrad H.G. and Mc Neil D.B. -Theoretical and Experimental Physics
3. Fretter W.B. -Introduction to Experimental Physics, Blackiee
4. J.Mendham, RC Denney, JD Barnes, MJK Thomas, Text book of quantitative chemical analysis, Vogel's, 2008

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3. http://www.mgcub.ac.in/pdf/material/20200428101433e562a8b8e8.pd
4. http://depthome.brooklyn.cuny.edu/physics/lab/phy2/newlabs/Diffraction-grating-ver-2.pdf
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CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	-	1	1	-	-	1	-	1	1
CO2	2	1	1	-	1	1	-	-	1	-	1	1
CO3	2	1	1	-	1	1	-	-	1	-	1	1
CO4	2	1	1	-	1	1	-	-	1	-	1	1
CO5	2	1	1	-	1	1	-	-	1	-	1	1
AVG	2	1	1	--	1	1	-	-	1	-	1	1

JGE1112	Programming in C Laboratory	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

The students should be made to:

- To be exposed to the syntax of C
- To be familiar with programming in C
- To learn to use arrays, strings, functions, pointers, structures and unions in C.
- To Learn the fundamentals of File Programming in C
- To solve simple problems using C

LIST OF PROGRAMS

1. Usage of Basic Linux commands
2. C Programming using Simple statements and expressions
3. Scientific problem solving using decision making and looping.
4. Simple programming for one dimensional and two dimensional arrays.
5. Solving problems using Strings
6. C Programming using Pointers
7. C Programming using user defined functions (Pass by value and Pass by reference)
8. C Programming using Recursion
9. C Programming using structures and union
10. C Programming using enumerated data types
11. C Programming using macros and storage classes
12. C Programming using Files

TOTAL : 60 PERIODS

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- Write simple C Programs
- Able to solve scientific problems using C
- Gain knowledge on the use of functions and arrays

- Use structures, pointers and files in C Programs
- Develop modularized applications in C

TEXT BOOKS:

1. PradipDey, ManasGhosh, "Programming in C - As per the latest AICTE syllabus", First Edition, Oxford University Press, 2018
2. Byron S Gottfried, "Programming with C", Schaum's Outlines, Third Edition, McGraw- Hill, 2010

WEBSITE REFERENCES

1. https://www.javatpoint.com/first-c-program
2. https://www.w3resource.com/c-programming-exercises/
3. https://www.javatpoint.com/functions-in-c
4. https://www.programiz.com/c-programming/c-structures-pointers
5. https://www.sitesbay.com/cprogramming/c-applications

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	-	-	-	2	2	2		2
CO2	3	3	3	3	-	-	-	3	3	3		3
CO3	3	3	3	3	-	-	-	3	3	3		3
CO4	3	3	3	3	-	-	-	3	3	3		3
CO5	3	3	3	3	-	-	-	3	3	3		3
AVG	3	3	3	3	-	-	-	3	3	3		3

JGE1111	DESIGN APPRECIATION LABORATORY (Common to all B.E /B.TechProgrammes)	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES

- To provide exposure to the students with hands-on experience on various basic Engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.
- To kindle your own creativity, ideation and realize the importance of team working.
- To gain knowledge through experience in handling of engineering aggregates.
- To appreciate the use of various mechanisms involved in engineering products.
- To understand the interactions between its subsystems and their functionality.

GROUP A (CIVIL & MECHANICAL)

I CIVIL ENGINEERING PRACTICE 13

Buildings:

(a) Study of plumbing and carpentry components of residential and industrial buildings. Safety aspects.

Plumbing Works:

(a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.
(b) Study of pipe connections requirements for pumps and turbines.
(c) Preparation of plumbing line sketches for water supply and sewage works.
(d) Hands-on-exercise: Basic pipe connections - Mixed pipe material connection - Pipe connections with different joining components.
(e) Demonstration of plumbing requirements of high-rise buildings.

Carpentry using Power Tools only:

(a) Study of the joints in roofs, doors, windows and furniture.
(b) Hands-on-exercise: Wood work, joints by sawing, planing and cutting.

MECHANICAL ENGINEERING PRACTICE 18

Welding:

(a) Preparation of butt joints, lap joints and T- joints by Shielded metal arc welding.
(b) Gas welding practice

Basic Machining:

(a) Simple Turning and Taper turning
(b) Drilling Practice

Sheet Metal Work:

(a) Forming & Bending:
(b) Model making - Trays and funnels.
(c) Different type of joints.

Machine Assembly Practice:

(a) Study of centrifugal pump
(b) Study of air conditioner

Demonstration on:

(a) Smithy operations, upsetting, swaging, setting down and bending. Example - Exercise - Production of hexagonal headed bolt.
(b) Foundry operations like mould preparation for gear and step cone pulley.
(c) Fitting - Exercises - Preparation of square fitting and V - fitting models.

GROUP B (ELECTRICAL & ELECTRONICS)

I ELECTRICAL ENGINEERING PRACTICE 13

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Stair case wiring
4. Measurement of electrical quantities - voltage, current, power & power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.
6. Measurement of resistance to earth of electrical equipment.

II ELECTRONICS ENGINEERING PRACTICE 16

1. Study of Electronic components and equipments - Resistor, colour coding measurement of AC signal parameter (peak-peak, rms period, frequency) using CR.
2. Study of logic gates AND, OR, EX - OR and NOT.
3. Generation of Clock Signal.
4. Soldering practice - Components Devices and Circuits - Using general purpose PCB.
5. Measurement of ripple factor of HWR and FWR.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

On successful completion of this course, the student will be able to

- Fabricate carpentry components and pipe connections including plumbing works.
- Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings.
- Carry out basic home electrical works and appliances.
- Measure the electrical quantities.
- Elaborate on the components, gates, soldering practices.LIST OF

EQUIPMENT FOR A BATCH OF 30 STUDENTS:

CIVIL

1. Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings. 15 Sets
2. Carpentry vice (fitted to work bench) 15 Nos
3. Standard woodworking tools 15 Sets
4. Models of industrial trusses, door joints, furniture joints 5 each
5. Power Tools:
   (a) Rotary Hammer 2 Nos
   (b) Demolition Hammer 2 Nos
   (c) Circular Saw 2 Nos
   (d) Planer 2 Nos
   (e) Hand Drilling Machine 2 Nos
   (f) Jigsaw 2 Nos

MECHANICAL

1. Arc welding transformer with cables and holders 5 Nos
2. Welding booth with exhaust facility 5 Nos
3. Welding accessories like welding shield, chipping hammer, wire brushetc. 5 Sets
4. Oxygen and acetylene gas cylinders, blow pipe and other welding outfit. 2 Nos
5. Centre lathe 2 Nos
6. Hearth furnace, anvil and smithy tools 2 Sets
7. Moulding table, foundry tools 2 Sets
8. Power Tool: Angle Grinder 2 Nos
9. Study-purpose items: centrifugal pump, air-conditioner 1 each

ELECTRICAL

1. Assorted electrical components for house wiring 15 Sets
2. Electrical measuring instruments 10 Sets
3. Study purpose items: Iron box, fan and regulator, emergency lamp 1 each
4. Megger (250V/500V) 1 No
5. Power Tools:

(a) Range Finder 2 Nos

(b) Digital Live-wire detector 2 Nos

ELECTRONICS

1. Soldering guns 10 Nos
2. Assorted electronic components for making circuits 50 Nos
3. Small PCBs 10 Nos
4. Multimeters 10 Nos
5. Study purpose items: Telephone, FM radio, low-voltage power supply

WEB SITE REFERENCES:

1. www.vikaspublishing.com/engineering-practices-lab
2. https://archieve.org/mechanicalengineeeringworkshoplaboratory

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	1	1	-	-	-	1	1
CO2	1	1	1	1	1	1	1	-	1	1	1	-
CO3	1	1	1	1	1	1	1	-	1	1	1	-
CO4	1	1	1	1	1	1	1	1	1	1	1	1
CO5	1	1	1	1	1	1	1	-	1	1	1	1
AVG	1	1	1	1	1	1	1	-	1	1	1	1

SEMESTER II

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JHS1221	Technical English and Soft Skills II	HS	4	2	0	2	3
2	JMA1201	Vector Calculus and Complex Analysis	BS	4	2	2	0	3
3	JBE1223	Applied Science for Electronics and information Engineering	BS	4	2	0	2	3
4	JGE1201	Python Programming	ES	3	3	0	0	3
5	JEC1204	Digital Logic Fundamentals	ES	3	3	0	0	3
6	JGE1202	Engineering Graphics & Design	ES	5	1	0	4	3
7	JNC1261	Environmental Science	NCM	3	3	0	0	0
PRACTICALS								
8	JGE1211	Python Programming Laboratory	ES	4	0	0	4	2
9	JEC1214	Digital Logic Fundamentals Laboratory	ES	4	0	0	4	2
TOTAL				**34**	**16**	**2**	**16**	**22**

JHS1221	TECHNICAL ENGLISH & SOFT SKILLS II	L	T	P	C
	(Common to all B.E /B.TechProgrammes)	2	0	2	3

Course Objectives:

- To make the students of engineering and technology enhance their ability to read and comprehend different texts
- To improve their creative and critical thinking so as to use in demanding contexts
- To equip the learners with the skills of writing convincing job applications and effective reports
- To develop their speaking skills to make technical presentations and participate in group discussions
- To facilitate them to hone their soft skills

UNIT I Technical Writing and Visual Conversion 9

Definitions, Purpose statements, Technical vocabulary, regular and irregular verbs - Process Description and Interpretation of Graphs and Charts

Soft Skills Lab 3

Skimming and scanning, understanding logic and sequencing in reading, inferring the exact meaning of text, making out meaning of pictorial and graphical representations

UNIT II Technical Writing and Guidelines Preparation 9

Conditional clauses, Numerical adjectives, Collocation, verbal analogies - Instructions, Recommendations, Checklist

Soft Skills Lab 3

Comprehensive listening: Listening to telephonic conversations, listening to native accents, short and long conversations from different domains, listening to various pre-recorded conversations and speeches

UNIT III 12

Soft Skills Lab

Listening and speaking practice based on BEC, IELTS and TOEFL

UNIT IV Technical Writing and Business letters 9

Cause and effect, impersonal passive voice, idioms and phrases, words used as nouns and verbs -- Letter writing – job application, business correspondence (letters) - calling for quotations, placing order, complaint letters, preparing a memo, notice and e-mail – itinerary

Soft Skills Lab 3

Group Discussions - Process, Skills, Guidelines, Evaluation, Oral Presentation – Planning, Preparing, Organizing, Presenting

UNIT V Technical Writing and Report Writing 9

Degrees of comparison, editing, Email etiquette, Misspelled words -- Report writing: survey, feasibility, industrial visit, reporting various incidents and accidents, Minutes of meeting

Soft Skills Lab 3

Starting a Career – vision statement, preparing logo and tagline, making short term and long term goals, setting plans

TOTAL: 60 PERIODS

COURSE OUTCOMES:

On the completion of the course, students will be able to

- Read and understand general and technical texts
- Apply creative and critical thinking and communicate their ideas efficiently
- Participate in group discussions and deliver short speeches effectively
- Write effectively and persuasively in academic and workplace contexts
- Face the future challenges confidently and successfully

TEXT BOOKS:

1. Department of English, Anna University, Chennai. Mindscapes: English for Technologists and Engineers. Orient Black Swan, Chennai, 2012.
2. Dhanavel, S.P. English and Communication Skills for Students of Science and Engineering. Orient Black Swan Publications, Chennai, 2011.
3. Rizvi, M. Ashraf, "Effective Technical Communication", Tata McGraw – Hill, 2006.

REFERENCE BOOKS:

1. Ibbotson, Mark, "Cambridge English for Engineering", Cambridge University Press, 2008.
2. English, Laura M & Sarah Lynn, "Business Across Cultures: Effective Communication Strategies", Addison Wesley, 1995.
3. Richard Johnson-Sheehan, "Technical Communication Today" 4th Edition Books Longman Publishing Group, 2011.
4. Porter, Patricia A., and Margaret Grant, "Communicating Effectively in English: Oral Communication for Non-Native Speakers", 2nd Edition, Wadsworth, 1992.
5. Gopalaswamy, Ramesh & Ramesh Mahadevan. ACE of Soft Skills: Attitude, Communication and Etiquette for Success, New Delhi: Pearson, 2010.

Web Links:

1. https://learnenglish.britishcouncil.org/business-english
2. https://www.thebalancecareers.com
3. https://www.deakin.edu.au/students/studying/study-support/academic-skills/report-writing
4. https://www.englishclub.com
5. https://www.ielts.org

Extensive Reading:

- Wells, H.G. The Time Machine, Peacock, India, 2008.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	1	2	3	-	2
CO2	-	-	-	-	-	-	-	1	2	3	-	2
CO3	-	-	-	-	-	-	-	1	2	3	-	2
CO4	-	-	-	-	-	-	-	1	2	3	-	2
CO5	-	-	-	-	-	-	-	1	2	3	-	2
AVG	-	-	-	-	-	-	-	1	2	3	-	2

JMA1201	VECTOR CALCULUS AND COMPLEX ANALYSIS (Common to all B.E /B.TechProgrammes)	L	T	P	C
		2	2	0	3

COURSE OBJECTIVES:

- To familiarize students with concepts of vector calculus and complex analysis in problem solving.
- To build concepts of Laplace transforms leading up to its applications on solving differential equations

UNIT I VECTOR CALCULUS 12

Vector Differentiation: Gradient and directional derivative – Divergence and curl - Vector identities – Irrotational and Solenoidal vector fields

Vector Integration: Line and surface integrals - Green's theorem – Gauss and Stoke's theorems – Verification and evaluation in simple problems.

UNIT II ANALYTIC FUNCTIONS 12

Analytic functions – Zeros and Singularities - Necessary and sufficient conditions for analyticity in Cartesian and polar coordinates (without proof) - Properties – Harmonic conjugates – Construction of analytic functions - Conformal mappings $w = z + c$, cz, $\frac{1}{z}$ – Bilinear transformation.

UNIT III COMPLEX INTEGRATION 12

Cauchy's integral theorem – Cauchy's integral formula – Taylor's and Laurent's series - Types of Singularities and residues – Cauchy's Residue theorem – Application of residue theorem for evaluation of real integrals (Circular contour and semi-circular contour only).

UNIT IV LAPLACE TRANSFORMS 12

Definition - Existence conditions – Transforms of elementary functions – Transforms of unit step function and unit impulse function – Properties with proof – Initial and final value theorems – Transform of periodic functions – Convolution theorem with proof – Problems.

UNIT V INVERSE LAPLACE TRANSFORMS 12

Definition - Evaluation of Inverse Laplace transforms by using properties, partial fractions, residues and convolution theorem - Applications to solution of linear second order ordinary differential equations with constant coefficients.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able

- To understand concepts of vector calculus and evaluate line and surface integrals
- To understand analyticity of complex valued functions, bilinear transformation and conformal mappings
- To evaluate complex integrals using Cauchy's integral and Cauchy's residue theorems
- To find Laplace transforms of functions using definition and properties
- To apply Laplace transform method in solving differential equations

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.

3. P.Anuradha and V.Sudhakar, "Vector Calculus and Complex Analysis", Scitech Publications, 1st Edition, Chennai, 2019.

REFERENCES:

1. 1.Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
2. 2.Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 3rd Edition, 2007.
3. 3.O'Neil, P.V., "Advanced Engineering Mathematics", Cengage Learning India Pvt Ltd, New Delhi, 2007.
4. 4.Sastry, S.S, Engineering Mathematics", Vol. I & II, PHI Learning Pvt. Ltd, 4th Edition, New Delhi, 2014.
5. 5.Wylie, R.C. and Barrett, L.C., "Advanced Engineering Mathematics" Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi, 2012.

WEB REFERENCES

1. https://nptel.ac.in/courses/111/105/111105122/
2. https://nptel.ac.in/courses/111/106/111106141/
3. https://nptel.ac.in/courses/111/107/111107056/
4. https://nptel.ac.in/courses/111/106/111106139/

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	-	-	-	-	2	-	-	2
CO2	2	2	2	2	-	-	-	-	2	-	-	2
CO3	2	2	2	2	-	-	-	-	2	-	-	2
CO4	2	2	2	2	-	-	-	-	2	-	-	2
CO5	2	2	2	2	-	-	-	-	2	-	-	2
AVG	2	2	2	2	-	-	-	-	2	-	-	2

JBE1223	APPLIED SCIENCE FOR ELECTRONICS AND INFORMATION ENGINEERING	L	T	P	C
		2	0	2	3

COURSE OBJECTIVES

- To understand the essential principles of semiconductor device and Electron transport properties.
- To understand the essential principles of magnetic properties of materials.
- To understand the essential principles of optical properties of materials.
- To compare the basic concepts of hybridization with chemical bonding.
- To understand the principles in various analytical techniques.

UNIT I SEMICONDUCTING MATERIAL 7

Intrinsic semiconductor – Carrier concentration – Fermi level – Variation of Fermi level with temperature – Electrical conductivity – Band gap determination – Compound semiconductors - Direct and Indirect band gap- Carrier concentration in N-type and P-type semiconductor – Variation of Fermi level with temperature and Impurity concentration .

UNIT II MAGNETIC AND SUPERCONDUCTING MATERIALS 7

Origin of magnetic moment – Bohr magneton – comparison of Dia, Para and Ferro magnetism – Domain theory – Hysteresis – Soft and Hard magnetic materials– Ferrites and its applications - Superconductivity: properties – Type I and Type II superconductors – BCS theory of superconductivity (Qualitative) – High Tc superconductors .

UNIT III OPTICAL PROPERTIES OF MATERIALS 7

Classification of Optical materials - metals, insulators and semiconductors) – Carrier generation and Recombination processes - Absorption emission and Scattering of light (concepts only) - Photo current in a P-N diode – Solar cell - LED – Organic LED.

UNIT IV CHEMICAL BONDING AND CONDUCTIVITY IN SOLIDS 10

Band theory - Salient feature-Application of band theory **(c**onductor, semiconductor, insulator)-Semiconductor- Types (intrinsic and extrinsic) - Band energy levels for pure silicon crystal, band model of n-type and p-type semiconductance of silicon. Types -Nonelemental semiconductor, Defect semiconductor, Chalcogen semiconductor (definition, properties). Preparation of Germanium- Fractional distillation and crystal growth methods. Fullerenes-preparation, properties and applications. Conducting polymer-Types-mechanism of conduction (polyacetylene) - polyaniline - properties, applications.

UNIT V INSTRUMENTAL METHODS OF ANALYSIS 9

Thermal analysis techniques- Thermo gravimetric analysis and Differential thermal analysis- Principle, instrumentation and applications - Concept of chromatography – Principle, instrumentation and applications of Paper chromatography, Column chromatography, Thin layer chromatography and Gas chromatography. Principle and applications of Conductometric titrations, Potentiometric titrations and pH-metry.

PHYSICS LABORATORY

LIST OF EXPERIMENTS: (ANY 5)

1. Determination of dispersive power of the given solid prism using spectrometer
2. Determination of thickness of the given thin material by forming interference fringes using air- wedge setup
3. Analysis of I-V Characterization of Solar cell
4. Determination of energy gap of the given semiconductor by plotting the graph between current and temperature
5. Determination of acceptance angle of the given fiber cable.
6. Determination of Young's modulus for the given uniform bar by nonuniform bending method

CHEMISTRY LABORATORY

LIST OF EXPERIMENTS (ANY 5)

1. Determination of strength of hydrochloric acid using pH meter.
2. Determination of strength of acids in a mixture of acids using conductivity meters.
3. Conductometric titration of strong acid vs strong base.
4. Estimation of iron content using potentiometer.

6. Estimation of sodium and potassium present in water using a flame photometer.
7. Determination of SAP and FAV values of an oil.
8. Estimation of acetic acid adsorbed on charcoal

TOTAL: 60 PERIODS

COURSE OUTCOMES

At the end of the course, the students will able to

- Acquire knowledge on basics of conductivity of solids, semiconductor physics and its Applications in various devices,
- Get knowledge on magnetic properties of materials and their applications in data storage
- Have the necessary understanding on the functioning of optical materials for Optoelectronics Acquainted with hands-on knowledge in the quantitative chemical analysis through instrumental analysis
- Acquire practical knowledge on interference pattern, semiconductor devices, solar cells and instrumental analysis of acids, bases and heavy metals.

TEXT BOOKS

1. Kasap, S.O.- Principles of Electronic Materials and Devices, McGraw, Education, 2007.
2. Jasprit Singh, Semiconductor Devices: Basic Principles, Wiley 2012.
3. Kittel, C. Introduction to Solid State Physics. Wiley, 2005.
4. Umesh K Mishra &Jasprit Singh, "Semiconductor Device Physics and Design", Springer, 2008.
5. Jain P.C. and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2010.

REFERENCES

1. Garcia, N. & Damask, A. "Physics for Computer Science Students". Springer-Verlag, 2012
2. Wahab, M.A. "Solid State Physics: Structure and Properties of Materials". Narosa Publishing House, 2009.
3. Gurdeep R.Chatwal, Sham K. Anand, Instrumental methods of chemical analysis, Himalaya Publishing House, 2007.
4. Practical Fiber Optics, D. Bailey and E. Wright, 2003.
5. J.Mendham, RC Denney, JD Barnes, MJK Thomas, Text book of quantitative chemical analysis, Vogel's, 2008.

WEBSITE LINK

1. https://nptel.ac.in/courses/115/102/115102025/
2. https://www.youtube.com/watch?v=6QUFuZpCgGw
3. http://tiny.cc/0vhjuz
4. .https://nptel.ac.in/content/storage2/courses/103108100/module7/module7.pdf
5. https://nptel.ac.in/courses/108/108/108108122/

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	-	-	1	-	-	1	-	1	-
CO2	2	1	1	-	-	1	-	-	1	-	1	-
CO3	2	1	1	-	-	1	-	-	1	-	1	-
CO4	2	1	1	-	-	1	-	-	1	-	1	-
CO5	2	1	1	-	-	1	-	-	1	-	1	-
AVG	2	1	1	--	-	1	-	-	1	-	1	-

JGE1201	PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To provide an introduction to Python Programming Language.
- To understand the decision making and looping concepts.
- To understand functions, strings and list in Python.
- To understand tuples, dictionaries and files.
- To know the exception handling and 2D concepts.

UNIT 1 INTRODUCTION TO PYTHON 9

History of Python, Features, Installing Python, Running Python Program, Interactive mode programming, Script Mode Programming, Identifiers, Reserved Words, Indentation, Comments, Variables, Data Types, Data Type Conversion

UNIT 2 DECISION MAKING AND LOOPI.NG 9

Python Operators, Operator Precedence, Decision Making: if Statement, if else Statement, if elif else Statement, nested if Statement, Loops: while loop, for loop, nested loops; Loop Control Statements: continue Statement, break Statement, pass Statement: Iterator and Generator

UNIT 3 FUNCTIONS, STRING, LIST 9

Functions: Pre defined Functions, User defined Functions, Recursion, Lambda Function; String: Functions, methods, modules; Lists: Operations, pre-defined functions, advanced list processing;Packages

UNIT 4 TUPLES, DICTIONARY, FILES 9

Tuples: Tuple Operations and methods, Dictionary: Dictionary Operations and methods; Files: Text Files, Reading and writing Files; Format Operator, Command line argument

UNIT 5 EXCEPTION HANDLING AND GRAPHICS 9

Date & Time Methods, Exception handling clauses, Raising an Exception, User Defined Exception; Simple graphics and image processing, simple 2d drawing - colors and shapes.

Total : 45 Periods

COURSE OUTCOMES :

At the end of the course, the student will be able

- To understand the evolution of Python and run basic python programs.
- To structure simple python programs for solving programs.
- To Decompose larger programs into functions.
- To Understand compound structures like list, tuple, dictionary.
- To Learn basic 2d graphics concepts in Python.

TEXT BOOKS :

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/thinkpython/)
2. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

REFERENCES :

1. John V Guttag, "Introduction to Computation and Programming Using Python'', Revised and expanded Edition, MIT Press , 2013
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Interdisciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
3. Timothy A. Budd, "Exploring Python", Mc-Graw Hill Education (India) Private Ltd.,, 2015.
4. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.
5. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.
6. Paul Gries, Jennifer Campbell and Jason Montojo, "Practical Programming: An Introduction to Computer Science using Python 3", Second edition, Pragmatic Programmers, LLC, 2013.

WEB SITE REFERENCES:

1. https://www.w3schools.com/python/python_reference.asp
2. https://www.pythonforbeginners.com/basics/python-websites-tutorials
3. https://www.programiz.com/python-programming/methods/built-in/list
4. https://www.geeksforgeeks.org/python-convert-dictionary-to-list-of-tuples/
5. https://www.javatpoint.com/python-exception-handling

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	-	-	-	-	-	-	-	-	-
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CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-
AVG	3	3	3	-	-	-	-	-	-	-	-	-

JEC1204	DIGITAL LOGIC FUNDAMENTALS (Common to B.E/B.Tech./ CSE & IT Programmes)	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To design digital circuits using simplified Boolean functions
- To analyze and design combinational circuits
- To analyze and design synchronous sequential circuits
- To analyze and design asynchronous sequential circuits
- To understand Memory and Programmable Logic Devices

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 9

Number Systems - Arithmetic Operations - Binary Codes- Boolean Algebra and Logic Gates - Theorems and Properties of Boolean Algebra - Boolean Functions - Canonical and Standard Forms - Simplification of Boolean Functions using Karnaugh Map - Logic Gates – NAND and NOR Implementations.

UNIT II COMBINATIONAL LOGIC 9

Combinational Circuits – Analysis and Design Procedures - Binary Adder-Subtractor - Decimal Adder - Binary Multiplier - Magnitude Comparator - Decoders – Encoders – Multiplexers.

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC 9

Sequential Circuits - Storage Elements: Latches, Flip-Flops - Analysis of Clocked Sequential Circuits - State Reduction and Assignment - Design Procedure - Registers and Counters.

UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC 9

Analysis and Design of Asynchronous Sequential Circuits – Reduction of State and Flow Tables – Race- free State Assignment – Hazards.

UNIT V MEMORY AND PROGRAMMABLE LOGIC 9

RAM – Memory Decoding – Error Detection and Correction - ROM - Programmable Logic Array – Programmable Array Logic – Sequential Programmable Devices.

TOTAL : 45 PERIODS

OUT COMES:

On Completion of the course, the students should be able to:

- Simplify Boolean functions using KMap
- Design and Analyze Combinational and Sequential Circuits
- Design and Analyze synchronous sequential circuits
- Analyze and design asynchronous sequential circuits
- Implement designs using Programmable Logic Devices

TEXT BOOK:

1. M. Morris Mano and Michael D. Ciletti, “Digital Design”, 5th Edition, Pearson, 2014.

REFERENCES

1. G. K. Kharate, Digital Electronics, Oxford University Press, 2010
2. John F. Wakerly, Digital Design Principles and Practices, Fifth Edition, Pearson Education, 2017.
3. Charles H. Roth Jr, Larry L. Kinney, Fundamentals of Logic Design, Sixth Edition,

CENGAGE Learning, 2013
4. Donald D. Givone, Digital Principles and Design , Tata McGraw Hill, 2003.

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1. https://nptel.ac.in/courses/108/105/108105113/
2. http://www.nptelvideos.com/lecture.php?id=9330
3. https://nptel.ac.in/courses/117/106/117106086/
4. https://nptel.ac.in/courses/117/106/117106086/
5. http://www.nptelvideos.com/lecture.php?id=9616

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	2	2	1	-	-	-	-	2	2
CO2	3	3	1	2	3	1	-	-	-	-	2	2
CO3	3	3	1	2	2	1	-	-	-	-	2	2
CO4	3	3	1	2	2	1	-	-	-	-	2	2
CO5	2	2	1	2	2	1	-	-	-	-	2	2
AVG	3	3	1	2	2	1	-	-	-	-	2	2

JGE1202	ENGINEERING GRAPHICS & DESIGN (Common to all B.E /B.TechProgrammes)	L	T	P	C
		1	0	4	3

OBJECTIVES

- To understand the importance of graphics in engineering
- To develop skills in preparation of basic drawing
- To improve their technical communication skill in the form of communicative drawing
- To impart knowledge about standard principle of orthographic projection of objects.
- To improve their visualization skills for developing new products.

UNIT I PLANE CURVES AND ORTHOGRAPHIC PROJECTION 15

Conics - Construction of ellipse, Parabola and hyperbola by eccentricity method - Construction of cycloid - construction of involutes of squad and circle - Drawing of tangents and normal to the above curves.

Representation of Three Dimensional objects - General principles of orthographic projection - Need for importance of multiple views and their placement - First angle projection - layout views - Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES 15

Projection of points and straight lines located in the first quadrant - Determination of true lengths and true inclinations - Projection of polygonal surface and circular lamina inclined to both reference planes.

UNIT III PROJECTION OF SOLIDS 15

Projection of simple solids like prisms, pyramids, cylinders and cones when the axis is inclined to one reference plane by change of position method.

UNIT IV SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES 15

Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other - Obtaining true shape of section.

Development of lateral surfaces of simple and truncated solids - Prisms, pyramids, cylinders and cones - Development of lateral surfaces of solids with cylindrical cut-outs and square cut-outs, perpendicular to the axis.

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 15

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones. Perspective projection of prisms, pyramids and cylinders by visual ray method.

TOTAL: 75 PERIODS

COURSE OUTCOMES:

On successful completion of this course, the student will be able to

- Familiarize with the fundamentals and standards of engineering graphics.
- Perform free hand sketching of basic geometrical constructions and multiple views of objects.
- Project orthographic projections of lines and plane surfaces.
- Draw projection of solids and development of surfaces.
- Interpret isometric and perspective view of objects.

TEXT BOOKS:

1. Natarajan K.V., “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2009.
2. Venugopal K and Prabhu Raja V., “Engineering Graphics”, New Age International (P) Limited, 2008.
3. Bhatt N.D. and Panchal V.M., ―Engineering Drawing‖, Charotar Publishing House, 50th Edition,2010

REFERENCES:

1. Basant Agarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
2. Gopalakrishna K.R., “Engineering Drawing” (Vol. I & II combined), Subhas Stores, Bangalore, 2007.
3. Luzzader, Warren.J and Duff,John M., “Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production”, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
4. N S Parthasarathy and Vela Murali, “Engineering Graphics”, Oxford University, Press, New Delhi, 2015.
5. Shah M.B and Rana B.C., “Engineering Drawing”, Pearson, 2nd Edition, 2009.

Publication of Bureau of Indian Standards:

1. IS 10711 - 2001: Technical products Documentation - Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) - 2001: Technical products Documentation - Lettering.
3. IS 10714 (Part 20) - 2001 & SP 46 - 2003: Lines for technical drawings.
4. IS 11669 - 1986 & SP 46 - 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) - 2001: Technical drawings - Projection Methods.

Web site References:

1. www.pdfdrive.com/engineering drawing-books.html
2. https://freevideolectures.com
3. https://nptel.ac.in/courses
4. https://nptel.ac.in/courses/105/104/105104148/
5. https://nptel.ac.in/courses/112/103/112103019/

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	-	1	1	-	1	1	1	1	1
CO2	1	1	1	1	1	1	1	-	1	1	1	-
CO3	1	-	1	1	1	-	1	1	1	1	1	1
CO4	-	1	1	1	-	1	1	1	1	1	1	1
CO5	1	1	1	-	1	1	1	1	1	1	-	1
AVG	1	1	1	1	1	1	1	1	1	1	1	1

JNC1261	ENVIRONMENTAL SCIENCE	L	T	P	C
		3	0	0	0

COURSE OBJECTIVES:

- To study the interrelationship between living organismsand the environment.
- To find and implement scientific, technological and environmental problems due to pollution.
- To study the various natural resources and the responsibility of the individual to conserve it.
- To study the social issues over the environment.
- To get knowledge on population explosion, human rights and value education.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIO DIVERSITY 9

Definition, scope and importance of environment - need for public awareness - concept of an ecosystem - structure and function of an ecosystem - 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) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) - Introduction to biodiversity definition: genetic, species and ecosystem diversity - value of biodiversity - threats to biodiversity - conservation of biodiversity: In- situ and ex-situ conservation of biodiversity.

UNIT II ENVIRONMENTAL POLLUTION 9

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 municipal solid wastes - Role of an individual in prevention of pollution.

UNIT III NATURAL RESOURCES 9

Forest resources: Use and over-exploitation, 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, floods, 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- effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. Energy resources: renewable and non renewable energy sources, Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification - role of an individual in conservation of natural resources.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 9

Water conservation- watershed management - resettlement and rehabilitation of policy. - consumerism and waste products - environment production act - Air (Prevention and Control of Pollution) act - Water (Prevention and control of Pollution) act - Wildlife protection act - Forest conservation act - enforcement machinery involved in environmental legislation - central and state pollution control boards - Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 9

Human population growth, variation among nations population explosion - family welfare programme - environment and human health - human rights - value education - HIV / AIDS - women and child welfare - role of information technology in environment and human health.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of course completion, students will be able to

- Explain about ecosystems, their structure and function to conserve biodiversity.
- Recognize the level of environmental pollution and their control measures.
- Explain about the various types of natural resources and role of a human being in maintaining a clean sustainable environment for the future generations.
- Identify the social problems in the environment to reduce social issues.
- Understand environment and human health - human rights - value education, and the role of information technology in environment and human health.

TEXT BOOKS:

1. ErachBharucha, - Textbook of Environmental Studies, Universities Press (I) PVT, LTD, Hyderabad, 2015.
2. Benny Joseph, Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.

REFERENCES:

1. Dharmendra S. Sengar, Environmental law', Prentice hall of India PVT LTD, New Delhi, 2007.
2. Rajagopalan, R, Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.

3. Gilbert M. Masters, Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
4. G. Tyler Miller and Scott E. Spoolman, - Environmental Science, Cengage Learning India PVT, LTD, Delhi, 2014.

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1.https://moef.gov.in/e-books/
2.https://www.csindia.org/understanding-eia-383
3.https://nptel.ac.in/courses/120108004
4.https://nptel.ac.in/courses/107/103/107103081/
5.https://nptel.ac.in/courses/109/104/109104045/

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	3	2	-	-	1	-
CO2	1	-	-	-	-	-	3	2	-	-	1	-
CO3	1	-	-	-	-	-	3	2	-	-	1	1
CO4	1	-	-	-	-	2	3	2	-	-	1	-
CO5	1	-	-	-	-	2	3	2	-	-	1	-
AVG	1	-	-	-	-	2	3	2	-	-	1	1

JGE1211	PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

Course Objectives

- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- To implement basic 2D diagrams.

LIST OF PROGRAMS

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Guess an integer number in a rang
6. Insert a card in a list of sorted cards.
7. Multiply matrices
8. Programs that take command line arguments (word count)
9. Find the most frequent words in a text read from a file
10. Create an User defined Exception
11. Draw a 2d circle and square

PLATFORM NEEDED

Python 3 interpreter for Windows/Linux

TOTAL: 60 PERIODS

COURSE OUTCOMES :

At the end of the course, the student will be able to

Co1 : Write, test, and debug simple Python programs.
Co2 : Implement Python programs with conditionals and loops.
Co3 : Develop Python programs step-wise by defining functions and calling them.
Co4 : Use Python lists, tuples, dictionaries for representing compound data.
Co5 : Draw 2d graphic diagrams in Python.

WEBSITE REFERENCE:

1. https://www.programiz.com/python-programming/examples
2. https://www.javatpoint.com/python-condition-and-loops-programs
3. https://realpython.com/python-lists-tuples/
4. https://www.tutorialsteacher.com/python/python-user-defined-function
5. https://www.cdslab.org/python/notes/visualization/2d/2d.html

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	-	3	-	-	3	3	3	-	3
CO2	3	3	3	-	3	-	-	3	3	3	-	3
CO3	3	3	3	-	3	-	-	3	3	3	-	3
CO4	3	3	3	-	3	-	-	3	3	3	-	3
CO5	3	3	3	-	3	-	-	3	3	3	-	3
AVG	3	3	3	-	3	-	-	3	3	3	-	3

		L	T	P	C
JEC1214	**DIGITAL LOGIC FUNDAMENTALS LABORATORY (Common to B.E/B.Tech./ CSE & IT Programmes)**	**0**	**0**	**4**	**2**

OBJECTIVES:

- To understand the various basic logic gates
- To design and implement the various combinational circuits
- To design and implement combinational circuits using MSI devices.
- To design and implement sequential circuits

LIST OF EXPERIMENTS

1. Verification of Boolean Theorems using basic gates.
2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters.
3. Design and implement Half/Full Adder and Subtractor.
4. Design and implement combinational circuits using MSI devices:
    - 4 – bit binary adder / subtractor
    - Parity generator / checker
    - Magnitude Comparator
5. Application using multiplexers.
6. Design and implement shift-registers.
7. Design and implement synchronous counters.

8. Design and implement asynchronous counters.
9. Design and implementation of a simple digital system (Mini Project).

TOTAL: 60 PERIODS

OUTCOMES:

Upon Completion of the course, the students will be able to:

- Implementation of basic logic gates
- Implement simplified combinational circuits using basic logic gates
- Implement combinational circuits using MSI devices
- Implement sequential circuits like registers and counters

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

1. Digital trainer kits - 30

2. Digital ICs required for the experiments in sufficient numbers

WEBSITE REFERENCES:

- http://vlabs.iitkgp.ac.in/dec/
- www.electronicsfor/you.com

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	2	1	-	-	-	1	3
CO2	3	3	2	2	1	2	1	-	-	-	1	3
CO3	3	3	2	2	1	2	1	-	-	-	1	3
CO4	3	3	2	2	1	2	1	-	-	-	1	3
CO5	3	3	2	2	1	2	1	-	-	-	1	3
AVG	3	3	2	2	1	2	1	-	-	-	1	3

SEMESTER-III

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JMA1303	Discrete Mathematics and Number Theory	BS	4	2	2	0	3
2	JCS1301	Data Structures	ES	3	3	0	0	3
3	JCS1302	Database Management Systems	PC	3	3	0	0	3
4	JCS1303	Computer Architecture	PC	3	3	0	0	3
5	JCS1321 (Integrated)	Object Oriented Programming	PC	4	2	0	2	3
PRACTICALS								
6	JPT1001	Soft Skill and Aptitude- I	EEC	2	0	0	2	*
7	JCS1311	Data Structures Laboratory	ES	4	0	0	4	2
8	JCS1312	Database Management Systems Laboratory	PC	4	0	0	4	2
TOTAL				27	13	2	12	19

JMA1303	DISCRETE MATHEMATICS AND NUMBER THEORY	L	T	P	C
		2	2	0	3

COURSE OBJECTIVES:

- To equip students with the ability to deal with abstraction by way of Propositional logic.
- To familiarize students in combinatorial problems and its applications.
- To enable students understand basics of graph theory and algorithms.
- To introduce fundamental concepts in number theory and its applications.
- To conceptualize congruence, its applications and standard theorems.

UNIT I LOGIC AND PROOFS 12

Propositional logic – Propositional equivalences - Predicates and quantifiers – Nested quantifiers – Rules of inference - Introduction to proofs – Proof methods and strategy.

UNIT II COMBINATORICS 12

Mathematical induction – Strong induction and well ordering – The basics of counting – The pigeonhole principle – Permutations and combinations – Recurrence relations – Solving linear recurrence relations – Generating functions – Inclusion and exclusion principle and its applications.

UNIT III GRAPHS 12

Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths.

UNIT IV DIVISIBILITY THEORY AND CANONICAL DECOMPOSITIONS 12

Division algorithm – Base-b representations – Number patterns – Prime and composite numbers – GCD – Euclidean algorithm – Fundamental theorem of arithmetic – LCM – Linear Diophantine equations.

UNIT V CONGRUENCES AND CLASSICAL THEOREMS 12

Congruences – Linear Congruences - Applications: Divisibility tests - Modular exponentiation - Chinese remainder theorem – 2 x 2 linear systems - Wilson‘s theorem – Fermat‘s little theorem – Euler‘s theorem – Euler‘s Phi functions – Tau and Sigma functions.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able

CO1:To understand propositional logic and various proof methods and strategy.

CO2:To use counting principles and mathematical induction in solving combinatorial problems.

CO3:To demonstrate efficient use of graph theoretic concepts in Solving connectivity and shortest path problems.

CO4:To understand divisibility theory and canonical decompositions of number theory.

CO5:To solve simple problems using classical theorems of number theory.

TEXT BOOKS:

1. Rosen, K.H., "Discrete Mathematics and its Applications", 7th Edition, Tata McGraw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition, 2011.
2. Tremblay, J.P. and Manohar.R, " Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.
2. Koshy, T., ―Elementary Number Theory with Applications, Elsevier Publications, New Delhi, 2002.

REFERENCES

1. Grimaldi, R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition, Pearson Education Asia, Delhi, 2007.
2. Lipschutz, S. and Mark Lipson., "Discrete Mathematics", Schaum‘s Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.
3. Koshy, T. "Discrete Mathematics with Applications", Elsevier Publications, 2006.
4. Lidl, R. and Pitz, G, "Applied Abstract Algebra", Springer Verlag, New Delhi, 2nd Edition, 2006.
5. Niven, I., Zuckerman.H.S., and Montgomery, H.L., ―An Introduction to Theory of Numbers‖, John Wiley and Sons , Singapore, 2004.
6. San Ling and Chaoping Xing, ― Coding Theory – A first Course, Cambridge Publications, Cambridge, 2004.

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1. https://nptel.ac.in/courses/111/106/111106086/
2. https://nptel.ac.in/courses/111/106/111106155/
3. https://nptel.ac.in/courses/111/106/111106102/
4. https://nptel.ac.in/courses/111/101/111101137/
5. https://nptel.ac.in/courses/111/103/111103020/

CO-PO MAPPINGS

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	-	-	2	-	-	2
CO2	3	3	2	2	-	-	-	-	2	-	-	2
CO3	3	3	2	2	-	-	-	-	2	-	-	2
CO4	3	3	2	2	-	-	-	-	2	-	-	2
CO5	3	3	2	2	-	-	-	-	2	-	-	2
AVG	3	3	2	2	-	-	-	-	2	-	-	2

JCS1301	DATA STRUCTURES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To be familiar withpointers and structures in C
- To understand the concepts of ADTs
- Touselinear data structures–lists, stacks, and queues
- To apply Tree and Graph structures
- To understand sorting, searching and hashing algorithms

UNIT I DATA STRUCTURES IN C –LISTS 9

Dynamicmemory allocation using mall oc(), free()-Pointers to Structure-Introduction to Data Structures– Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked listimplementation – Singly linkedlists- Circularly linkedlists– Doubly-linkedlists – Applications oflists–Polynomial Manipulation

UNIT II LINEAR DATA STRUCTURES-STACK AND QUEUE 9

Stack ADT – Array implementation of stack – Linked List implementation of stack– Applications ofstackADT–Infix to Postfix Notation, Evaluatingarithmeticex pressions– QueueADT–Array implementation of Queue – Linked List implementation of Queue – Circular queue – Applications ofqueues

UNIT III NON-LINEAR DATA STRUCTURES- TREES 9

TreeADT–Tree terminologies–BinaryTreeADT-Tree traversals–Expression trees–Binary search treeADT-AVLTrees –Complete binarytree–Fullbinary tree-Heap–Priority queue using Heap–B-Tree-B+Tree

UNIT IV NON-LINEAR DATA STRUCTURES-GRAPHS 9

Graphs - Definition – Representation of Graph – Types of graph – Breadth-first traversal– Depth-first traversal – Topological Sort – Applications of graphs-Shortest path algorithm – Dijkstra's algorithm-Minimums panning trees-Prim'sAlgorithm-Kruskal'sAlgorithm

UNIT V SEARCHING, SORTING AND HASHING TECHNIQUES 9

Searching-LinearSearch–BinarySearch.Sorting–Bubblesort–Selectionsort–Insertionsort
Hashing-Hash Functions –Separate Chaining–Open Addressing–Rehashing

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

- Write programs using pointers and structures in C
- Implement abstract data types of linear data structures
- Apply the different linear data structures to problem solutions
- Apply the different non-linear data structures to problem solutions
- Implement the various sorting and hashing algorithms

TEXT BOOKS

1. Mark Allen Weiss,"Data Structures and Algorithm Analysis in C",2nd Edition, Pearson E ducation,2014.
2. Yashavant Kanetkar, "Understanding Pointers in C&C++", 5th Revised & Updated Edition, BPB Publications, 2018.

REFERENCES

1. Reema Thareja,"Data Structures Using C", Second Edition, Oxford University Press, 2014.
2. E.Balagurusamy, "Data Structures Using C", McGraw Hill Education; First edition 2017.
3. Jeri R.Hanly, Elliot B.Koffman, "Problem Solving and Program Design in C", 7th Edition, 2012, Prentice-Hall.
4. A.KSharma, "Data Structures usingC", Second Edition, Pearson Education India 2013.
5. Aaron M.Tenenbaum, Yedidyah Langsam, MosheJ. Augenstein, "Data Structures Using C", Pearson Education; First edition 2019.
6. Aho, Hopcroft and Ullman, "Data Structures andAlgorithms", Pearson Education, 2002.

WEBSITE REFERENCES

1.https://nptel.ac.in/courses/106/102/106102064/
2.https://www.hackerearth.com/practice/data-structures/arrays/1-d/tutorial/
3.https://www.geeksforgeeks.org/data-structures
4.https://www.tutorialspoint.com/data_structures_algorithms/index.htm

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	3	3	1	-	-	-	2	3	3	-	3	2	3	1
CO-2	3	3	3	-	-	-	-	3	3	3	-	3	3	3	3
CO-3	3	3	3	1	-	-	-	3	3	3	-	3	3	3	1
CO-4	3	3	3	1	-	-	-	3	3	3	-	3	3	3	2
CO-5	3	3	3	1	-	-	-	3	3	3	-	3	2	3	2

JCS1302	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To learn the working of various datamodels and get exposed to SQL querying
- To design data base with ERmodels and understand the significance of normalization
- To understand the fundamental concepts of transaction processing- concurrency control techniques and recovery procedures
- To have an introductory knowledge about the Storage and Query processing Techniques
- To familiarize the students with different types of advanced databases

UNIT I DATA MODELS AND QUERYING 9

Purpose of Data base System–Views of data–Data Models–Data base System Architecture
Introduction to relational databases–Relational Model–Keys–Relational Algebra–SQL fundamentals–Advanced SQL features–Embedded SQL–Dynamic SQL.

UNIT II DESIGN AND NORMALIZATION 9

Entity-Relationship model – E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping
Functional Dependencies–Non-loss Decomposition–First-Second-Third Normal Forms
Dependency Preservation – Boyce/Codd Normal Form – Multi-valued Dependencies and
Fourth Normal Form–Join Dependencies and Fifth Normal Form.

UNIT III TRANSACTION PROCESSING 9

Transaction Concepts–ACID Properties– Schedules–Serializability–ConcurrencyControl– Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Transaction Recovery avePoints – Isolation Levels–SQL Facilities for Concurrency and Recovery

UNIT IV IMPLEMENTATION TECHNIQUES 9

RAID – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview–Query optimization.

UNIT V ADVANCED DATABASE SYSTEMS 9

Distributed Databases Architecture – Data Storage – Transaction Processing – Object-based Data bases Object Database Concepts –Object-Relational Features– ODMG Object Model– ODL–OQLXML Databases –XML Hierarchical Model –DTD–XMLSchema– XQuery–DatabaseConnectivity–Fundamentals of Database security.

TOTAL 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

- Design efficient databases and extract information with SQL queries
- Develop preliminary design of normalized databases
- Analyze the various stransactions and provide smooth access of data
- Create organized databases and write optimized queries
- Learn the various advanced database concepts and security

TEXTBOOKS

1. Abraham Silberschatz, HenryF. Korth, S.Sudharshan, "Database System Concepts", Seventh Edition, TataMcGraw Hill, 2020.
2. RamezElmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Sixth Edition, Pearson Education, 2015.

REFERENCES

1. Raghu Ramakrishnan, "Database Management Systems", Fourth Edition, McGraw-Hill College Publications, 2015.
2. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2008.
3. G.K.Gupta, "Database Management Systems" ,Tata McGrawHill, 2011.

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1. https://www.tutorialspoint.com/dbms/index.htm
2. https://www.studytonight.com/dbms/
3. https://www.w3schools.in/dbms/
4. https://sqlzoo.net/

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	2	3	3	2	2	3	3	2	3	3	1	2	2	3
CO-2	3	3	3	3	3	2	2	2	3	1	2	3	3	3	1
CO-3	3	2	3	1	3	3	3	2	3	3	3	3	3	2	2
CO-4	1	3	3	2	3	3	2	3	3	2	3	2	3	3	2
CO-5	3	3	3	2	2	2	3	3	2	3	2	3	2	3	2

JCS1303	COMPUTER ARCHITECTURE	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To understand the basic structure and operations of a computer
- To familiarize with arithmetic and logic unit and implementation of fixed-point and floating-point arithmetic operations
- To expose the concept of pipelining
- To understand parallelism and multi-core processors
- To learn cache memories and virtual memory

UNIT-I BASIC STRUCTURE OF A COMPUTER SYSTEM 9

Functional Units – Basic Operational Concepts – Performance – Instructions:Operations, Operands – Instruction Representation – Logical Operations – Decision Making – Addressing and Addressing Modes

UNIT-II ARITHMETIC FOR COMPUTERS 9

Fixed-point Representation–Addition,Subtraction,Multiplication,Division–Floating-point Representation–Floating-point Operations-Subword Parallelism

UNIT-III PROCESSOR AND CONTROL UNIT 9

Basic MIPS Implementation–Building a Datapath–Control Implementation Scheme–Pipelining–Pipelined Datapath and Control–Handling Data Hazards –Handling Control Hazards–Exceptions.

UNIT-IV PARALLELISIM 9

Parallel Processing Challenges – Flynn‘s Classification – Hardware Multithreading – Multi-coreProcessors and other Shared Memory Multiprocessors – Introduction to Graphics Processing Units,Clusters, Warehouse Scale Computers.

UNIT-V MEMORY & I/OSYSTEMS 9

Memory Hierarchy–Memory Technologies–Cache Basics–Measuring and Improving Cache Performance–Virtual Memory, TLB’s –Accessing I/O Devices–DMA and Interrupts.

TOTAL:45 Periods

COURSE OUTCOMES

Upon completion of the course,the students will be able to:

- Understand the basic structure of computers, operations and instructions
- Design arithmetic and logic unit
- Realize pipelined execution and design control unit
- Familiarize in the concepts of parallel processing architectures
- Acquire knowledge in various memory systems and I/O communication

TEXTBOOKS

1.DavidA.Patterson and JohnL.Hennessy,"Computer Organization and Design:The Hardware/Software Interface",Fifth Edition,Morgan Kaufmann/Elsevier,2014.

2.CarlHamacher, ZvonkoVranesic,SafwatZaky and Naraig Manjikian,"Computer Organization and Embedded Systems",Sixth Edition,TataMc Graw Hill,2012.

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1.V.Carl Hamacher ,Zvonko G.Varanesic and SafatG.Zaky,"Computer Organization",VI Edition, McGraw Hill Inc,2012.

2.William Stallings"Computer Organization and Architecture", Seventh Edition, Pearson Education,2006.

3.Vincent P.Heuring, HarryF.Jordan," Computer System Architecture", Second Edition, Pearson Education, 2005.

4.Govindarajalu, "Computer Architecture and Organization, Design Principles and Applications",First Edition,Tata McGraw Hill, New Delhi,2005.

5.JohnP.Hayes,"Computer Architecture and Organization",Third Edition,Tata McGraw Hill,1998.

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1. https://nptel.ac.in/courses/106/105/106105163/
2. https://people.inf.ethz.ch/omutlu/lecture-videos.html
3. https://freevideolectures.com/course/2274/computer-architecture

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	2	3	1	1	2	3	3	2	3	3	1	2	2	3
CO-2	3	3	3	1	1	2	2	2	3	1	2	3	3	3	2
CO-3	3	2	3	1	1	3	3	2	3	3	3	3	3	2	2
CO-4	1	3	3	1	1	3	2	3	3	2	3	2	3	3	2
CO-5	3	3	3	1	1	2	3	3	2	3	2	3	2	3	2

JCS1321	OBJECT ORIENTED PROGRAMMING	L	T	P	C
		2	0	2	3

COURSE OBJECTS

- Tounderstand the basic concepts of Object Oriented Programming in Java
- To know the principles of in heritance and interfaces
- To define exceptions and use of I/O streams
- To learn the concepts of threads and generics classes
- To design and build simple Graphical User Interfaces usings wing components

UNIT-I INTRODUCTION TO OOP AND JAVA FUNDAMENTALS 12

Object Oriented Programming –objects and classes –features of OOP-OOP in Java –CharacteristicsofJava–TheJavaEnvironment-JavaSourceFile–Compilation.Fundamental rogramming Structures in Java –constructors, methods – method overloading, access specifies -static members - Comments, Data Types, Variables, Operators, Control Flow, Arrays, Packages, and Naming Conventions, Case study-simple program using objects, classes and constructors.

UNIT-II INHERITANCE AND INTERFACES 12

Inheritance –Super classes-sub classes –Protected members –constructors in sub classes-the Object class –abstract classes and methods-final methods and classes –Interfaces –defining an interface, implementing interface, differences between classes and interfaces and extending interfaces-Object cloning-inner classes, Reflection, Array Lists –Strings, Case study- program using inheritance strings and array List.

UNIT - III EXCEPTION HANDLING AND I/O 12

Exceptions -exception hierarchy -throwing and catching exceptions –built-in exceptions, creating own exceptions, Stack Trace Elements. Input / Output Basics –Streams –Byte streams and Character streams–Reading and Writing Console–Reading and Writing Files, Case study-program using Exceptions and File Handling

UNIT- IV MULTI THREADING, GENERIC PROGRAMMING AND ADVANCED JAVA 12

Differences between multi-threading and multit asking, thread life cycle, creating threads, synchronizing threads, Inter-thread communication, **Fibers,** daemonthreads, thread groups. Generic Programming–Generic classes –generic methods –Bounded Types –Restrictions and Limitations, Case study-program using Multi threading and Generic Programming.

UNIT-V EVENT DRIVEN PROGRAMMING 12

Graphics programming -Frame –Components -working with 2D shapes -Using color, fonts, and images -Basics of event handling -event handlers -adapter classes -actions -mouse events - AWTevent hierarchy -Introduction to Swing –layout management -Swing Components –Text Fields, TextAreas –Buttons-Check Boxes –Radio Buttons –Lists-choices-Scrollbars –Windows –Menus– Dialog Boxes, Case study-Program using AWT components and Swing Components.

TOTAL: 60 PERIODS

LIST OF EXPERIMENTS

1. Write a Java Program to capture the personal details of a person.
2. Develop an application with Employee class with Emp_name, Emp_id, Address, Mail_id,Mobile no as members. Inherit the classes, Programmer, Assistant Professor, Associate Professor and Professor from employee class. Add Basic Pay (BP) as the member of all the inherited classes with 97% of BP as DA, 10 % of BP as HRA, 12% of BP as PF, 0.1% of BP for staff club fund. Generate pay slips for the employees with their gross and net salary.
3. Write a program to perform string operations using Array List.
4. Write a program to do the arithmetic operations with required exceptions.
5. Write a program to read a file and print on the console
6. Write a java program that implements a multi-threaded application thath as three threads. First thread generates a random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print avalue of cube of the number.
7. Write a java program to find the maximum value from the given type of elements using agenericfunction.
8. Design alogin screen using JAVAAWT components.

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

- Develop Java programs using OOP principles
- Develop Java programs using inheritance and interfaces concepts
- Build Java applications using exceptions, I/O streams and Java beans
- Develop Java applications with threads and generic classes
- Develop interactive applications usings wings

TEXTBOOKS

1.Herbert Schildt,"Java The complete reference",11th Edition, McGraw Hill Education, 2017.

2.Cay S. Horstmann, Garycornell,"CoreJavaVolume–I Fundamentals", 9th Edition, Prentice Hall, 2013.

REFERENCES

1.Paul Deitel, HarveyDeitel,"Java SE 8 for programmers", 3rd Edition, Pearson, 2015

2.Steven Holzner,"Java2 Black book", Dream tech press, 2011.

WEB REFERENCES

1. https://www.w3schools.com/java/java_intro.asp
2. https://www.tutorialspoint.com/java/index.html
3. https://www.javatpoint.com/java-tutorial
4. https://developer.ibm.com/tutorials/j-introtojava1/

Mapping of CO withPO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	2	3	1	2	2	3	3	2	3	3	1	2	2	3
CO-2	3	3	3	-	-	2	2	2	3	1	2	3	3	3	1
CO-3	3	2	3	-	-	3	3	2	3	3	3	3	3	2	2
CO-4	1	3	3	-	-	3	2	3	3	2	3	2	3	3	2
CO-5	3	3	3	-	-	2	3	3	2	3	2	3	2	3	2

JPT1001	SOFT SKILLS AND APTITUDE - I	L	T	P	C
		0	0	2	*

COURSE OBJECTIVES

- To help students groom their personality and develop their skill of building social relationships
- To improve the personality traits of students and their creativity
- To help students gain knowledge in rational thinking and aptitude
- To make students think logically and judiciously
- To help student acquire technical skills in C Programming language

UNIT-I SOFT SKILLS AND APTITUDE-I 6

Self-Realization – Self Motivation – Relationship Building – Personality Enrichment – PersonalityTraits–Intra Personal Communication–Inter Personal Communication–Behavioral Based Perception–Attitude & Behavior–SWOT Analysis

UNIT-II SOFT SKILLS AND APTITUDE–II 6

Dimensions of Personality – Self Confidence – Open Mindedness – Acceptance – Creativity – Strategies for developing creativity–Over coming mythsofcreativity–Presence of Mind– Staying Focused–Self Acceptance–Self Growth

UNIT-III QUANTITATIVE APTITUDE 6

Number system–Divisibility Rule–Simplification– Surds and Indices–Squareroot and Cuberoot –Averages– Percentage

UNIT-IV LOGICAL REASONING 6

Number series–Alphabet series–Alphabet test–Word test–Letter Arrangement–Word Arrangement–Coding and Decoding–Analogy

UNIT-V TECHNICAL APTITUDE IN C-I 6

Technical aptitude in C:Program Structure – Data types – Variables – Constants – Operators – Decision Making-Switch statement–Looping statements–Functions–Call by reference-Recursive Arrays, single dimensional, Multi-dimensional

TOTAL: 30 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

- Build better relationship with all in their social settings
- Engage in creative activities focusing on their career
- Solve the real time and complex problems in aptitude
- Solve critical reasoning and real time application problems
- Apply their knowledge in the basics of C programming

TEXTBOOKS

1. Dr.R.S.Aggarwal,"Quantitative Aptitude", S.Chand Publishing, 2020.
2. Dr.R.S.Aggarwal,"A Modern Approach to Verbal Reasoning", S. Chand Publishing, 2017.
3. Dr.R.S.Aggarwal,"A Modern Approach to Non-Verbal Reasoning", S.Chand Publishing, 2017.
4. Pradip Dey, ManasGhosh, "Fundamentals of Computing and Programming in C", First Edition, Oxford University Press, 2009.
5. Yashavant P.Kanetkar. "Let Us C", BPB Publications, 2011.

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1. https://www.indiabix.com/aptitude/questions-and-answers/
2. https://m4maths.com/placement-puzzles.php
3. https://www.youtube.com› watch/average
4. https://www.youtube.com›watch/codinganddecoding
5. https://www.youtube.com›watch/cprograms
6. https://www.youtube.com›watch/selfconfidence
7. https://www.youtube.com› watch/motivation

Mapping of CO with PO/PSO

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	2	3	2	-	-	1	3	2	1	-	-
CO2	-	2	3	2	-	-	1	3	2	1	-	-
CO3	-	2	3	2	-	-	1	3	2	1	-	-
CO4	-	2	3	2	-	-	1	3	2	1	-	-
CO5	-	2	3	2	-	-	1	3	2	1	-	-

JCS1311	DATA STRUCTURES LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES

- To implement linear and non-linear data structures
- To identify and implement appropriated at a structures for various applications
- To execute different operations of search trees
- To implement various sorting and searching algorithms
- To implement hashing techniques

LIST OF PROGRAMS

Implement the following programs

1. List ADT using Python with insert, delete, search and modify operations
2. Linked list
3. Polynomial Manipulation using list ADT
4. Stack using Python
5. a. Stack ADT using arrays
   b. Stack ADT using linked list
6. a. Queue ADT using arrays
   b. Queue ADT using linked list
7. Infixto Post fix conversion
8. Circular queue
9. Binary Search Trees and Tree traversals
10. AVL Trees
11. BFS and DFS of a graph
12. Bubblesort, Selection sort, Insertion sort using Python
13. Linear search and Binary search using Python
14. Hashing-Linear Probing and Quadratic Probing

TOTAL 60 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

1. Identify appropriate data structures for specified problem definition
2. Implement operations like searching, insertion, deletion, traversing mechanism etc. on various data structures
3. Apply appropriate linear /non-linear data structure operations for solving a given problem
4. Implement appropriate sorting/searching technique for given problem
5. Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.

TEXT BOOKS

1. Yashavant Kanetkar,"Understanding Pointersin C&C++", 5th Revised & Updated Edition, BPB Publications,2018.
2. Rance D.Necaise, "Data Structures andAlgorithms Using Python", Wiley Publications, 2010.

WEBSITE REFERENCES

1. https://www.geeksforgeeks.org/data-structures/
2. www.nptel.ac.in/courses/106106130/
3. https://www.tutorialspoint.com/python_data_structure/

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

HARDWARE

Stand alone desktops 30 Nos. (or) Server supporting 30 terminals or more

SOFTWARE

Ubuntu C / Python 3

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	2	3	1	2	2	3	3	2	3	3	1	2	2	3
CO-2	3	3	3	-	-	2	2	2	3	1	2	3	3	3	1
CO-3	3	2	3	-	-	3	3	2	3	3	3	3	3	2	2
CO-4	1	3	3	-	-	3	2	3	3	2	3	2	3	3	2
CO-5	3	3	3	-	-	2	3	3	2	3	2	3	2	3	2

JCS1312	DATABASE MANAGEMENT SYSTEMS LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES

- To familiarize with DDL, DML and DCL Commands
- To learn the use of nested and join queries
- To understand functions, procedures and procedural extensions of databases
- To be familiar with database triggers for specific application
- To develop applications using front-end tools and back-end DBMS

LIST OF EXPERIMENTS

1. Data Definition Commands, Data Manipulation Commands for inserting, deleting,
2. updating and retrieving Tables and Transaction Control statements
3. Database Querying–Simple queries, Nested queries, Subqueries and Joins
4. Creation of Views, Sequences, Indexes, Save point and commit constraints
5. Database Programming: Implicit and Explicit Cursors with PL/SQL block
6. Creation of PL/SQL Procedures and Functions
7. Creation of PL/SQLTriggers
8. ExceptionHandling
9. Database Designusing ER modeling, Normalization and Implementation for any application
10. Database Connectivity with Front EndTools

11. Mini project (Application Development) in one or two of the following systems
    a) Student database system
    b) Inventory Control System
    c) Online Library Management
    d) Hospital Management System
    e) Railway Reservation System
    f) Personal Information System
    g) Online Course registration and maintenance System
    h) Attendance Management System
    i) Hotel Management System
    j) E-commerce portal
    k) Online auction system

TOTAL: 60 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

- Execute typical data definitions, data control and data manipulation commands
- Familiarize with Nested and Join Queries for extracting combinatorial data
- Implement simple applications that useViews
- Develop PL/SQL procedures, functions and packages
- Develop applications using Front-end & Back-end Too lsand also to handle report generation

TEXTBOOKS

1. Abraham Silberschatz, Henry F.Korth,S.Sudharshan, "Database System Concepts", Seventh Edition, Tata McGrawHill, 2020.
2. Ramez Elmasri, ShamkantB. Navathe, "Fundamentals of Data base Systems", Sixth Edition, Pearson Education, 2015.

WEBSITE REFERENCES

1. https://www.w3schools.com/sql/default.asp
2. https://www.tutorialspoint.com/dbms/er_diagram_representation.htm
3. https://www.tutorialspoint.com/python/python_database_access.htm
4. https://sqlzoo.net

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

HARDWARE:

Standal one desktops 30 Nos. (or) Server supporting 30 terminals or more.

SOFTWARE:

Frontend: Python/Visual Studio or Equivalent
Backend: Oracle/MS SQLServer /MySQL/DB2 or Equivalent

Mapping of CO with PO/PSO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	-	-		-	-	-	-	-	-	-	2	3	3	3
CO-2	-	3	2	2	-	-	-	-	-	-	-	2	3	3	3
CO-3	3	-	-	3	-	-	-	-	-	-	-	-	3	3	3
CO-4	-	3	2	3	-	-	-	-	-	-	-	2	3	3	3
CO-5	-	3	2	-	-	-	-	-	-	-	-	2	3	3	3

SEMESTER-IV

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JMA1403	Applied Probability and Queuing Theory	BS	4	2	2	0	3
2	JCS1401	Computer Networks	PC	3	3	0	0	3
3	JCS1402	Operating Systems	PC	3	3	0	0	3
4	JCS1403	Design and Analysis of Algorithms	PC	3	3	0	0	3
5	JCS1404	Software Engineering	PC	3	3	0	0	3
6		Open Elective-I	OE	3	3	0	0	3
PRACTICALS								
7	JPT1001	Soft Skills and Aptitude-II	EEC	2	0	0	2	1
8	JCS1411	Networks Laboratory	PC	4	0	0	4	2
9	JCS1412	Operating Systems Laboratory	PC	4	0	0	4	2
TOTAL				29	17	2	10	23

JMA1403	APPLIED PROBABILITY AND QUEUEING THEORY	L	T	P	C
		2	2	0	3

COURSE OBJECTIVES:

- To provide basic concepts of discrete, continuous random variables and standard distributions.
- To introduce two dimensional random variables, correlation and regression.
- To acquaint students with statistical testing of hypothesis and its applications.
- To familiarize students in the concepts of random processes and its applications.
- To enable students to understand various Markovian and Non-Markovian queueing models.

UNIT I RANDOM VARIABLES 12

Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Exponential and Normal distributions.

UNIT II TWO - DIMENSIONAL RANDOM VARIABLES 12

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT III TESTING OF HYPOTHESIS 12

Statistical hypothesis - Large sample tests based on Normal distribution for single mean and difference of means - Tests based on t, Chi-square and F distributions for mean, variance and proportion - Contingency table - Goodness of fit.

UNIT IV RANDOM PROCESSES 12

Classification – Stationary process – Markov process – Discrete parameter Markov chain – Chapman Kolmogorov theorem - Poisson process.

UNIT V QUEUEING MODELS 12

Markovian queues – Birth and death processes – Single and multiple server, Infinite and finite queueing models – Little‘s formula – Non-Markovian queues - M/G/1 queue – Pollaczek Khinchin formula - M/D/1 and $M/E_K/1$ as special cases.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will beable

CO1: To understand random variables and use standard distributions in solving real time problems.

CO2: To use joint density functions to perform correlation and regression analysis.

CO3: To apply hypothesis testing for making statistical inferences in large and small sample real life problems.

CO4: To demonstrate efficient use of random processes in modeling engineering problems.

CO5: To understand and apply concepts of Markovian and Non-Markovian models in problems.

TEXT BOOKS:

1. Ibe, O.C.,"Fundamentals of Applied Probability and Random Processes", 1st Indian Reprint,Elsevier, 2007.
2. Taha, H.A., "Operations Research", 9th Edition, Pearson India Education Services, Delhi, 2016.
3. Gross, D., Shortle, J.F, Thompson, J.M and Harris. C.M., —”Fundamentals of Queueing Theory", Wiley Student 4th Edition, 2014.

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1. Hwei Hsu, "Schaum‘s Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw Hill Edition, New Delhi, 2004.
2. Trivedi, K.S., "Probability and Statistics with Reliability, Queueing and Computer Science Applications", 2nd Edition, John Wiley and Sons, 2002.
3. Yates, R.D. and Goodman. D. J., "Probability and Stochastic Processes", 2nd Edition, Wiley India Pvt. Ltd., Bangalore, 2012.
4. Devore. J.L., "Probability and Statistics for Engineering and the Sciences, Cengage Learning, New Delhi, 8th Edition, 2014.
5. Spiegel. M.R., Schiller. J. and Srinivasan, R.A., "Schaum‘s Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill Edition, 2004.

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2. https://nptel.ac.in/courses/103/106/103106120/
3. https://nptel.ac.in/courses/117/103/117103067/
4. https://nptel.ac.in/courses/108/106/108106179/

CO-PO MAPPINGS

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	-	-	2	-	-	2
CO2	3	3	2	2	-	-	-	-	2	-	-	2
CO3	3	3	2	2	-	-	-	-	2	-	-	2
CO4	3	3	2	2	-	-	-	-	2	-	-	2
CO5	3	3	2	2	-	-	-	-	2	-	-	2
AVG	3	3	2	2	-	-	-	-	2	-	-	2

JCS1401	COMPUTER NETWORKS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To learn the basic concepts of layered approach in Computer Networks
- To know functions of Data link layer and components to build different types of networks
- To learn the functions of networklayer and the various routing protocols
- To familiarize the functions 1and protocol so theTransport layer
- To familiarize the application layer services

UNIT-I INTRODUCTION AND PHYSICAL LAYER 9

Building a network - Requirements Layering and protocols - Design issues for the layers-TCP/IPProtocol suite-OSIModel -Physicallayer-Multiplexing and Spread Spectrum-Encoding Techniques-TransmissionMedia-Performance.

UNIT-II DATA-LINK LAYER & MEDIA ACCESS 9

Link layer Services - Framing - Error Detection - Flow control - Media access control - Ethernet(802.3) - Wireless LANs - 802.11 - Bluetooth - Switching and bridging - Basic Internetworking (IP,CIDR,ARP,DHCP,ICMP).

UNIT-III NETWORK LAYER 9

Network layer - Routing - Shortest Path Routing - Flooding - Routing (RIP, OSPF, metrics) -Switch basics - Global Internet (Areas, BGP, Ipv6) - Multicast - Addresses - Multicast routing(DVMRP,PIM).

UNIT-IV TRANSPORT LAYER 9

Overview of Transport layer-UDP-Reliable by testream (TCP)-Connection management-Flow control-Retransmission-TCP Congestion control-Congestion avoidance(DECbit,RED)-QoS.

UNIT-V APPLICATION LAYER 9

Electronic Mail (SMTP, POP3, IMAP, MIME)-HTTP-Web Services-DNS -SNMP.

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, students will be able to

- Evaluate the functions and performance of a network
- Comprehend the data flow and control between nodes in the network
- Analyze and design routing algorithms
- Familiarize with the functionalities of various protocols and congestion mechanism in network
- Familiarize with different application layer protocols

TEXTBOOKS

1. Behrouz A. Forouzan, “Data Communications and Networking”, Fifth Edition TMH, 2017.
2. LarryL. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Fifth Edition, Morgan Kauffmann Publishers Inc., 2012.

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1. James F.Kurose, Keith W.Ross, “Computer Networking: A Top-Down Approach”, Seventh Edition, Pearson Education, 2017.
2. William Stallings, Data and Computer Communications, Tenth Edition, Pearson Education, 2013.
3. Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.
4. Ying-DarLin,Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach, McGraw Hill Publisher, 2011.
5. AndrewS.Tanenbaum, David Wetherall, “Computer Networks”, Fifth Edition, Pearson Education, 2013.

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2.https://www.cse.iitk.ac.in/users/dheeraj/cs425/lec12.html
3.https://www.engineersgarage.com/tutorials/transport-layer-protocols-iot-part-9/

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	3	3	3	1	-	1	-	-	-	1	3	-	-
CO-2	3	3	3	3	3	-	1	-	-	-	-	-	3	-	-
CO-3	3	3	-	3	2	-	-	-	-	-	-	-	2	-	-
CO-4	3	3	-	3	3	1	-	-	-	-	-	-	3	-	-
CO-5	3	-	-	3	3	-	-	-	-	-	-	-	2	-	

JCS1402	OPERATING SYSTEMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To study the basic concepts, structure and functions of operating systems
- To learn process management concepts such as process scheduling, CPU scheduling, semaphores and dead locks etc.
- To learn various memory management concepts
- To understand the file storage handling management and I/O systems
- To learn the case study of operating system and services

UNIT-I OPERATING SYSTEMS OVERVIEW 9

Computer System Overview- Basic Elements – Interrupts - Memory Hierarchy - Cache Memory - Direct Memory Access - Operating System Overview - Objectives and Functions - Evolution of Operating System - Operating System Structure and Operations - System Calls - System Programs- OS Generation and System Boot.

UNIT-II PROCESS MANAGEMENT 9

Processes-Process Concept-Process Scheduling-Operations on Processes–Interprocess Communication – CPU Scheduling-Multiple-processor Scheduling-Real Time Scheduling-Threads-Overview – Multi threading Models - Threading Issues - Process Synchronization – Critical Section Problem - Mutex Locks - Semaphores - Monitors - Deadlocks - System Model – Deadlock Characterization-Methods for Handling Deadlocks-Deadlock Prevention-Deadlock Avoidance-Deadlock Detection-Recovery from Deadlock.

UNIT-III MEMORY MANAGEMENT 9

MainMemory–Background–Swapping-ContiguousMemoryAllocation–Paging–Segmentation - Segmentation with Paging, 32 and 64 Bit Architecture Examples - Virtual Memory –Background - Demand Paging - Page Replacement – Allocation – Thrashing - Allocating Kernel Memory.

UNIT-IV FILE SYSTEM AND I/O SYSTEM 9

Mass Storage system – Overview of Mass Storage Structure - Disk Structure - Disk Scheduling and Management, Swap Space Management - File-System Interface – File concept - Access methods –Directory Structure-File Sharing and Protection-File Allocation Methods-Free Space Management - Efficiency and Performance – Recovery - I/O Systems – I/O Hardware – Application I/O Interface-KernelI/Osubsystem–Streams–Performance.

UNIT-V CASE STUDY 9

Linux System-Design Principles-Kernel Modules-Process Management–Scheduling-Memory Management-Input-Output Management-File System-Inter-process Communication-Mobile OS -iOS and Android-Architecture and SDK Frame work-Media Layer-ServicesLayer-CoreOS Layer-File System.

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, students will be able to:

- Classify operating system components and system calls based on functionality
- Analyze and evaluate CPU scheduling algorithms and assess the solutions for synchronization problems and dead lock prevention
- Familiarize inmemory management and storage management techniques
- Analyze the File System Interface, Directory Structure and I/O systems
- Carryout case studies to generate and illustrate different aspects of various operating systems

TEXTBOOKS

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, 9th Edition, John Wiley and Sons Inc.,2018.
2. William Stallings, “Operating Systems–Internals and Design Principles”, 7th Edition, Prentice Hall, 2018.

REFERENCES

1. AndrewS.Tanenbaum, “Modern Operating Systems”, Second Edition, Addison Wesley,2014.
2. Charles Crowley, “Operating Systems: A Design-Oriented Approach”, Tata McGraw Hill Education”, 2018.
3. DMDhamdhere, “Operating Systems: A Concept-Based Approach”, Second Edition, Tata McGraw Hill Education.

WEBSITE REFERENCE

1. https://www.tutorialspoint.com/operating_system/os_overview.htm/
2. https://www.geeksforgeeks.org/introduction-of-process-management/
3. https://technobyte.org/memory-management-os-simple-explanation/
4. https://inst.eecs.berkeley.edu/~eecsba1/sp97/reports/eecsba1a/index-os.html

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	-	2	-	-	-	-	-	-	2	2	2	3	3	3
CO-2	3	-	2	-	-	-	-	-	-	-	2	-	3	3	3
CO-3	1	-	2	-	-	-	-	-	-	1	2	-	3	3	3
CO-4	3	-	2	-	-	-	-	-	-	1	2	-	3	3	3
CO-5	2	-	2	-	-	-	-	-	-	1	2	-	3	3	3

JCS1403	DESIGN AD ANALYSIS OF ALGORITHMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To impart knowledge on runtime analysis of algorithms
- To study and understand various algorithm design techniques
- To analyze various searching and sorting algorithms
- To study the various graph algorithms
- To learn the limits of computation

UNIT - I INTRODUCTION 9

Introduction Fundamentals of Algorithmic Problem Solving- Important Problem types – Fundamental Data structures –Time complexity- Space complexity- Analysis Framework – A symptotic notations- Basic Efficiency classes.

UNIT - II FUNDAMENTALS OF THE ANALYSIS OF ALGORITHM EFFICIENCY 9

Best, Average and Worst Case Analysis-Linear search-Amortized efficiency- Mathematical Analysisof Non- recursive Algorithm - Mathematical Analysis of Recursive Algorithm -Example: Fibonacci Numbers.

UNIT - III ANALYSIS OF SORTING AND SEARCHING ALGORITHMS 9

Brute Force Strategy: Selection Sort and Bubble Sort, Brute-force string matching ,Exhaustive search-Knapsack problem, Assignment problem, Travelling Salesman Problem-Divide and conquer: general method-Masters theorem-Mergesort, QuickSort, BinarySearch.

UNIT - IV ANALYSIS OF GRAPH ALGORITHMS 9

Dynamic Programming: Warshalls and Floyd Algorithm, Optimal Binary Search trees-Greedy Technique: Container Loading Problem, Huffman trees, knapsack problem.

UNIT - V NP COMPLETE AND NP HARD PROBLEMS 9

NP Complete and NP Hard-NP Complete problems, backtracking: n-Queens Problem, Hamiltonian Circuit problem, Subset-Sum problem- Branch and bound: Assignment problem, Knapsack problem, Traveling sales man problem.

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, students will be able to:

- Gain knowledge on fundamentals of algorithmic problem solving
- Analyze the algorithm efficiency
- Compare different types of sorting and searching algorithms
- Familiarize in different design techniques of Graph Algorithms
- Analyze NP complete, NP hard problems, back tracking and branch & bound techniques

TEXTBOOKS

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education Asia, 2012
2. Horowitz, Sahni, and Rajasekaran, "Computer Algorithms", Silicon Press, 2007.

REFERENCES

1. Sara Baase and Allen Van Gelder, "Computer Algorithms Introduction to Design and Analysis", Pearson Education Asia, 2010
2. T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, "Introduction to Algorithms", PHI Pvt.Ltd. ,2009.
3. V.Aho, J.E.Hopcroft and J.D.Ullman, "The Design and Analysis of Computer Algorithms" Pearson Education Asia, 2003.

WEBSITE REFERENCES

1. https://www.geeksforgeeks.org/algorithms-gq/analysis-of-algorithms-gq
2. https://www.javatpoint.com/daa-tutorial

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	2	2	1	1	1	1	1	1	1	2	3	3	3
CO-2	3	3	3	3	1	2	1	1	2	2	1	2	3	3	3
CO-3	3	3	3	3	2	2	2	2	1	1	1	2	3	3	3
CO-4	3	3	3	2	2	1	1	1	2	2	2	3	3	3	3
CO-5	3	3	3	3	3	2	2	2	2	1	1	3	3	3	3

JCS1404	SOFTWARE ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To study the differents of tware process models and developments
- To learn the fundamental concepts of requirements engineering and Analysis Modeling
- To analyze and apply the various software design methodologies
- To acquire knowledge in various testing methodologies and tools
- To attain the knowledge in Project Management process

UNIT-I SOFTWARE PROCESS AND AGILE DEVELOPMENT 9

Introduction to Software Engineering –The Software Process–Perspective and Specialized Models–Agile Development–Introduction to Agility-Agile Process-Extreme programming-XP Values–XP Process.

UNIT-II REQUIREMENTS ANALYSIS AND SPECIFICATION 9

Software Requirement – Functional and Non-Functional –User requirements –System requirements Software Requirements Document–Requirement Engineering Process–Feasibility Studies Requirements elicitation and Analysis–Requirement Negotiation–Requirements Validation Requirements Management-Classical analysis–Structured system Analysis– Data Dictionary.

UNIT-III SOFTWARE DESIGN 9

Design process–Design Concepts–Design Model–Design Heuristic–Architectural Design Architectural Styles–Architectural Mapping using Data Flow- User Interface Design – Interface analysis–Interface Design–Component level Design–Designing Class based components, Traditional Components.

UNIT-IV TESTING AND MAINTENANCE 9

Software Testing Fundamentals -White box Testing – Basis Path Testing-Control Structure Testing Black Box Testing – Regression Testing – Unit Testing – Integration Testing – Validation Testing System Testing–Testing tools– Reengineering Process Model-Reverse and Forward Engineering.

UNIT-V PROJECT MANAGEMENT 9

Software Project Management –Estimation – LOC –FP Based Estimation – Make/Buy Decision COCOMO I & II Model – Project Scheduling – Earned Value Analysis Planning – Project Plan Planning Process– RFP Risk Management–Identification–Projection–Risk Mitigation-RMMM Plan-CASE Tools

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, students will be able to:

1. Identify the key activities in managing a software project and compare different process models
2. Apply concepts of Requirements Engineering and Analysis Modeling
3. Apply systematic procedures in software design and systems
4. Compare the various testing strategies
5. Handle project management system and qualities

TEXT BOOKS

1. Roger S.Pressman,"Software Engineering–A Practitioner's Approach", Eighth Edition, McGraw-Hill International Edition, 2014.
2. Ian Sommerville, "Software Engineering", 9th Edition, Pearson Education Asia, 2011.

REFERENCES

1. Rajib Mall, Fundamentals of Software Engineering, Third Edition, HI Learning Private Limited, 2009.
2. Pankaj Jalote, Software Engineering, A Precise Approach,Wiley India, 2010.
3. Kelkar S.A.,"Software Engineering", Prentice Hall of India Pvt Ltd, 2007.
4. Stephen R.Schach, "Software Engineering" ,Tata McGraw-Hill Publishing Company Limited, 2007.

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	-	2	-	-	-	-	-	-	2	2	2	3	3	3
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CO-3	1	-	2	-	-	-	-	-	-	1	2	-	3	3	3
CO-4	3	-	2	-	-	-	-	-	-	1	2	-	3	3	3
CO-5	2	-	2	-	-	-	-	-	-	1	2	-	3	3	3

JPT1001	SOFT SKILLS AND APTITUDE – II	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES

- To help students learn various forms of writing and develop content
- To help students acquire time and stress management skills
- To facilitate students to gain required knowledge to understand practical concepts in aptitude
- To develop the thinking and analytical skills of students
- To gain knowledge in concepts of C programming language

UNIT-I SOFTS KILLS AND APTITUDE - III 6

Communication – on Specific topics – both oral and written – Content development – various forms of writing and specific writing – Brainstorming – Individual – Concept focusing – Public Speaking –Analytical writing.

UNIT-II SOFT SKILLS AND APTITUDE - IV 6

Importance of Time–Time Management techniques–Theart of prioritizing and scheduling– Stress –Positive and Negative Stress – Stress Management techniques–Concept of Goal setting–Importance of Goals–Dreamvs Goal–Reasons for failure of Goals–SMART.

UNIT - III QUANTITATIVE APTITUDE 6

Ratio and Proportions–Allegations and Mixtures–Problemon Ages–Profit and Loss and Discount

UNIT-IV LOGICAL REASONING 6

Oddman out series–Blood Relation–Seating Arrangement–Number Ranking

UNIT-V TECHNICAL APTITUDE IN C-II 6

Strings - Storage Classes – Pointers – Pre processor directives - Structures – Union. Type def – Input/Output – File I/O - Header Files – Type casting – Error handling – Command Line Arguments –Variable Arguments–Memory Management-Bitwise operators.

TOTAL: 30 PERIODS

COURSE OUTCOMES

Upon completion of the course, students will be able to:

- Develop different types of content using the skills learnt
- Manage time and stress competently
- Find answers to real time application problems
- Uselogical reasoning skills to solve problems differently
- Apply C programming concepts for coding

TEXT BOOKS

1. Dr.R.S.Aggarwal, "Quantitative Aptitude", S.Chand Publishing, 2020.
2. Dr.R.S.Aggarwal, "A Modern Approachto Verbal Reasoning",S. Chand Publishing, 2017.
3. Dr.R.S.Aggarwal, "A Modern Approach to Non-Verbal Reasoning", S. Chand Publishing, 2017.
4. Pradip Dey, ManasGhosh, "Fundamentals of Computing and Programming in C", First Edition, Oxford University Press, 2009.
5. Yashavant P.Kanetkar. "Let Us C", BPB Publications, 2011.

WEB SITE REFERENCES

1. https://www.indiabix.com/aptitude/questions-and-answers/
2. https://m4maths.com/placement-puzzles.php
3. www.freshersworld.com/

Mapping of CO with PO/PSO

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	2	3	2	-	-	1	3	2	1	-	-
CO2	-	2	3	2	-	-	1	3	2	1	-	-
CO3	-	2	3	2	-	-	1	3	2	1	-	-
CO4	-	2	3	2	-	-	1	3	2	1	-	-
CO5	-	2	3	2	-	-	1	3	2	1	-	-
AVG	-	2	3	2	-	-	1	3	2	1	-	-

JCS1411	NETWORKS LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To learn Socket programming
- To study various networking commands
- To implement and analyze various network protocols
- To learn and implement various socket programming concepts
- To simulate and analyze the performance of various network protocols

LIST OF EXPERIMENTS

1. Learn to use commands like tcpdump, netstat, if config, ns look up and trace route. Captureping and trace route PDUs using a network protocol analyzer and examine
2. Write a code simulating ARP/RARP protocols.
3. Write a socket program for HTTP web page upload and download.

4. Applications using TCP Sockets like
    a. Echoclient and echo server
    b. Chat
    c. File Transfer
5. Applications of DNS using UDP Sockets
6. Study of Network simulator and Simulation of Congestion Control Algorithms
7. Study of TCP/UDP performance using Simulation tool.
8. Simulation of Distance Vector/Link State Routing algorithm.
9. Performance evaluation of Routing protocols using Simulation tool.
10. Simulation of error correction code (like CRC).

TOTAL: 60 PERIODS

COURSE OUTCOMES

Upon completion of the course, students will be able to:

- Implement various protocols usingT CP and UDP
- Implement various network commands
- Simulate the performance of various network protocols
- Implement error correction codes
- Analyze the various routing algorithms

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

LABORATORY REQUIREMENT FOR BATCH OF 30 STUDENTS:

HARDWARE

1. Stand alone desktops **30 Nos**

SOFTWARE

1.C/ C++/Java/Python/Equivalent Compiler **30 Nos**

2.Network simulator like NS2/Glomosim/OPNET/PacketTracer/Equivalent

WEBSITE REFERENCES

1. https://www.javatpoint.com/socket-programming
2. https://www.tutorialspoint.com/java/java_networking.htm
3. https://www.nstools.org/techprog.shtml
4. https://ipwithease.com/top-5-network-simulation-tools-in-2020/

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	3	-	-	-	-	3	2	3	-	3	3	3	3
CO-2	3	3	3	-	-	-	-	3	2	3	-	3	3	3	3
CO-3	3	3	3	-	-	-	-	2	2	3	-	3	3	3	3
CO-4	2	2	3	-	-	-	-	3	3	3	-	2	3	3	3
CO-5	3	3	3	-	-	-	-	3	2	2	-	3	3	3	3

JCS1412	OPERATING SYSTEMS LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES

- To learn Unix commands and shell programming
- To execute various CPU Scheduling Algorithms
- To implement and familiarize in Process Creation and Inter Process Communication
- To implement Dead lock Avoidance and Dead lock Detection Algorithms
- To implement Page Replacement Algorithms, File Organization and File Allocation Strategies

LIST OF EXPERIMENTS

1. Basics of UNIX commands
2. Write programs using the following system calls of UNIX operating system fork, exec, getpid, exit, wait, close, stat, open dir, read dir
3. Write C programs to simulate UNIX commands like cp, ls, grep, etc.
4. Shell Programming
5. Write C programs to implement the various CPU Scheduling Algorithms
6. Implementation of Semaphores
7. Implementation of Shared memory and IPC
8. Bankers Algorithm for Dead lock Avoidance
9. Implementation of Dead lock Detection Algorithm
10. Write C program to implement Threading & Synchronization Applications
11. Implementation of the following Memory Allocation Methods for fixed partition
    a) FirstFit b)WorstFit c)BestFit
12. Implementation of Paging Technique of Memory Management
13. Implementation of the following Page Replacement Algorithms
    a) FIFO b)LRU c)LFU
14. Implementation of the various File Organization Techniques
15. Implementation of the following File Allocation Strategies
    a) Sequential b)Indexed c)Linked
16. Install, upgrade and configure Linux operating systems.

TOTAL: 60 PERIODS

COURSE OUTCOMES

Upon completion of the course, students will be able to:

- Compare the performance of various CPU Scheduling Algorithms
- Implement Dead lock avoidance, Detection Algorithms and Semaphores
- Create processes and implement IPC
- Analyze the performance of the various Page Replacement Algorithms
- Implement File Organization and File Allocation Strategies

TEXTBOOKS

1. Abraham Silberschatz, Peter Baer Galvin and GregGagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2018.

REFERENCES

1. William Stallings, "Operating Systems–Internals and Design Principles", 7th Edition, Prentice Hall, 2018.
2. Andrew S.Tanenbaum,"Modern Operating Systems" Second Edition, Addison Wesley,2014.
3. Charles Crowley, "Operating Systems: A Design-OrientedApproach", Tata McGraw Hill Education", 2018.
4. DMDhamdhere, "Operating Systems: A Concept-BasedApproach",Second Edition, Tata McGraw Hill Education.

WEBSITE REFERENCE

1. https://www.tutorialspoint.com/operating_system/os_overview.htm
2. https://www.geeksforgeeks.org/introduction-of-process-management
3. https://technobyte.org/memory-management-os-simple-explanation
4. https://www.cse.iitb.ac.in/~mythili/teaching/cs347_autumn2016/notes/09-filesystem-io.pdf
5. https://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems/13_IOSystems.html
6. https://inst.eecs.berkeley.edu/~eecsba1/sp97/reports/eecsba1a/index-os.html

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	-	-		-	-	-	-	-	-	-	2	3	3	3
CO-2	-	3	2	2	-	-	-	-	-	-	-	2	3	3	3
CO-3	3	-	-	3	-	-	-	-	-	-	-	-	3	3	3
CO-4	-	3	2	3	-	-	-	-	-	-	-	2	3	3	3
CO-5	-	3	2	-	-	-	-	-	-	-	-	2	3	3	3

OPEN ELECTIVE - I

SEMESTER - IV

JCS9001	AN INTRODUCTION TO SYSTEM SOFTWARE	L	T	P	C
		3	0	0	3

OBJECTIVES

- To understand the relation ship between system software and machine architecture.
- To know the design and implementation of assemblers
- To know the design and implementation of linkers and loaders.
- To have an understanding of micro processors.
- To have an understanding of systems software tools.

UNIT-I INTRODUCTION 8

System software and machine architecture – The Simplified Instructional Computer (SIC) - Machine architecture- Data and instruction formats-addressing modes-instruction sets-I/O and programming.

UNIT-II ASSEMBLERS 10

Basic assembler functions - A simple SIC assembler – Assembler algorithm and data structures –Machine dependent assembler features-Instruction formats and addressing modes–Program relocation - Machine independent assembler features - Literals –Symbol-defining statements –Expressions - One pass assemblers and Multi pass assemblers - Implementation example – MASM assembler.

UNIT-III LOADERS AND LINKERS 9

Basic loader functions - Design of an Absolute Loader – A Simple Bootstrap Loader – Machine dependent loader features - Relocation – Program Linking – Algorithm and Data Structures for Linking Loader-Machine-independent loader features–Automatic Library Search–Loader Options-Loader design options-Linkage Editors–Dynamic Linking–Boots trap Loaders-Implementation example-MSDOS linker.

UNIT-IV MACRO PROCESSORS 9

Basic macro process or functions-Macro Definition and Expansion–Macro Processor Algorithm and data structures-Machine-independent macro process or features-Concatenation of Macro Parameters–Generation of Unique Labels–Conditional Macro Expansion –Keyword Macro Parameters-Macro with in Macro-Implementation example-MASM Macro Processor–ANSIC Macro language.

UNIT-V SYSTEM SOFTWARE TOOLS 9

Text editors - Overview of the Editing Process - User Interface – Editor Structure. – Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system–User-Interface Criteria.

TOTAL: 45 PERIODS

TEXT BOOK

1. Leland L. Beck, "System Software – An Introduction to Systems Programming", 3rd Edition, Pearson Education Asia, 2006.

REFERENCES

1. D.M.Dhamdhere,"Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw-Hill, 2000.
2. John J.Donovan "Systems Programming", Tata McGraw-Hill Edition, 2000.
3. John R. Levine, Linkers & Loaders–Harcourt India Pvt. Ltd.,Morgan Kaufmann Publishers,2000.

Mapping of CO with PO/PSO

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	-	-	-	-	-	-	-	-	-	2
CO2	3	3	-	-	-	-	-	-	-	-	-	2
CO3	2	2	-	-	-	-	-	-	-	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	2
CO5	3	2	-	-	-	-	-	-	-	-	-	2
AVG	3	1	-	-	-	-	-	-	-	-	-	2

JCS9002	BASICS OF OBJECT ORIENTED PROGRAMMING	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the basic concepts of Object Oriented Programming.
- Execute the Object oriented concepts to solve problems using C++.
- Develop programs using files and templates

UNIT-I CLASSES AND OBJECTS 9

Need for object oriented programming - Characteristics of object oriented programming -Classes and Objects: Simple Class-Nesting of Member functions - Static Data Members and Member Functions –Constructors and Destructors-Returning Objects from Functions.

UNIT-II ARRAYS, STRINGS AND OVER LOADING 9

Array Fundamentals - Arrays as Class Member Data - Arrays of Objects - String Manipulations - Operator overloading: Unary Operators - Binary Operators - Special Operators - Pitfalls of Operator Over loading and Data Conversion.

UNIT-III INHERITANCE 9

Derived Class and Base Class - Derived Class Constructors - Overriding Member Functions – Public and Private Inheritance-Types of Inheritance: Single, Multi Level, Multiple, Hierarchical and Hybrid-Virtual Base Classes-Abstract Classes

UNIT-IV FUNCTIONS AND STREAMS 9

Pointers - this Pointer - Pointers to Objects and Derived Classes - Function Overloading – Virtual Function - Friend Function-Static Function. Streams: Stream Classes-Unformatted I/O Operations Formatted Console I/O Operations.

UNIT-V FILES, TEMPLATES AND EXCEPTION HANDLING 9

File Stream Operations-File Pointers Manipulation-Templates: Class Templates-Function Templates –Exception Handling Mechanism: Try Throw and Catch.

COURSE OUTCOMES:

On Completion of the course, the students should be able to:

- Design problem solutions using Object Oriented Techniques..
- Apply the concepts of data abstraction, encapsulation and inheritance for problem solutions.
- Use the controls tructures of C++ appropriately
- Critically analyse the various algorithms.
- Apply the different data structures to problem solutions

TEXTBOOK:

1. Bjarne Stroustrup,―The C++ Programming Language‖, 4thEdition, Addison-Wesley Professional, 2013.
2. Robert Lafore, - Object oriented programming in C++, 4th Edition, Pearson Education India

REFERENCES

1. Stephen Prata, -C++ Primer Plus, 6th Edition, Pearson Education, 2015
2. E Balagurusamy, -Object oriented programming in C++, 6th Edition, Mcgraw Hill publishing

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CO2	3	-	3	2	3	-	-	-	1	-	-	3
CO3	3	1	3	2	3	-	-	-	-	-	-	3
CO4	3	1	3	2	3	-	-	-	2	-	-	3
CO5	3	2	3	2	3	-	-	-	2	-	-	3
AVG	3	2	3	2	3	-	-	-	2	-	-	3

JCS9003	USER INTERFACE DESIGN	L	T	P	C
		3	0	0	3

OBJECTIVES

- To learn and underst and the Characteristics and principles of Graphical Interface
- To know the design of Graphica l Interface
- To learn and understand the design of windows and controls
- To learn the design of webpages and multimedia.
- To have an understanding of the techniques and tools fortesting the graphical interface

UNIT-I INTRODUCTION 8

Human–Computer Interface–Characteristics of Graphics Interface–Direct Manipulation Graphical System–Web User Interface–Popularity–Characteristic & Principles–Usability heuristics.

UNIT-II HUMAN COMPUTER INTERACTION 10

User Interface Design Process – Obstacles –Usability –Human Characteristics In Design – Human Interaction Speed –Business Functions –Requirement Analysis – Direct – Indirect Methods – Basic Business Functions–Design Standards–System Timings–Human Consideration. In Screen Design-Structures Of Menus– Functions Of Menus–Contents Of Menu–Formatting–Phrasing. The Menu–Selecting Menu Choice–Navigating Menus–Graphical Menus.

UNIT-III WINDOWS 9

Characteristics–Components–Presentation Styles–Types–Managements–Organizations–Operations– Web Systems– Device– Based Controls Characteristics– Screen – Based Controls – Operate Control–Text Boxes–Selection Control–Combination Control–Custom Control–Presentation Control.

UNIT-IV MULTIMEDIA 9

Text For Web Pages–Effective Feed back–Guidance &Assistance–Internationalization–Accessibility–Icons–Image–Multimedia–Coloring.

UNIT-V WINDOWS LAYOUT–TEST 9

Proto types–Kinds of Tests–Retest–Information Search–Visualization–Hypermedia –WWW–Software Tools.

TOTAL: 45 PERIODS

OUTCOMES:

On Completion of the course, the students should be able to:

- Define the characteristics and principles of different graphical user interface.
- Apply the concepts and principles of designing graphical interface
- Use various controls and styles in designing a window
- Describe the design of multi media and web pages
- Test and compare various graphical interfaces

TEXTBOOKS:

1. Wilbent.O.Galitz,"The Essential Guide To User Interface Design", John Wiley & Sons, 2001.
2. BenSheiderman, "Design the User Interface", Pearson Education, 1998.

REFERENCE:

1. Alan Cooper, "The Essential of User Interface Design", Wiley – Dream Tech Ltd.,2002.

Mapping of CO with PO/PSO

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	-	3	-	-	-	-	-	-	-
CO2	2	2	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	3	-	-	-	-	-	-	-
CO4	2	2	3	-	3	2	-	-	-	-	-	-
CO5	2	2	3	-	3	2	-	-	-	-	-	-
AVG	2	2	3	-	3	**2**	-	-	-	-	-	-

SEMESTER V

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JCS1501	Internet Programming	PC	3	3	0	0	3
2	JCS1502 (Integrated)	Object Oriented Analysis and Design	PC	4	2	0	2	3
3	JCS1503	Theory of Computation	PC	5	3	2	0	4
4		Professional Elective – I	PE	3	3	0	0	3
5		Open Elective-II	OE	3	3	0	0	3
PRACTICALS								
6	JPT1002	Technical Skills and Aptitude-1	EEC	2	0	0	2	*
7	JHS1511	Professional Communication	HS	2	0	0	2	1
8	JCS1511	Internet Programming Laboratory	PC	4	0	0	4	2
TOTAL				26	14	2	10	19

***Only Internal Assessment**

JCS1501	INTERNET PROGRAMMING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand different Internet Technologies
- To design interactive web pages using Scripting languages
- To learn java-specific webservices architecture
- To understand the essential client side technologies for internet programming
- To develop applications using database connectivity and server side programming in Java environment

UNIT I WEBSITE BASICS, HTML5, CSS3, WEB 2.0 9

Web Essentials: Clients, Servers and Communication – The Internet-Basic Internet protocols - World wide web- HTTP Request Message - HTTP Response Message - Web Clients – Web Servers - HTML5 - Tables - Lists - Image - HTML5 control elements - Semantic elements - Drag and Drop - Audio - Video controls - CSS3 - Inline, embedded and external style sheets - Rule cascading - Inheritance - Backgrounds - Border Images - Colors - Shadows - Text - Transformations - Transitions - Animations - Web Servers - Microsoft Internet Information Services –Apache HTTP Server

UNIT II CLIENT SIDE PROGRAMMING 9

Java Script: An introduction to Java Script–Java Script DOM Model-Date and Objects-Regular Expressions- Exception Handling-Validation-Built-in objects-Event Handling - DHTML with JavaScript-JSON introduction–Syntax–Function Files–Http Request–SQL

UNIT III SERVER SIDE PROGRAMMING 9

Servlets: Java Servlet Architecture-Servlet Life Cycle-Form GET and POST actions-Session Handling- Understanding Cookies- Installing and Configuring Apache Tomcat Web Server-DATABASE CONNECTIVITY: JDBC perspectives, JDBC program example-JSP: Understanding Java Server Pages-JSP Standard Tag Library (JSTL) - Creating HTML forms by embedding JSP code - ASP. NET Overview

UNIT IV PHP and XML 9

An introduction to PHP: PHP- Using PHP- Variables- Program control- Built-in functions - Form Validation- Regular Expressions - File handling – Cookies - Connecting to Database.XML: Basic XML- Document Type Definition- XML Schema DOM and Presenting XML, XML Parsers and Validation, XSL and XSLT Transformation, News Feed (RSS and ATOM).

UNIT V INTRODUCTION TO AJAX and WEB SERVICES 9

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods; WebServices: Introduction-Javaweb services Basics–Creating, Publishing, Testing and Describing a Web services (WSDL)-Consuming a webservice, Database Driven webservice from an application –SOAP-Session Tracking-UDT to a WebService

TOTAL 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to

- Construct a basic website using HTML and Cascading Style Sheets.
- Build dynamic webpage with validation using Java Script objects and by applying different eventh and ling mechanisms.
- Develop server side programs using Servlets and JSP.
- Construct simple webpages inPHP and to represent data in XML format.
- Use AJAX and web services to develop interactive web applications

TEXT BOOK:

1.Deitel and Deitel and Nieto, "Internet and World Wide Web- How to Program", Prentice Hall, 5th Edition, 2011.

REFERENCES:

1. Stephen Wynkoop and John Burke "Runninga Perfect Website", QUE, 2nd Edition, 1999.
2. Chris Bates, Web Programming–Building Intranet Applications, 3rd Edition,Wiley Publications, 2009.
3. Jeffrey C and Jackson,"WebTechnologies A Computer Science Perspective", Pearson Education, 2011.
4. Gopalan N.P. and Akilandeswari J., "Web Technology", Prentice Hall of India, 2014.
5. UttamK. Roy, "Web Technologies", Oxford University Press, 2011.

WEBSITE REFERENCES:

1. https://www.htmldog.com/guides/
2. https://www.codecademy.com/catalog
3. https://www.w3schools.com/

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	3	3	-	-	-	-	2	3	3	-	3	2	2	3
CO-2	3	3	3	-	-	-	-	3	3	3	-	3	3	3	1
CO-3	3	3	3	-	-	-	-	3	3	3	-	3	3	2	2
CO-4	3	3	3	-	-	-	-	3	3	3	-	3	3	3	2
CO-5	3	3	3	-	-	-	-	3	3	3	-	3	2	3	2

JCS1502	OBJECT ORIENTED ANALYSIS AND DESIGN	L	T	P	C
		2	0	2	3

COURSE OBJECTIVES:

- To understand the fundamentals of object modeling and Use cases
- To design with static UML diagrams
- To design with the UML dynamic and implementation diagrams
- To improve the software design with design patterns
- To test the software again stits requirements specification

UNIT I UNIFIED PROCESS AND USE CASE DIAGRAMS 9

Introduction to OOAD with OO Basics-Iterative, Evolutionary,and Agile–Unified Process – UML diagrams-Casestudy–the Next Gen POS system-Inception-Evolutionary Requirements-Usecases Modelling–Relating Usecases–include, extendand generalization – When to use Use-cases

UNIT II STATICUML DIAGRAMS 9

Class Diagram— Elaboration – Domain Model – Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies – Aggregation and Composition - Relationship between sequence diagrams and use cases–When to use Class Diagrams

UNIT III DYNAMIC AND IMPLEMENTATION UML DIAGRAMS 9

Dynamic Diagrams – UML interaction diagrams - System sequence diagram – Collaboration diagram – When to use Communication Diagrams - State machine diagram and Modelling – When to use State Diagrams-Activity diagram–When to use activity diagrams-Implementation Diagrams-UML package diagram -When to use package diagrams–Component and Deployment Diagrams–When to use Component and Deployment diagrams

UNIT IV DESIGN PATTERNS 9

GRASP: Designing objects with responsibilities–Creator–Information expert–Low Coupling – High Cohesion – Controller Design Patterns – creational – factory method –structural – Bridge – Adapter – behavioural – Strategy – observer –Applying GoF designpatterns – Mapping design to code.

UNIT V TESTING 9

Object Oriented Methodologies – Software Quality Assurance – Impact of object orientation on Testing–Develop Test Cases and Test Plans.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to

- Design software applications using OO concepts.
- Expresss of software design with UML diagrams
- Identify various scenarios based on software requirements
- Transform UML based software design into pattern-based designusing design patterns
- Understand the various testing methodologies for OO software

TEXT BOOKS:

1. Craig Larman, "Applying UML and Patterns : An Introduction to Object-Oriented
2. Analysis and Design and Iterative Development", Third Edition , Pearson Education, 2005.
3. AliBahrami, "Object Oriented Systems Development", McGraw Hill International Edition, 1999

REFERENCES:

1. Erich Gamma, and Richard Helm, Ralph Johnson, JohnVlissides, "Design patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley, 1995.
2. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Third edition, Addison Wesley, 2003.
3. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Addison Wesley Longman, 1999.
4. Bemd Bruegge, Allen H.Dutoit, "Object Oriented Software Engineering using UML, Patterns and Java", Pearson, 2004.

WEBSITE REFERENCES:

1. https://www.tutorialspoint.com/object_oriented_analysis_design/index.htm
2. https://nptel.ac.in/courses/106/105/106105153/
3. http://www.digimat.in/nptel/courses/video/106105153/L31.html
4. https://www.youtube.com/watch?v=qiyMyyYqZVY
5. http://www.infocobuild.com/education/audio-video-courses/computer-science/ObjectOrientedAnalysis -IIT-Kharagpur/lecture-38.html

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	2	3	3	2	2	3	3	2	3	3	1	2	2	3
CO-2	3	3	3	3	3	2	2	2	3	1	2	3	3	3	2
CO-3	3	2	3	1	3	3	3	2	3	3	3	3	3	2	2
CO-4	1	3	3	2	3	3	2	3	3	2	3	2	3	3	2
CO-5	3	3	3	2	2	2	3	3	2	3	2	3	2	3	2

JCS1503	THEORY OF COMPUTATION	L	T	P	C
		3	2	0	4

COURSE OBJECTIVES:

- To understand formal languages and finite Automata
- To construct automata for any given pattern and find it sequivalent regular expressions
- To design a context free grammar for any given language
- To understand Turing machines and their capability
- To understand undecidable problems and NP class problems

UNIT I AUTOMATA FUNDAMENTALS 9

Introduction to formal proof–Additional forms of Proof–Inductive Proofs–Introduction to Formal language, Alphabets and languages, Finite Automata–Deterministic Finite Automata – Non-deterministic Finite Automata –Finite Automata with Epsilon Transitions

UNIT II REGULAR EXPRESSIONS AND LANGUAGES 9

Regular Expressions–Operators of RE-FA and Regular Expressions–Proving Languages not to be regular – Closure Properties of Regular Languages – Equivalence and Minimization of Automata.

UNIT III CONTEXT FREE GRAMMAR AND LANGUAGES 9

CFG – Parse Trees – Ambiguity in Grammars and Languages – Definition of the Push down Automata – Languages of a Pushdown Automata – Equivalence of Pushdown Automata and CFG, Deterministic Pushdown Automata. - Normal Forms for CFG – Pumping Lemma for CFL–Closure Properties of CFL

UNIT IV TURING MACHINES 9

Turing Machine Model, Representation of Turing Machines, Language Acceptability by Turing Machines, Design of TM, Description of TM, Programming Techniques for TM Construction, Working with JFLAP (Java Formal Languages & Automata package)

UNIT V UNDECIDABILITY 9

Non Recursive Enumerable (RE) Language – Undecidable Problem with RE – Undecidable Problems aboutTM–Post‘s Correspondence Problem, The Class P and NP.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to

- Construct automata, regular expression for any pattern.
- Write Context free grammar for any construct.
- Design Turing machines for any language.
- Propose computation solutions using Turing machines.
- Derive whether a problem is decidable or not.

TEXT BOOKS:

1. J.E.Hopcroft, R.Motwani and J.DUllman,—Introduction to Automata Theory, Languages and Computations, Second Edition, Pearson Education, 2003.
2. PeterLinz- An Introduction to Formal Languages and Automata, Sixth Edition, Jones & Bartlett, 2016

REFERENCES:

1. H.R.Lewis and C.H.Papadimitriou, —Elements of the theory of Computation, Second Edition, PHI, 2003
2. J.Martin,—Introduction to Languages and the Theory of Computation, Third Edition, TMH, 2003
3. Micheal Sipser, —Introduction of the Theory and Computation, Thomson Brokecole, 1997.

WEBSITE REFERENCES:

1. AutomataTutorial|TheoryofComputation-Javatpoint
2. TheoryOfComputationandAutomataTutorials-GeeksforGeeks
3. AutomataTheoryTutorial-Tutorialspoint
4. NPTEL::ComputerScienceand Engineering-TheoryofComputation
5. Theoryofcomputation(TOC)Articles, Tutorials(includehelp.com)
6. https://users.cs.duke.edu/~rodger/tools/jflap/indexold.html

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	2	-	3	-	-	1	2	1	-	1	2	2	3
CO-2	3	3	2	-	3	-	-	1	2	1	-	1	3	3	2
CO-3	3	3	2	-	-	-	-	-	2	1	-	1	3	2	2
CO-4	3	2	1	-	-	-	-	-	-	-	-	1	3	3	2
CO-5	2	2	1	-	-	-	-	-	-	-	-	1	2	3	2

JPT1002	TECHNICAL SKILLS AND APTITUDE - I	L	T	P	C
		0	0	2	*

COURSE OBJECTIVES:

- To make students analyze and solve problems in technical as well as Quantitative aptitude.
- To enhance the Technical skills and basics of programming language
- To make students understand how to apply the practical knowledge with real time applications.
- To make students think and draw a conclusion from different scenarios.
- To help students understand python programming concepts

UNIT I OOPS CONCEPTS 6

What is object oriented programming?. Constand classes. Arrays and string arrays fundamentals. Arrays of object, string, The standard C++ String class. Operator overloading: Overloading unary operations. Concept of inheritance. Derived class and based class. Derived class constructors, member function, Virtual Function

UNIT II PYTHON I 6

Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tupleb assignment, modules and functions.

UNIT III PYTHON II 6

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, list parameters; Tuples: tuple assignment, Dictionaries: operations and methods; advanced list processing–list comprehension

UNIT IV QUANTITATIVE APTITUDE 6

Boats and streams – Time and work – Pipes and Cistern – Time and Distance – Problems onTrains

UNIT V LOGICAL REASONING 6

Syllogism – Statement and Conclusion – Inequalities – Non Verbal Reasoning – Figure Analogy – Mirror and Water images – Paper cutting and Folding – Cubes and Dices – attern completion.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to

- Apply OOPS concepts in applications
- To enhance knowledge in python programming.
- Gain knowledge in coding using the python programming.
- Solve complex arithmetic problems practically with realtime applications.
- Think logically in solving problems, enhance decision making, for difficult situations.

TEXTBOOKS:

1. Dr.E. Balagurusamy,"ProgramminginC++"complete reference 8th Edition.
2. "THE COMPLETE REFERENCE PYTHON", Herbert schildt., McGraw Hill Education, 2011.
3. Python: The Complete Reference by Martin Brown and Martin C.Brown Published in 2014.
4. Python in anut shell by Alex Martelli Revised in March 2013.
5. Dr.R.SAgrawal, "Quantitative Aptitude "and Non Verbal Reasoning published in 2000.

WEBSITE REFERENCES:

1. https://www.indiabix.com/aptitude/questions-and-answers/
2. https://m4maths.com/placement-puzzles.php
3. www.freshersworld.com
4. www.careerride.com
5. www.youtube.com/watch/python
6. www.youtube.com/watch/conceptsofpython

7. https://stackoverflow.com/
8. https://www.w3schools.com/
9. https://www.geeksforgeeks.org/

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	-	2	3	2	-	-	1	3	2	1	-	-	2	2	3
CO-2	-	2	3	2	-	-	1	3	2	1	-	-	2	2	2
CO-3	-	2	3	2	-	-	1	3	2	1	-	-	2	2	2
CO-4	-	2	3	2	-	-	1	3	2	1	-	-	2	2	2
CO-5	-	2	3	2	-	-	1	3	2	1	-	-	2	2	2

JHS1511	PROFESSIONAL COMMUNICATION	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- To enable students to acquire aspecialized knowledge of the essential professional skills
- To train them to make effective presentations on a variety of topics
- To help them participate in group discussions displaying team work skills
- To build their confidence and help the mattend interviews winningly
- To groom them to become successful professionals

UNIT I EXPOSURE TO PROFESSIONAL SKILLS 6

Introduction to Skills: hardskills and softskills–communication skills–inter personal skills employ ability and career skills–planning and prioritizing work–time management–stress management–emotional intelligence–SWOT analysis

UNIT II PREPARING AND PRESENTING IN SPIRING TALKS 6

Key elements of effective presentation–nonverbal communication–impressive self-introduction and short individual presentation – preparing outline – structuring and organizing content–presenting–introducing topic–developing points–concluding–answering questions

UNIT III MEASURES TO CRACK GROUP DISCUSSION 6

Group discussion skills–team building–using key strategies–etiquette–content preparation brain storming–out of box thinking–mind mapping–turn taking and turn giving–speaking persuasively–questioning and clarifying

UNIT IV INTERVIEW SKILLS TO GET HIRED 6

Interview skills–etiquette–body language–confidence–preparedness–types of interview – Frequently Asked Questions (FAQs) –mock interview–job application and resume writing –

UNIT V LANGUAGE SKILLS AND CAREER MAPPING 6

Listening skills – understanding different accents – reading skills – verbal ability – email writing – professional grooming – leadership qualities – fundamentals of entrepreneurship –career planning–goal setting–future challenges

TOTAL : 30 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to

- Have sufficient knowledge of the skills required for professional development
- Give formal and effective presentations
- Participate active lying roup discussions
- Attend job interviews and answer questions confidently and effortlessly
- Emerge as professionals ready for placement.

RECOMMENDED SOFTWARE:

1. **Globearena**
2. **WinEnglish**

TEXTBOOKS:

- Interact English Lab Manual for Under graduate Students, 2016, Hyderabad: Orient Black Swan.

REFERENCES:

1. Alex,K, 2019, Soft Skills: Know Yourself and Know the World, NewDelhi :S.Chand & Company Limited.
2. Butter field, Jeff, 2015, Soft Skills for Everyone. NewDelhi: Cengage Learning.
3. Kumar,Suresh Eetal, 2015, Communication for Professional Success, Hyderabad: Orient Black Swan.
4. Mitra, BarunK, 2016, Personality Development and SoftSkills, NewDelhi:Oxford University Press.
5. Raman, Meenakshi and Sangeeta Sharma, 2014, Professional Communication, Oxford: Oxford University Press.
6. Rizvi, Ashraf, M, 2018, Effective Technical Communication, Chennai: McGraw-Hill Education.

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1. https://www.britishcouncil.in/english/online/resources-websites/moocs
2. https://alison.com/courses/communications
3. https://in.topresume.com/career-advice/15-free-resources-to-improve-your-presentation-andspeaking-skills
4. http://www.washington.edu/doit/TeamN/present_tips.html
5. https://www.softwaretestinghelp.com/how-to-crack-the-gd/
6. http://www.oxforddictionaries.com/words/writing-job-applications
7. http://www.mindtools.com/pages/article/newCDV_34.htm
8. https://myinterviewpractice.com/

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	-	-	-	-	1		1	-	-	1	-	1	2	2	3
CO-2	-	-	-	-	1		1	-	-	1	-	1	2	2	2
CO-3	-	-	-	-	1		1	-	-	1	-	1	2	2	2
CO-4	-	-	-	-	1		1	-	-	1	-	1	2	2	2
CO-5	-	-	-	-	1		1	-	-	1	-	1	2	2	2

JCS1511	INTERNET PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To be familiar with Web page design using HTML/XML and style sheets
- To be exposed to creation of user interfaces using Java frames and applets.
- To learn to create dynamic web pages using server-side scripting.
- Tolearn to write Client Server applications.
- To be familiar with the PHP programming.
- To be exposed to creating applications with AJAX

LIST OF EXPERIMENTS

1. Create a web page with the following using HTML
   a. To embed a map in a web page
   b. To fix the hot spot sin that map
   c. Show all the related information when the hot spot sare clicked.
2. Create a web page with the following.
   a. Cascading style sheets.
   b. Embedded style sheets.
   c. In line style sheets. Use our college information for the web pages.
3. Validate the Registration, user login, user profile and payment by credit card pages using Java Script.
4. Write programs in Java using Servlets:
   a. To invoke servlets from HTML forms
   b. Session tracking using hidden form fields and Session tracking for a hit count
5. Write programs in Java to create three-tier applications using servlets for conducting on line examination for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.
6. Install TOMCAT web server. Convert the static web pages of programs into dynamic webpages using servlets (or JSP) and cookies. Hint: User's information (user id, password, creditcard number) would be stored in web.xml. Each user should have a separate Shopping Cart.
7. Redo the previous task using JSP by converting the static web pages into dynamic web

pages. Create a database with user information and books information. The book scatalogue should be dynamically loaded from the database.

8. Create and save an XML document at the server, which contains 10 users Information. Write a Program, which takes user Idasan input and returns the User details by takingthe user information n from the XML document
9. i.Validate the formusing PH Pregular expression. ii. PHP stores a formdata into database.
10. Write a web service for finding what people think by asking 500 people's opinion for any consumer product.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to:

- Construct Web pages using HTML/XMLandstyle sheets
- Build dynamic web pages with validation using Java Script objects and by applying different eventh and ling mechanisms
- Develop dynamic web pages using server-side scripting
- Use PHP programming to develop web applications
- Construct web applications using AJAX and web services

WEBSITE REFERENCES:

1. https://www.w3schools.com/html/
2. https://www.javatpoint.com/php-tutorial
3. https://www.javatpoint.com/servlet-tutorial
4. https://www.tutorialspoint.com/xml/index.htm

SOFTWARE REQUIRED:

- Dream Weaver or Equivalent, My SQL or Equivalent, Apache Server, WAMP/XAMPP

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	3	3	-	-	-	-	2	3	3	-	3	3	3	3
CO-2	3	3	3	-	-	-	-	3	3	3	-	3	3	3	3
CO-3	3	3	3	-	-	-	-	3	3	3	-	3	3	3	3
CO-4	3	3	3	-	-	-	-	3	3	3	-	3	3	3	3
CO-5	3	3	3	-	-	-	-	3	3	3	-	3	3	3	3

PROFESSIONAL ELECTIVE I

SEMESTER V

JCS1001	COMPUTER HARDWARE AND INTERFACING (Common to CSE & IT)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand and introduce issues related to CPU and memory
- To learn the components on the mother board and Power management
- To acquire knowledge and fundamental ideas of different storage media
- To understand the features of different I/ Operipheral devices and their inter faces.
- To understand concepts of various Bus Architectures

UNIT I CPU AND MEMORY 9

CPU essentials – processor modes – modern CPU concepts – Architectural performance features – the Intel's CPU – CPU over clocking – over clocking requirements –over clocking the system – over clocking the Intel processors – Essential memory concepts – memory organizations – memory packages – modules – logical memory organizations – memory considerations–memory types–memory techniques –selecting and installing memory

UNIT II MOTHER BOARDS 9

Active mother boards–sockets and slots–Intel D850GB–Pentium 4 mother board–expansions lots–form factor–upgrading a mother board–chipsets–northbridge–southbridge–CMOS – CMOS optimization tactics – configuring the standard CMOS setup – motherboard BIOS – POST – BIOS features – BIOS and Boot sequences – BIOS short comings and compatibility issues–power supplies and power management–concepts of switch in gregulation–potential power problems–power management.

UNIT III STORAGE DEVICES 9

Thefloppy drive–magnetic storage–magnetic recording principles–data and disk organization – floppy drive – hard drive – data organization and hard drive – sector layout –IDE drive standard and features – Hard drive electronics – CD-ROM drive – construction –CDROM electronics–DVD-ROM–DVDmedia–DVD drive and decoder.

UNIT IV I/O PERIPHERALS 9

Parallel port –signals and timing diagram–IEEE 1284 modes–a synchronous communication - Serial port signals–video adapters–graphic accelerators –3D graphics accelerator issues– Direct X–mice–modems–keyboards – sound boards–audio bench marks.

UNIT V BUS ARCHITECTURE 9

Buses – Industry standard architecture (ISA), peripheral component Interconnect (PCI) – Accelerated Graphics port (AGP) – plug-and-play devices – SCSI concepts – USB architecture - GPU Architecture – case study on architectures used for Artificial Intelligence and Machine learning- Case study on NVM, RDMA-capable (remote direct memory access) networks.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the students should be able to:

- Understand the fundamentals of process or modes, CPU working and memory
- Examine the different Mother boards operations and power management
- Understand the different storage devices and features
- Analyze the various I/O Peripherals and communications
- Understand the Bus Architecture and related components

TEXTBOOKS:

1. Stephen J.Bigelow, "Trouble Shooting, maintaining and Repairing PCs", TataMcGraw-Hill, New Delhi, 2001.
2. B.Govindarajulu, "IBMPC and Clones hardware trouble shooting and maintenance" ,TataMcGraw-Hill, NewDelhi, 2002.

REFERENCES:

1. Craig Zacker& John Rourke, "The complete reference:PC hardware", Tata McGraw-Hill,NewDelhi,2001.
2. Mike Meyers, "Introduction to PC Hardware and Trouble shooting", Tata McGraw-Hill, NewDelhi,2003.
3. COMPUTER HARDWARE: Installation, Interfacing,Trouble shooting and Maintenance K.L.JAMES , PHILearning Pvt.Ltd.,03-Jun-2013.
4. Embedded Linux: Hardware, Software, and Interfacing (Sams White Books) Paperback–7 March 2002 by Craig Holla baugh Ph.D.

WEBSITE REFERENCES:

1. https://www.tutorialspoint.com/computer_fundamentals/computer_hardware.htm
2. https://computerhardwarecomponentsandfunctions.wordpress.com
3. https://courses.lumenlearning.com/zeliite115/chapter/reading-bus/
4. https://tyrocity.com/topic/bus-architecture/
5. https://www.slideshare.net/rayrenz/computer-hardware-parts-functions

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	3	3	2	3	2	1	3	1	1	3	2	1	3	2
CO-2	3	3	3	2	3	2	1	3	1	1	3	2	2	2	2
CO-3	3	3	3	2	3	2	1	3	1	1	3	2	3	1	2
CO-4	3	2	3	2	3	2	1	3	1	1	3	2	1	3	2
CO-5	3	3	3	2	3	2	1	3	1	1	3	2	1	1	1

JCS1002	ELECTRONIC COMMERCE	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To Learn the E-Commerce Platform and its concepts
- To Understand theTechnology, infrastructure and Business in E-Commerce
- To Understand the Security and Challenges in E-Commerce
- To Understand the types of Marketing
- To Build an Own E-Commerce using Open Source Frame works

UNIT I INTRODUCTION TO E COMMERCE AND TECHNOLOGY INFRASTRUCTURE 9

Foundations of Electronic Commerce -The scope of E commerce -Working of Web – HTML Markup for Structure-Creating simple page-Marking up text-Adding Links-Adding Images - TableMarkup- Forms- HTML 5

UNIT II BUILDING ANE-COMMERCE WEBSITE, MOBILE SITE AND APPS 9

Systematic approach to build an E-Commerce:Planning,System RequirementAnalysis,System Design, Building the system, Testing the system, Implementation and Maintenance,Optimize Web Performance – Other E-Commerce Site tools – Developing a Mobile Website and Mobile App

UNIT III E-COMMERCE SECURITY AND PAYMENT SYSTEMS 9

E-Commerce Security Environment–Security threats in E-Commerce–Technology Solutions: Encryption, Securing Channels of Communication, Protecting Networks, Protecting Servers and Clients – Types of Electronic payment systems – Digital token based system –Smart cards–Credit card based system

UNIT IV BUSINESS CONCEPTS IN E-COMMERCE 9

Digital Commerce Marketing and Advertising strategies and tools–Internet Marketing Technologies–Social Marketing–Mobile Marketing–Location based Marketing–Marketing Research-Ethical, Social, Political Issues in E-Commerce

UNIT V PROJECT CASE STUDY 9

Case Study: Identify Key components, strategy, B2B, B2C, C2B.Models of E-commerce Business model of any e-commerce website - Mini Project: Develop E-Commerce project in any one of Platforms like Woo-Commerce, Big Commerce Magentoor Open cart

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On Successful completion of the course, Students will be able to:

- DesignWebsite using HTML CSS and JS
- Design Responsive Sites
- Manage security in environment
- Understand business concepts
- Manage, Maintain and Support Web Apps

TEXT BOOKS:

1. Kenneth C.Laudon, Carol Guercio Traver, "E-Commerce", Pearson, 15th Edition, 2019

REFERENCES:

1. Robbert Ravens bergen, "Building E-Commerce Solutions with Woo Commerce", PACKT, 2nd Edition, 2015

WEBSITE REFERENCES:

1. http://docs.opencart.com/
2. http://devdocs.magento.com/
3. http://doc.prestashop.com/display/PS15/Developer+tutorials

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	-	-	3	-	-	-	-	-	-		3	2	3	2	2
CO-2	-	2	-	-	3	-	-	-	1	1	3	1	3	3	2
CO-3	-	-	-	-	1	1	-	2	-	-	2	-	1	2	2
CO-4	-	-	-	-		1	-	3	-	2		1	1	3	2
CO-5	-	-	3	-	3	2	-		1	1	1	2	3	3	1

JCS1003	MOBILE COMPUTING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the basic concepts of mobile computing
- To learn the basics of mobile tele communication system
- To be familiar with the network layer protocols and Ad-Hoc networks
- To know the basis of transport and application layer protocols
- To gain knowledge about different mobile platforms and application development

UNIT I INTRODUCTION 9

Introduction to Mobile Computing - Applications of Mobile Computing - Generations of Mobile Communication Technologies - Multiplexing - Spread spectrum - MAC Protocols - SDMA-TDMA-FDMA-CDMA

UNIT II MOBILE TELE COMMUNICATION SYSTEM 9

Introduction to Cellular Systems - GSM - Services & Architecture - Protocols – Connection Establishment - Frequency Allocation - Routing - Mobility Management - Security - GPRS - UMTS-Architecture-Handover-Security.

UNIT III MOBILE NETWORK LAYER 9

Mobile IP - DHCP - AdHoc - Proactive protocol - DSDV, Reactive Routing Protocols - DSR,AODV , Hybrid routing - ZRP, Multicast Routing - ODMRP, Vehicular Ad Hoc networks -VANET-MANET Vs VANET-Security.

UNIT IV MOBILE TRANSPORT AND APPLICATION LAYER 9

Mobile TCP -WAP- Architecture-WDP-WTLS-WTP-WSP -WAE –WTA Architecture - WML

-

UNIT V MOBILE PLATFORMS AND APPLICATIONS 9

Mobile Device Operating Systems-Special Constraints & Requirements-Commercial Mobile Operating Systems-Software Development Kit:IOS, Android, Black Berry, Windows Phone - M commerce-Structure-Pros & Cons-Mobile Payment System- Security Issues

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to:

- Explain the basics of mobile telecommunication systems
- Illustrate the generations of telecommunication systems in wireless networks
- Determine the functionality of MAC, network layer and identify a routing proto colfora given Adhoc network
- Explain the functionality of Transport and Application layers
- Develop a mobile application using android / blackberry /ios / Windows SDK

TEXT BOOKS:

1. Jochen Schiller,"Mobile Communications", PHI, Second Edition, 2003.
2. Prasant Kumar Pattnaik, RajibMall, "Fundamentals of Mobile Computing", PHI Learning Pvt.Ltd, NewDelhi–2012

REFERENCES:

1. Dharma Prakash Agarval, Qing and AnZeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
2. U we Hansmann, Lothar Merk, Martin S.Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2003.
3. William.C.Y.Lee, "Mobile Cellular Telecommunications-Analog and Digital Systems", Second Edition, Tata McGraw Hill Edition, 2006.
4. C.K.Toh,"AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.

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1. https://mjginfologs.com/tutorials-on-mobile-computing/
2. https://www.javatpoint.com/mobile-computing
3. http://developer.android.com/index.html
4. https://developer.apple.com/
5. http://developer.windowsphone.com
6. http://developer.blackberry.com

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	1	2	1	-	1	-	-	1	2	1	2	2	3	2
CO-2	3	2	3	2	1	1	-	-	2	2	2	2	2	3	3
CO-3	3	3	2	3	2	1	-	-	2	2	2	2	3	3	2
CO-4	3	3	2	3	3	1	-	-	1	2	2	2	3	3	2
CO-5	3	3	2	3	3	1	-	-	2	3	3	3	3	3	2

JCS1004	SOFTWARE QUALITY ASSURANCE	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the fundamentals of software quality and quality factors
- To Study the Software Quality Assurance (SQA) architecture and the details of SQA components
- To Understand how the SQA components can be integrated into the project life cycle
- To learn the software quality infra structure
- To understand the advanced concepts of SQA

UNIT I INTRODUCTION TO SOFTWAR EQUALITY & ARCHITECTURE 9

Need for Software quality –Quality challenges–Software quality assurance(SQA)–Definition and objectives–Software quality factors-McCall's quality model –SQA system and architecture–Software Project life cycle Components–Preproject quality components – Development and quality plans.

UNIT II SQ A COMPONENTS AND PROJECT LIFE CYCLE 9

Software Development methodologies–Quality reviews–assurance activities in the development process- Verification & Validation – R Software Testing – Software Testing implementations – Quality of software maintenance – Pre-Maintenance of software quality components–Quality Assurance Tools–CASE tools for software quality–Software maintenance quality–Project Management.

UNIT III SOFTWARE QUALITY INFRA STRUCTURE 9

Procedures and work instructions – Templates – Checklists – 3S developmenting – Staff training and certification Corrective and preventive actions – Configuration management – Software change control–Configuration management audit-Documentation control–Storage and retrieval

UNIT IV SOFTWARE QUALITY MANAGEMENT & METRICS 9

Project process control – Computerized tools - Software quality metrics – Objectives of quality measurement – Process metrics – Product metrics – Implementation – Limitations of software metrics–Cost of software quality–Classical quality cost model–Extended model Application of Costmodel.

UNIT V STANDARDS, CERTIFICATIONS & ASSESSMENTS 9

Quality management standards – ISO 9001 and ISO 9000-3 – Capability Maturity Models – CMM and CMMI assessment methodologies-Bootstrap methodology–SPICE Project –SQA project process standards – IEEE Std 1012 & 1028 – Organization of Quality Assurance – Department management responsibilities – Project management responsibilities – SQA units and other actors in SQA systems.

COURSE OUTCOMES:

At the end of the course, student will be able to

- Utilize the concepts in software development life cycle.
- Demonstrate their capability to adopt quality standards.
- Assess the quality of software product.
- Apply the concepts inpreparing the quality plan & documents
- Able to identify the management components of software quality.

TEXT BOOKS:

1. Daniel Galin,"Software QualityAssurance", Pearson Publication, 2016
2. Gordon G Schulmeyer, "Hand book of Software Quality Assurance", Third Edition, Artech House Publishers 2007

REFERENCES:

1. Alan C. Gillies, "Software Quality: Theory and Management", International Thomson Computer Press, 2006.
2. Mordechai Ben-Menachem "Software Quality: Producing Practical Consistent Software", International Thompson Computer Press,1997.
3. Software Quality Assurance, Milind Limaye, TMH, NewDelhi, 2011
4. Software Testing And QualityAssurance-Theory and Practice, Kshirasagar Nak Priyadarshi Tripathy, JohnWiley & Sons Inc, 2008

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2. www.cs.toronto.edu/~yijun/csc408h/handouts/lecture5.pdf3.
3. web.uettaxila.edu.pk/CMS/SP2012/.../notes%5CSQA%20Lec_2.pdf4.
4. www.facweb.iitkgp.ernet.in/~spp/lect14.ppt

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	3	3	2	3	1	2	1	3	3	3	1	2	3
CO-2	1	2	3	3	1	2	2	1	1	2	3	3	3	2	2
CO-3	2	3	3	3	2	1	2	3	2	3	1	3	2	3	1
CO-4	1	2	3	3	3	3	2	2	2	3	1	3	1	2	3
CO-5	2	3	3	2	2	3	3	2	1	2	1	3	2	3	1

JCS1005	SYSTEM SOFTWARE	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To learn the basics of machine architecture and its working
- To have an understanding of foundations of design of assemblers
- To know about loaders and linkers
- To understand about macro processors and its features
- Tolearn to use system software tools

UNIT I INTRODUCTION 9

System software and machine architecture – The Simplified Instructional Computer (SIC) – Machine architecture –Data and instruction formats-addressing modes- instruction sets- I/O and programming.

UNIT II ASSEMBLERS 9

Basic assembler functions-A simple SIC assembler–Assembler algorithm manddata structures Machine dependent assembler features-Instruction formats and addressing modes–Program relocation-Machine independent assembler features-Literals–Symbol-defining statements–Expressions - One pass assemblers and Multi pass assemblers - Implementation example – MASM asembler.

UNIT III LOADERS AND LINKERS 9

Basic loader functions-Design of an Absolute Loader–A Simple Boots trap Loader-Machine dependent loader features-Relocation–Program Linking–Algorithm and Data Structures for Linking Loader - Machine-independent loader features - Automatic Library Search – Loader Options - Loader design options - Linkage Editors – Dynamic Linking – Bootstrap Loaders – Implementation example-MSDOS linker.

UNIT IV MACRO PROCESSORS 9

Basic macro processor functions-Macro Definition and Expansion–Macro Processor Algorith mand data structures-Machine-independent macroprocess or features-Concatenation of Macro

Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters-Macro within Macro-Implementation example –MASM Macro Processor–ANSIC Macro language.

UNIT V SYSTEM SOFTWARE TOOLS 9

Text editors-Overview of the Editing Process-User Interface–Editor Structure.-Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system–User-Interface Criteria.

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course,student will be able to

- Understand there lationship between system software architecture and machine
- Ability to design and implement linkers and loaders
- Ability to understand the concepts of macro processors
- Ability to analyze the functions of Assemblers
- Ability to understand about system software tools

TEXT BOOKS:

1. Leland L. Beck, "System Software – An Introduction to Systems Programming", 3rd Edition, Pearson Education Asia, 2006.
2. Srimanta Pal, "Systems Programming Oxford University Press, 2011.

REFERENCES:

1. D.M.Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw-Hill, 2000.
2. John J.Donovan "Systems Programming", Tata McGraw-Hill Edition,2000.
3. JohnR. Levine, Linkers & Loaders–Harcourt India Pvt. Ltd.,Morga nKaufmann

WEBSITE REFERENCES:

1. SystemSoftware -GeeksforGeeks
2. System Software Tutorial for Beginners - Electronics and Communication StudyMaterials

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	3	3	-	-	-	-	-	-	-	-	3	1	2	2
CO-2	3	3	3	2	-	-	-	-	-	-	-	3	-	2	2
CO-3	3	3	2	-	-	-	-	-	-	-	-	3	-	2	3
CO-4	3	3	2	-	-	-	-	-	-	-	-	3	2	-	2
CO-5	3	3	3	-	3	-	-	-	-	-	-	3	2	2	-

OPEN ELECTIVE II

SEMESTER V

JCS9004	INTRODUCTION TO WEB DESIGN	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To define the principle of Web page design.
- To visualize the basic concept of HTML.
- To recognize the elements of HTML.
- To learn about different layouts and styles in CSS.
- To develop the concept of web publishing.

UNIT I WEB DESIGN PRINCIPLES 9

Basic principles involved in developing a web site – Planning process – Five Golden rules of web designing – Designing navigation bar – Page design – Home Page Layout – Design Concept, Basics in Web Design - Brief History of Internet – What is World Wide Web – Why create a website–Web Standards–Audience requirement.

UNIT II INTRODUCTION TO HTML 9

What is HTML – HTML Documents – Basic structure of an HTML document – Creating an HTML document– Mark upTags, Heading– Paragraphs– Line Breaks– HTML Tags.

UNIT III ELEMENTS OF HTML 9

Introduction to elements of HTML – Working with Text – Working with Lists, – Tables and Frames – Working with Hyperlinks – Images and Multimedia – Working with Forms and controls.

UNIT IV INTRODUCTION TO CASCADING STYLE SHEETS 9

Concept of CSS – Creating Style Sheet – CSS Properties – CSS Styling (Back ground, Text Format, Controlling Fonts) – Working with block elements and objects – Working with Lists and Tables – CSS Id and Class – Box Model (Introduction, Border properties, Padding Properties, Margin properties) – CSS Advanced (Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector) – CSS Colour Creating page Layout and Site Designs.

UNIT V INTRODUCTION TO WEB PUBLISHING OR HOSTING 9

Creating the WebSite–Saving the site–Working on the website–Creating website structure – Creating Titles for webpages–Themes–Publishing websites.

COURSE OUTCOMES:

On successful completion of the course, Students will be able to

- Gain fundamental knowledge on the principles of Web design
- Create dynamic website/web based applications using HTML.
- Debug the programs by applying concepts and error handling techniques of HTML.
- Design websites using basic elements to control layout and style.
- Design an original and functional website that communicates and publish on the interne.

TEXT BOOKS:

1. Basic of Web Design: HTML5 & CSS, 5th Edition, Terry Felke-Morris, Pearson, 2019.
2. Learning Web Design–A Beginner's Guide to HTML, CSS, Java Script and Web Graphics, O'Reilly Media, Jennifer Niederst Robbins, 2018.

REFERENCES:

1. Beginning HTML, XHTML, CSS and Java Script, JohnW iley & Sons, Inc Duckett Jon, 2011.
2. Beginning CSS: Cascading Style Sheets for Web Design, 3rd Edition, Wrox, Ian Pouncey, Richard York, 2011.
3. HTML & CSS: The Complete Reference, Thomas Powell, Fifth Edition, 2017.
4. HTML, XHTML, and CSS Bible, 5thEdition, Steven M. Schafer, 2010.
5. HTML 5 in simple Steps, Kogent Learning Soultion Inc, Dream tech Press, 2010.

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1. https://www.w3schools.com/html/default.asp
2. https://www.tutorialspoint.com/html5/index.htm
3. https://www.youtube.com/watch?v=mU6anWqZJcc
4. https://www.edx.org/course/html5-and-css-fundamentals
5. https://www.coursera.org/learn/html-css-javascript-for-web-developers

Mapping of CO with PO/PSO

	Program Outcomes											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	3	2	3	1	2	1	3	1	3
CO2	3	2	3	3	1	2	2	1	1	2	3	3
CO3	3	3	3	3	2	2	2	3	2	3	3	3
CO4	3	2	3	2	3	3	2	2	2	2	3	3
AVG	3	3	3	2	2	3	3	2	1	2	2	3

JCS9005	**PROGRAMMING TOOLS AND TECHNIQUES**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

COURSE OBJECTIVES:

- To learn fundamentals of software project management
- To provide an understanding of Scripting languages
- To learn GUI programming
- To learn high level programming language processing.
- To understand windows programming

UNIT I SOFTWARE PROJECT MANAGEMENT TOOLS 6

Introduction-Project Plan-Mile stone checklist-Gantt chart-PERT chart-Resource Histogram

UNIT II INTRODUCTION TO PERL AND SCRIPTING 12

Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, sub routines

UNIT III GUI PROGRAMMING USING PYTHON 9

Simple GUIs- Creating Simple "static" GUIs with labels and buttons only. Repetition and Conditional commands- Binding events to widgets-Advanced GUIs-Check Boxes, radio buttons, list boxes.

UNIT IV LANGUAGE PROCESSING TOOLS 9

Basic Functions of Assembler, Assembler Design, Single pass and 2 Pass Assemblers and their Design, Linkers and Loaders, Absolute Loader and Relocating loader, Design of Linking Loader, Macro Processor c and its design, Fundamentals of Text Editor Design,

UNIT V WINDOWS PROGRAMMING 9

Windows environment – a simple windows program – windows and messages – creating the window–displaying the window–message loop–the window procedure–message processing – text output – painting and repainting – introduction to GDI – device context –basic drawing– child window controls

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon successful completion of this course, the students will be able to:

- Use and apply tools to facilitate the software project management process
- Acquire programming skills inscripting language.
- Create, run and manipulate Python based GUI programs
- Ability to understand the tools involved inprocessing of programming languages
- Explain concepts in windows programming.

TEXTBOOKS:

1. Nicholas Ayden,— Python Programming, 2019
2. Charles Petzold, "Windows Programming", Microsoft press,1996
3. David Barron,—The world of Scripting Languages,Wiley, 2000

REFERENCES:

1. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD, 2000.
2. Beck.—System Software - An Introduction to system programming, 2002.

WEBSITE REFERENCES:

1. WhatIsaScriptingLanguage?:ACompleteGuide |CareerKarma
2. OverviewofWindowsProgramminginC++|MicrosoftDocs

Mapping of CO with PO/PSO

	Program Outcomes											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	3	2	3	1	2	1	3	1	3
CO2	3	2	3	3	1	2	2	1	1	2	3	3
CO3	3	3	3	3	2	2	2	3	2	3	3	3
CO4	3	2	3	2	3	3	2	2	2	2	3	3
AVG	3	3	3	2	2	3	3	2	1	2	2	3

JCS9006	**HIGH PERFORMANCE NETWORKS FOR BEGINNERS**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

COURSE OBJECTIVES:

- Describe the role of high performance network and where it is used
- Explain the techniques involved to support real-time traffic and congestion control
- Define the architecture of Integrated Services in high performance network
- Implement principles of high performance wireless net work operations
- Applications of Network management invoice over IP

UNIT I HIGH PERFORMANCE NETWORKS 9

Introduction-frame relay networks – ATM protocol architecture-ATM logical connection – ATM cells-ATM service categories–AAL–highspeed LANS: the emergence of high speed LANS-Ethernets-fiber channel-wireless LANS

UNIT II CONGESTION AND TRAFFIC MANAGEMENT 9

Congestion control in data networks and internets – link level flow and error control- TCP traffic-congestion control in ATM networks–Interior routing protocols.

UNIT III QOS IN IP NETWORKS 9

Integrated service architecture-queuing discipline– random early detection differentiated services protocol for QOS support – RSVP – multiportal Label switching – real time transport protocol-IP version six.

UNIT IV PRINCIPLES OF WIRELESS NETWORK OPERATION 9

Local broad band and Adhoc networks. Introduction to wireless LANS-IEEE802. 11 WLAN-WATM–HIPERLAN- Adhoc networking and WPAN.

UNIT V NETWORK MANAGEMENT AND APPLICATION 9

Network management-choosing a configuration method–MIB–SNMP–XML CORBA – COPS–VPNS-mobile IP-voice over IP.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the students should be able to:

- Learn the various high-speed networking technologies and their design issues.
- Apply techniques involved to support real-time traffic and congestion control.
- Design high speed networks with quality of service (QoS).
- Understand the performance of high-speed wireless networking technologies.
- Apply the concept learnt in Network management in voice over IP.

TEXTBOOKS:

1. William Stallings, "HIGH SPEED NETWORKS AND INTERNET" ,Pearson Education, Second Edition, 2002.
2. Kaven Pahlavan And Prashant Krishnamoorthy, "Principles Of Wireless Network", Prentice Hall Of India, 2010.
3. Adrian Farrel, "The Internet And Its Protocols" Elsevier Publications, 2011.

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1. Behrouz A.Forouzan, "Data Communication And Computer Networking" ,4th, 2011.
2. Larry L. Peterson and Bruce S.Davie," Computer Networks", Third edition, Elsevier Publications, 2003

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2. https://www.cse.wustl.edu/~jain/papers/ftp/cnis/index.html
3. https://www.cse.wustl.edu/~jain/cis788-95/ftp/atm_cong/index.html
4. https://www.cse.wustl.edu/~jain/cis788-99/ftp/qos_protocols/index.html
5. https://www.slideshare.net/ayyakathir/unit1-29753217

Mapping of CO with PO/PSO

	Program Outcomes											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	3	2	3	1	2	1	3	1	3
CO2	3	2	3	3	1	2	2	1	1	2	3	3
CO3	3	3	3	3	2	2	2	3	2	3	3	3
CO4	3	2	3	2	3	3	2	2	2	2	3	3
AVG	3	3	3	2	2	3	3	2	1	2	2	3

SEMESTER VI

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JCS1601	Compiler Design	PC	3	3	0	0	3
2	JIT1602	Artificial Intelligence	PC	3	3	0	0	3
3	JCS1603	Cryptography and Network Security	PC	3	2	1	0	3
4		Professional Elective - II	PE	3	3	0	0	3
5		Professional Elective - III	PE	3	3	0	0	3
		Open Elective - III	OE	3	3	0	0	3
PRACTICALS								
6	JPT1002	Technical Skills and Aptitude-II	EEC	2	0	0	2	1
7	JCS1611	Compiler Design Laboratory	PC	4	0	0	4	2
8	JCS1621	Mini Project	EEC	2	0	0	2	1
9	JCS1641	Internship	EEC	-	-	-	2	1
TOTAL				26	18	0	10	23

SEMESTER VI

JCS1601	COMPILER DESIGN	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To know about various phases of the compiler and to kenization
- To learn about the techniques for parsing
- To understand the way sof in termed iater e presentation
- To have an idea about generating assembly code
- To have a brief understanding of code optimization techniques

UNIT I INTRODUCTION AND LEXICAL ANALYSIS 9

Language Processors – Structure of a Compiler – Role of Lexical Analyser – Specification of Tokens–Recognition of Tokens–Lex–Finite Automata–Construction of NFA from Regular Expression–NFA to DFA–Direct Conversion of Regular Expression to DFA–Minimization of DFA.

UNIT II SYNTAX ANALYSIS 9

Role of Parser – Error Handling – Error-Recovery Strategies – Context-Free Grammars – Recursive-Descent Parser – Predictive Parser – Shift-Reduce Parser – Simple LR Parser – CanonicalLR parser–LALR Parser–Yacc.

UNIT III INTERMEDIATE-CODE GENERATION 9

Syntax-Directed Definitions – Evaluation Orders for SDDs – Applications of Syntax-Directed Translation–DAG–Three-Address Code–Types and Declarations–Translation of Expressions –Type Checking–Backpatching.

UNIT IV RUN-TIME ENVIRONMENT AND CODE GENERATION 9

Storage Organization– Stack Allocation of Space– Accessto Nonlocal Data on Stack–Heap Management – Issues in the Design of Code Generator – The Target Machine – Addresses in the Target Code–Basic Blocks and Flow Graphs–A Simple Code Generator.

UNIT V CODE OPTIMIZATION 9

Principal Sources of Optimization – Optimization of Basic Blocks – Peephole Optimization –Register Allocation – Loops in Flow Graphs – Introduction to Global Data-flow Analysis –Code Improving Transformations.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the students should be able to:

- Develop a lexical analyser for recognizing tokens.
- Construct parsers with an understanding of context-free grammar.
- Translate the source program into intermediate code.
- Understand accessing of variables and data and the algorithm that generate code.
- Analyze and understand code optimization.

TEXT BOOKS:

1. AlfredV.Aho, MonicaS.Lam,RaviSethi and Jeffrey D.Ullman,Compilers: Principles, Techniques, & Tools, Second Edition, Pearson Education, 2007.
2. Torben Ægidius Mogensen, Introduction to Compiler Design, Second Edition, Springer, 2017.

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2. J.E.Hopcroft, R.Motwani and J.D.Ullman, Introduction to Automata Theory, Languages and Computations, Second Edition, Pearson Education, 2003.
3. Keith Cooper and Linda Torczon, Engineering a Compiler, Second Edition, Elsevier, 2011.
4. Santanu Chattopadhyay, Compiler Design, PHI, 2005.

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1. https://holub.com/compiler/
2. https://nptel.ac.in/courses/106/108/106108113/
3. https://www.javatpoint.com/compiler-tutorial
4. https://www.tutorialspoint.com/compiler_design/index.htm
5. https://www3.nd.edu/~dthain/compilerbook/

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	3	3	-	-	-	-	2	3	3	-	3	3	3	3
CO-2	3	3	3	-	-	-	-	3	3	3	-	3	3	3	3
CO-3	3	3	3	-	-	-	-	3	3	3	-	3	3	3	3
CO-4	3	3	3	-	-	-	-	3	3	3	-	3	3	3	3
CO-5	3	3	3	-	-	-	-	3	3	3	-	3	3	3	3

JIT1602	**ARTIFICIAL INTELLIGENCE**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

COURSE OBJECTIVES:

- To know the underlying structure behind intelligence mathematically
- To know the logical implications in computational intelligence
- To know the automated learning techniques
- To study the techniques of knowledge representation
- To explore the adaption of artificial intelligence techniques in real-time scenarios

UNIT I INTELLIGENT AGENTS AND SEARCH TECHNIQUES 9

Agents and Environments – Good Behaviour: The Concepts of Rationality – The Nature of Environments–The Structure of Agents–Problem Solving by Search–Uninformed Search–Searching with Costs–Informed State Space Search–Heuristic Search: Greedy–A* Search Problem Reduction Search–Game Search–Constraint Satisfaction Problems

UNIT II REASONING WITH LOWER ORDER LOGICS 9

Logical Agent – Proposition Logic – Syntax and Semantics – Theorem Proving – Model Checking–Inference in First Order Logic:Forward Chaining–Backward Chaining–Resolution

UNIT III KNOWLEDGE REPRESENTATION 9

Knowledge Representation Issues–Approaches for Knowledge Representation: Simple Relational Knowledge – Inherited Knowledge – Semantic Nets – Frames – Semantic Web – Ontology

UNIT IV AI PLANNING AND NATURAL LANGUAGE PROCESSING 9

Classical Planning – Types – Partial Order Planning – Graph Plan and SAT Plan – Natural Language Processing Basics: Syntax –Semantics – Introduction to Statistical NLP

UNIT V LEARNING AND APPLICATIONS 9

Logical Formulation of Learning – Knowledge in Learning – Explanation-based Learning – Learning using Relevance Information – Natural Language Tool kit (NLTK) –Application with NLP: Developing a Simple Chatbot–Types of Chatbot

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to:

- Apply the search technique storeal-time problems
- Apply the reasoning techniques to real world problems
- Understand the representation of knowledge
- Understand the learning techniques
- Apply AI techniques in developing real world applications

TEXT BOOKS:

1. Stuart J.Russell, Peter Norvig, “Artificial Intelligence-A Modern Approach”, Third Edition, Pearson Publishers, 2015.
2. Elaine Rich, Kevin Knight, Shivashankar B.Nair, “Artificial Intelligence”, Third Edition, Tata McGraw-Hill Education, 2008.

REFERENCES:

1. Dheepak Khemani, “ A first course in Artificial Intelligence”, McGraw Hill Education Pvt Ltd., NewDelhi, 2013.
2. Steven Bird, Ewan Klein and Edward Loper, “Natural Language Processing with Python”, O’ Reilly, 2009, https://www.nltk.org/book/.
3. Nils J.Nilsson, “Artificial Intelligence: A New Synthesis”, Morgan Kaufmaan Publishers Inc; Second Edition, 2003.

WEBSITE REFERENCES:

1. http://nptel.ac.in/courses/106105079/2
2. https://in.udacity.com/course/intro-toartificial-intelligence--cs271

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	3	3	-	-	-	-	2	-	-	3	3	3	3
CO-2	3	3	3	3	-	-	-	-	2	-	-	3	3	3	3
CO-3	3	3	3	3	-	-	-	-	2	-	-	3	3	3	3
CO-4	3	3	3	3	-	-	-	-	2	-	-	3	3	3	3
CO-5	3	3	3	3	3	-	-	-	2	-	-	3	3	3	3

JCS1603	CRYTOGRAPHY AND NETWORK SECURITY	L	T	P	C
		2	1	0	3

COURSE OBJECTIVES:

- To underst and Cryptography Theories, Algorithms and Systems
- To learn the mathematics concepts in symmetric key cryptography and algorithms
- To acquire knowledge and fundamental ideas of public-key cryptography
- To understand the principles of Message Authentication, Integrity and related algorithms
- To understand necessary Approaches and Techniques to build protection
- Mechanisms in order to secure computer networks

UNIT I INTRODUCTION 9

Security trends - Legal, Ethical and Professional Aspects of Security, Need for Security at Multiple levels, Security Policies - Model of network security – Security attacks, services and mechanisms–OSI security architecture–Classical encryption techniques: substitution techniques, transposition techniques, steganography- Foundations of modern cryptography: perfect security–information theory–product cryptosystem–cryptanalysis.

UNIT II SYMMETRIC KEY CRYPTOGRAPHY 9

MATHEMATICS OF SYMMETRIC KEY CRYPTOGRAPHY: Algebraic structures–Modular arithmetic-Euclid‟s algorithm- Congruence and matrices - Groups, Rings, Fields-Finite fields- SYMMETRIC KEY CIPHERS: SDES – Block cipher Principles of DES – Strength of DES–Differential and linear crypt analysis-Block cipher design principles–Blockcipher mode of operation–Evaluation criteria for AES–Advanced Encryption Standard-RC4 Key distribution.

UNIT III PUBLIC KEY CRYPTOGRAPHY 9

MATHEMATICS OF A SYMMETRIC KEY CRYPTO GRAPHY: Primes–Primality Testing –Factorization – Euler‟s totient function, Fermat‟s and Euler‟s Theorem - Chinese Remainder

Theorem–Exponentiation and logarithm-ASYMMETRIC KEYCIPHERS: RSA cryptosystem–Key distribution–Key management–Diffie Hellman key exchange-ElGamal cryptosystem–Elliptic curve arithmetic-Elliptic curve cryptography– Learning honey pot and monitor the honeypot on network using KF Sensor

UNIT IV MESSAGE AUTHENTICATION AND INTEGRITY 9

Authentication requirement – Authentication function – MAC – Hash function – Security o fhash function and MAC – SHA –Digital signature and authentication protocols – DSS-Entity Authentication: Biometrics, Passwords, Challenge Response protocols-Authentication applications - Kerberos, X.509- Learning secure data storage, secure data transmission and for creating digital signatures using GnuPG.

UNIT V SECURITY PRACTICE AND SYSTEM SECURITY 9

Electronic Mail security–PGP, S/MIME-IP Security-Cutting Edge Web Application Security : Click jacking - DNS rebinding - Flash security - Java applet security - Single-sign- on solution and security - IPv6 impact on web security .System Security: Intruders–Malicious software – viruses – Firewalls - IoT attack, types of IoT attacks, Threats and Security Solutions.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the students should be able to:

- Understand the fundament also f networks security, security architecture, threats and vulnerabilities
- Apply the different cryptographi cooperation so f symmetric cryptographic algorithms
- Apply the different cryptographic operation so f public key cryptography
- Apply the various Authentication schemes to simulate different applications.
- Understand various Security practices and System security standards.

TEXT BOOKS:

1. William Stallings, Cryptography and Network Security: Principles and Practice, PHI 8th Edition, 2019
2. Stuttard, Dafydd, and Marcus P into. The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws. John WileySons, 2011

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1. C K Shyamala, N Harini and Dr.TR Padmanabhan: Cryptography and Network Security, Wiley India Pvt.Ltd.
2. Behrouz A.Foruzan, Cryptography and Network Security, Tata McGraw Hill 2007.
3. Charlie Kaufman, Radia Perlman, and Mike Speciner, Network Security: PRIVATE Communication in a PUBLIC World, Prentice Hall, ISBN 0-13-046019-2.
4. Sullivan, Bryan, and Vincent Liu.Web Application Security, A Beginner's Guide. McGraw Hill Professional, 2011.

WEBSITE REFERENCES:

1. https://www.tutorialspoint.com/cryptography/index.htm
2. https://www.geeksforgeeks.org/cryptography-introduction/
3. https://mindmajix.com/cryptography-tutorial
4. https://www.academia.edu/35766751/Cryptography_tutorial
5. https://www.vssut.ac.in/lecture_notes/lecture1428550736.pdf

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	3	3	3	3	1	3	1	1	3	2	3	2	2
CO-2	3	3	3	2	3	2	1	3	2	1	3	2	3	2	2
CO-3	3	3	3	2	3	2	1	3	2	1	3	2	3	2	2
CO-4	3	2	3	2	3	3	1	3	2	1	3	2	3	2	2
CO-5	3	3	3	2	3	3	1	3	2	1	3	2	3	2	2

JPT1002	TECHNICAL SKILLS AND APTITUDE - II	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- To make students analyze and solve problems intechnical as well as quantitative aptitude. Enhance the technical skills and basics of programming language
- To make the students understand
- How to apply the practical knowledge in realtime applications.
- To make the students think and draw conclusions from different scenarios.
- To help the students understand JAVA programming concepts
- To help the students understand concepts and develop new applications in JAVA

UNIT I JAVA FUNDAMENTALS 6

OO Pin Java–Characteristics of Java–Java Source-File-Structure–Compilation. Fundamental Programming Structures in Java

UNIT II ADVANCED JAVA PROGRAMMING 6

Defining classes in Java–constructors, methods-access specifiers–static members-Data Types, Variables, Operators, Control Flow, Arrays, Inheritance–Super classes-sub classes –Protected members–constructors in sub classes-Interfaces–Strings.

UNIT III MATHEMATICAL AND ARITHMATIC PROBLEM SOLVING 6

Crpto arithmatic Problem Solving, Logarithms, Trigonometry, Mensuration, Probability, Permutations and Combinations.

UNIT IV LOGICAL REASONING - COGNITIVE THINKING 6

Numerical Ability, English Ability, Gaming, Arrangements, Visual Reasoning, Flowcharts –Visual Reasoning–DI.

UNIT V LOGICAL REASONING-CRITICAL THINKING 6

Logical Sequence, I nferred Meaning, Agree Disagree Psychometric, Statement & On clusions, Cubes and Cuboids

TOTAL: 30 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to

- Enhance their knowledge in JAVA concepts and Java Programming.
- Gain knowledge in coding using JAVA programming.
- Solve complex arithmetic problems practically with real time applications.
- Think logically in solving problems, enhance decision making, for difficult situations

TEXTBOOKS:

1. Herbert Schildt, "Java The complete reference", 8th Edition, McGraw Hill Education, 2011.
2. Cay S. Horstmann, Garycornell, "Core JavaVolume–I Fundamentals", 9th Edition, Prentice Hall, 2013.
3. Dr. R .S Agrawal, "Quantitative Aptitude" and Non Verbal Reasoning published in 2000.
4. S.Chand – A Modern Approach to Logical Reasoning Published in 2000.

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2. https://m4maths.com/placement-puzzles.php
3. www.freshers world.com
4. www.careerride.com
5. www.youtube.com/watch/python
6. www.youtube.com/watch/conceptsofpython
7. https://stackoverflow.com/
8. https://www.w3schools.com/
9. https://www.geeksforgeeks.org/

Mapping of CO with PO/PSO

CO\ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	1		1	-	-	1	-	1
CO2	-	-	-	-	1		1	-	-	1	-	1
CO3	-	-	-	-	1		1	-	-	1	-	1
CO4	-	-	-	-	1		1	-	-	1	-	1
AVG	-	-	-	-	1		1	-	-	1	-	1

JCS1611	COMPILER DESIGN LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To expose the students to compiler writing tools.
- To learn the implementation of the different Phases of compiler
- To familiarize with control flow and data flow analysis
- To implement the efficient storage allocation strategies
- To learn simple optimization techniques

LIST OF EXPERIMENTS

1. Implementation of Symbol Table using C
2. Develop alexical analyzer to recognize patterns using Lex Tool. Simulate the same using C. (eg:. identifiers, constants, comments, operators etc.)
3. Identify whether a given line is a comment or not using a C program.
4. Generate YACC specification for few syntactic categories.
5. Convert the BNF rules into YACC form and write code to generate Abstract Syn tax Tree.
6. Implement LL (1) parser.
7. Implement LALR parser.
8. Implement control flow analysis and Data flow Analysis
9. Implement Heap storage allocation strategy
10. Constructa DAG for any given three address code.
11. Implement the back end of the compiler that generates machine code from abstract syntax tree generated by the parser.
12. Implementation of Simple Code Optimization Techniques.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

Upon completion of the course the students will be able to:

- Describe the functionality of each phase involved in Compilation process
- Implement the parsing techniques including Bottom-up and Top-down parsing for the given programming construct described in Context Free Grammar.
- Understand the different representations of intermediate code
- Describe the concepts of storage administration for different programming environments
- Generate the machine code by considering all the functionalities of the different phases of the compiler and develop anoptimized compiler.

TEXT BOOKS:

1. Alfred VAho ,Monica S.Lam, Ravi Sethi and Jeffrey DUllman,"Compilers– Principles,Techniques and Tools", 2nd Edition, Pearson Education, 2007
2. Randy Allen, Ken Kennedy,"Optimizing Compilers for Modern Architectures: A Dependence-based Approach", Morgan Kaufmann Publishers, 2002
3. Charles N.Fischer, Richard. J.LeBlanc, "Craftinga Compiler with C", Pearson Education, 2008.

WEBSITE REFERENCES

1. https://github.com/JacobSamro/Compiler-Design-Lab
2. https://www.javatpoint.com/lex
3. https://www.javatpoint.com/YACC
4. https://www.guru99.com/compiler-design-tutorial.html
5. https://www.codeproject.com/Articles/30353/Designing-a-Compiler

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

HARDWARE:

Stand alone desktops 30Nos. (or) Server supporting 30 terminals or more.

SOFTWARE:

- C/C++ compiler and Compiler writing tools
- LEX and YACC compilers

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	3	3	3	1	3	2	2	1	1	2	3	3	2	2
CO-2	3	3	3	3	3	3	2	2	2	1	1	3	3	2	2
CO-3	3	3	3	3	2	2	2	2	2	1	1	3	3	2	2
CO-4	3	3	3	3	3	2	2	2	2	2	1	3	3	2	2
CO-5	3	3	3	3	3	2	2	2	3	2	1	3	3	2	2

JCS1621	**MINI PROJECT**	**L**	**T**	**P**	**C**
		0	**0**	**2**	**1**

COURSE OBJECTIVES:

- To understand real time software development environment.
- To develop research skills with new product design ideas.
- To develop leadership and ownership capability
- To implement quality programming strategies
- To learn simple software development tools

GUIDELINES

1. **Selection of project Title**
   Project work can be of three types:
   a. Developing solutions for real time problems
   b. System software project
   c. Research level project

2. **Project Team**
   - To achieve the stated objectives, it is imperative that the miniproject is done through a team effort with are striction on minimum 2 and maximum 4 students per team.
   - A team leader shall be selected
   - Even if students are doing projectas teams, each one must independently assigned different modules of the work and must maintain and submit there porton progress on assigned activities.
3. **Selection ofTools**
   Students can choose platform /tools /languages to be utilized to develop their projects.
4. **Project Management**
   - Students should submit fortnightly a progress report, which highlights the indication of percentage of completion of project work.
   - Each team should submit 3 copies of project report which should contain of

System Requirement specification, Analysis, Design, Coding, testing and Implementation strategies followed in the project.

COURSE OUTCOMES:

Upon completion of the course the students will be able to:

- Implement the different phases of software project development in real-time.
- Identify challenging opportunities in different do main.
- Generate efficient software programs.
- Encourage collaborative project development.

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO-2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO-3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO-4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO-5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

PROFESSIONAL ELECTIVE II
SEMESTER VI

JIT1002	AGILE METHODOLOGIES (Common to CSE & IT)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- Understand the basic concepts of Agile Software Process
- Comprehend various Agile Methodologies
- Develop Agile Software Process
- Apply principles of Agile Testing
- Understand metrics used in Agile

UNIT I INTRODUCTION 9

Softwareis new product development- Iterative and Evolutionary Methods-Agile

Development–Case Study: Perform acomparative Study betweenTraditional/Heavy weight Methodologies with Agile Methodology

UNIT II AGILE AND ITS SIGNIFICANCE 9

Agile Story :Evolutionary delivery -Scrum Demo- Planning game,-Sprint back log- adaptive planning - Agile Motivation – Problems With The Waterfall - Research Evidence Scrum :Method Overview-Life cycle phases and Work product roles

UNIT III AGILE METHODOLOGY 9

Extreme Programming: Method Overview-Life cycle phases and Work product roles-Unified process : Method Overview -Life cycle phases and Work product roles- EVO : Method Overview-Life cycle phases and Work product roles-Case Study: Student group must collaborate and report together along with assigned batch members. Collect the requirements from the client and adopt the suitable agile practice method.

UNIT IV AGILE PRACTICES 9

Agile Project management-Agile Environment-.Agile Requirements – Case Study–Practices : At the end of each s print of automated and acceptance tests

UNIT V AGILITY AND QUALITY ASSURANCE 9

Agile product development – Agile Metrics – Feature Driven Development (FDD)- Agile approach to Quality Assurance – Test Driven Development–Agile approach in Global Software Development

COURSE OUTCOMES

At the end of the course, the students will be able to

- Differentiate agile methodologies and Non–agile methodologies
- Describe the various practices followed in Agile Software Process
- Select suitable a gile approach for the projects
- Understand A gile Environment
- Apply a gile metrices to projects

TEXT BOOKS:

1. Craig Larman,"Agile and Iterative Development–A Manager's Guide", Pearson Education–2006
2. Elisabeth Hendricks on Quality Tree Software Inc, "Agile Testing" 2008

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1. Chetankumar Patel, Muthu Ramachandran, Story Card Maturity Model (SMM):A Process Improvement Frame work for Agile Requirements Engineering Practices ,Journal of Software, Academy Publishers, Vol 4, No 5 (2009), 422-435, Jul 2009.E.Capriolo, D.Wampler, and J.Rutherglen, "Programming Hive", O'Reilley, 2012
2. David J. Anderson; Eli Schragenheim, A gile Management for Software Engineering: Applying the Theory of Constraints for Business Results, Prentice Hall, 2003

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2. https://www.infoworld.com/article/3237508/what-is-agile-methodology-modern-software-development-explained.html
3. https://www.simplilearn.com/tutorials/agile-scrum-tutorial/what-is-agile

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO- 1	3	3	3	3	2	3	1	2	1	3	1	3	1	2	2
CO-2	3	2	3	3	1	2	2	1	1	2	3	3	1	3	3
CO-3	3	3	3	3	2	2	2	3	2	3	3	3	1	1	2
CO-4	3	2	3	2	3	3	2	2	2	2	3	3	2	2	3
CO-5	3	3	3	2	2	3	3	2	1	2	2	3	2	2	3

JCS1006	MULTI MEDIA TOOLS AND TECHNIQUES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To Learn the usage of Hardware in Multi media
- To Learn the usage of Software Tools in Multi media
- To Learn to create effective web pages that will include Elements of multi media.
- To understand the basic ideas about compression techniques in multi media.
- To Study about the various compression algorithms related to multi media components –Text, speech, audio, image and Video.

UNIT I INTRODUCTION AND HARDWARE 9

Introduction: Multimedia-Definitions, Basic properties and medium types Multimedia applications, Uses of Multimedia, Introduction to making multimedia-Multimedia skills , Hardware for Multimedia: Macintosh and Windows production Platforms, Multimedia Hardware, Hardware

peripherals-Connections, Memory and storage devices, Input Devices, Output Devices. Communication Devices, Networking

UNIT II SOFTWARE TOOLS 9

Using Text in Multimedia, Adding Sound to Multimedia Project, Basic Software Tools, Text, Image and Sound Editing Tools, Painting and Drawing Tools, Case study of Basic software Tools, Animation Tools, Multimedia Authoring Tools: Types and Cards, Page based Authoring Tools, Icon and Time Based Authoring Tools

UNIT III WORKING WITH DREAM WEAVER 9

Introduction to Dream weaver, Study of User Interface, Working with Tools and Text , Inserting Images, Study of User Interface-Dream weaver, Using Basic HTML in Dreamweaver, Adding Text to webpages, Inserting Images to Webpages, Tables using Frame and Forms, Example–Simple web page with Images and Tables, Adding Multimedia elements to Dream weaver, Build Style Sheets with layers using webpage, Working with timelines , Enhancing website management and work flow in Dream weaver.

UNIT IV FUNDAMENTALS OF COMPRESSION TECHNIQUES 9

Graphics, Image and Video representations – Fundamental concepts of video, digital audio –Need for compression – Taxonomy of compression Algorithms– Error Free Compression –Lossy Compression Text Compression Techniques– Huffman coding – Arithmetic Coding –Shannon-Fanocoding.

UNIT IV MULTI MEDIA DATA COMPRESSION 9

Image Compression: Fundamentals—JPEG Standard—JBIG—Audio compression Techniques–law, A-Law companding—Speech Compression—Video compression techniques and Standards–MPEG video coding: MPEG-1 and MPEG2.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the students should be able to:

- Acquire the knowledge on the usage of Hardware in Multimedia.
- Acquire the ability to apply Software Tools in Multimedia.
- Acquire the ability to create Webpages that use multimedia Elements.
- Have knowledge about fundamentals of compression in multimedia.
- Discuss various techniques incompression of multimedia components.

TEXT BOOKS:

1. Tay Vaughan,―MULTIMEDIA: Making it Work,9th Edition,TMH,2014.
2. Joseph W Lowery," Adobe CS5 Bible Dream weaver Bible", 1st Edition, Wiley publication , 2010.
3. Khalid Sayood, "Introduction to Data Compression" Morgan Kaufmann; Fifth Edition 2018

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1. Andleigh,P. K and KiranThakrar, "Multimedia Systems and Design", PHI, 2003.
2. Ranjan Parekh "Principles of Multimedia Paperback" McGraw Hill Education; 2nd edition 2nd Edition 2017.
3. James J.Maivald, "Adobe Dream weaver CC Classroom in a Book", Adobe; 1st edition 2017.
4. David Solomon,"Data Compression–The Complete Reference" Fourth Edition,

Springer Verlog, NewYork, 2007.
5. Mark S.Drew, Ze-NianLi, "Fundamentals of Multimedia" Springer; 3rd ed.2021edition

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1. https://www.tutorialspoint.com/multimedia/index.htm
2. https://helpx.adobe.com/in/dreamweaver/tutorials.html
3. http://www.teacherclick.com/dreamweaver8/index.html.
4. https://nptel.ac.in/courses/117/105/117105083/
5. https://www.youtube.com/watch?v=9eqrhe2XMbA

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO- 1	3	-	-	-	-	-	-	-	-	-	-	-	1	2	2
CO-2	-	3	3	-	3	-	-	-	-	-	-	-	1	1	2
CO-3	-	3	3	-	3	-	-	-	-	-	-	-	2	1	2
CO-4	-	3	3	-	3	-	-	-	-	-	-	-	1	1	3
CO-5	-	3	3	-	3	-	-	-	-	-	-	-	2	2	2

JCS1007	AUGMENTED REALITY AND VIRTUAL REALITY (Common to CSE & IT)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the basic concept and frame work of augmented reality.
- To learn the techniques of augmented reality.
- To learn classification and application of AR in a real time environment.
- To understand the fundamentals of Virtual Reality Environment.
- To study about the applications of Virtual reality

UNIT I AUGMENTED REALITY 9

History of Augmented Reality-Characteristics -Issues & Challenges –The SDK's and Tool'sused to build Augmented Reality applications -Advantages and Disadvantages of AR.-Future scope of Augmented Reality.

UNIT II TECHNIQUES FOR AUGMENTED REALITY 9

Components of Augmented Reality-architecture-Augmented Reality systems and functionality-Techniques of Augmented Reality -Augmented reality working planes- infinite carving planes-laser carving-laser colouring-texture map capture-surface of revolution.

UNIT III CLASSIFICATIONS AND APPLICATIONS 9

Projection based Augmented Reality-Non-interactive Augmented Reality-interactive Augmented Reality - Location Based Augmented Reality - Recognition Based Augmented

Reality –Augmented Reality Working on Different Devices-Applications of Augmented Reality in real Time environment- Applications- Medical Training and Retail- Open source tools- Google's AR core, Droid AR.

UNIT IV VIRTUAL REALITY 9

Fundamental Concept and Components of Virtual Reality-Primary features and present development on VR-Requirement and benefits of VR-Computer graphics-Real time computer graphics- Scientific Landmark 3D Computer Graphics Flight Simulation- Virtual environment

UNIT V TECHNIQUES AND APPLICATIONS OF VIRTUAL REALITY 9

VR Database-Tessellated Data, LODs-Lights and Cameras-Cullers, Occluder-Scripts-Graphical user interface-Control Panel-VR Toolkits- Software for VR- Available OS and Examples- Applications- Automotive Industry and Healthcare- Open source tools - GuriVR, Open space 3D

TOTAL 45 PERIODS

COURSE OUTCOMES:

Upon completion of the course, the student should be able to:

- Summarize the Augmented Reality basic Concepts
- Differentiate the techniques of Augmented reality and the applications.
- Classify the Augmented Reality Methods and aware of the real time applications of Augmented Reality.
- Apply the knowledge inVR Environment
- Design Virtual Reality applications.
- Explain the challenges faced by implementation of Augmented Reality and Virtual Reality.

TEXT BOOK:

1. "Analyzing the Social Web", Jennifer Golbeck, Morgan Kauffmann.
2. Anand R., "Augmented and Virtual Reality", Khanna Publishing House, Delhi.

REFFERENCES:

1. Burdea, G.C. and P.Coffet.Virtual Reality Technology, Second Edition.Wiley-IEEE Press, 2003/2006.
2. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann, 2013.
3. Alan Craig, William Sherman and Jeffrey Will, Developing Virtual Reality Applications, Foundations of Effective Design, Morgan Kaufmann, 2009.
4. John Vince, "Virtual Reality Systems", Pearson Education Asia, 2007
5. William R.Sherman, Alan B.Craig, "Understanding Virtual Reality: Interface, Application and Design", Morgan Kaufmann, 2008.

WEBSITE REFFERENCE:

1. www.vresources.org
2. www.vrac.iastate.edu
3. www.w3.org/MarkUp/VRM

MAPPING OF CO WITH PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	3	3	2	3	1	2	1	3	1	3	2	3	2
CO-2	3	2	3	3	1	2	2	1	1	2	3	3	2	1	1
CO-3	3	3	3	3	2	2	2	3	2	3	3	3	2	3	2
CO-4	3	2	3	2	3	3	2	2	2	2	3	3	2	3	2
CO-5	3	3	3	2	2	3	3	2	1	2	2	3	1	2	1

JCS1008	WEB DESIGN AND MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To learn the basic concepts in HTML.
- To learn and understand the concept of Javascript.
- To understand there sponsived e sign and development.
- To learn the web project management and maintenance process.
- To design a Web site with HTML, JS, CSS/CMS-Word press.
- To gain knowledge to host website on internet.

UNIT I WEB DESIGN-HTML MARK UP FOR STRUCTURE 9

Working of Web - HTML Markup for Structure - Creating simple page - Marking up text –Adding Links –Adding Images -Table Markup-Forms -HTML5

UNIT II CSS AND JAVA SCRIPT 9

CSS - Formatting text - Colours and Background - Padding, Borders and Margins – Floating and positioning-Page Layout with CSS-Transition, Transforms and Animation-Javascript-Using Java Script

UNIT III RESPONSIVE WEBD ESIGN 9

Sass for Responsive Web Design - Marking Content with HTML5 - Mobile-First or Desktop-First-CSS Grids, CSS Frameworks, UI Kits, and Flexbox for RWD-Designing small UIs by Large Finger - Images and Videos in Responsive Web Design - Meaningful Typography for Responsive Web Design.

UNIT IV WEB PROJECT MANAGEMENT 9

Project Life Cycle - Project Definition - Discovery and Requirements - Project Schedule and Budgeting - Running the project - Technical Documentation - Development, Communicaton, Documentation-QA and testing-Deployment-Support and operations.

UNIT V PROJECT CASE STUDY 9

Using HTML, CSS, JS or using Open source CMS like Word press, design and develop a Website having Aesthetics, Advanced and Minimal UI Transitions based on the project-Host and manage the project live in any public hosting.

COURSE OUTCOMES:

On Successful completion of the course, Students will be able to

- Design Web site using HTML.
- Design web application using CSS.
- Create and validate forms using Java scripts.
- Design Responsive Sites using advanced techniques.
- Manage and maintain web projects.
- Host and Support Web Application.

TEXT BOOKS:

1. Jennifer Niederst Robbins, "Learning Web Design", O'REILLY 4th Edition, 2018.
2. Jon Duckett, "HTML and CSS:Design and Build Websites", John Wiley and Sons, edition 20142.

REFERENCES:

1. JonDuckett, JackMoore, "Java Script & JQuery: Interactive Front-End Web Development", John Wiley and Sons, edition 2014.
2. Uttam K.Roy" Web Technologies" Oxford University Press, 13th impression, 2017.
3. Ricardo Zea, "Mastering Responsive Web Design", PACKT Publishing, 2015.
4. Justin Emond, Chris Steins, "Pro Web Project Management", A press, 2011

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1. https://www.w3schools.com/html/default.asp
2. https://www.tutorialspoint.com/html5/index.htm
3. https://www.youtube.com/watch?v=mU6anWqZJcc
4. Wordpress-http://www.wpbeginner.com/category/wp-tutorials/
5. https://www.freecodecamp.org/news/learn-responsive-web-design-in-5-minutes/

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	3	3	2	3	1	2	1	3	1	3	1	2	1
CO-2	3	2	3	3	1	2	2	1	1	2	3	3	1	1	2
CO-3	3	3	3	3	2	2	2	3	2	3	3	3	1	1	1
CO-4	3	2	3	2	3	3	2	2	2	2	3	3	1	1	1
CO-5	3	3	3	2	2	3	3	2	1	2	2	3	2	1	1

JCS1009	DATAWARE HOUSING AND DATAMINING (Common to CSE&IT)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To learn data warehouse concepts, architecture, business analysis and tools
- To study the methodology of engineering legacy data bases for dataware housing and data mining to derive business rules for decision support systems.
- To understand datapre-processing and data visualization techniques
- To study algorithms for finding hidden and interesting patterns in data
- To understand and apply various classification and clustering techniques using tools

UNIT I INTRODUCTION TO DATA WARE HOUSING AND ON- LINE ANALYTICAL PROCESSING (OLAP) 9

Basic Concepts – Data Warehousing Components – Building a Data Warehouse – Database Architectures for Parallel Processing – Parallel DBMS Vendors – Multi dimensional Data Model–Data Warehouse Schemas for Decision Support, Concept Hierarchies-Characteristics of OLAP Systems–Typical OLAP Operations, OLAP and OLTP.

UNIT II INTRODUCTION TO DATA MINING 9

Introduction to Data Mining Systems–Knowledge Discovery Process–Data Mining Techniques – Issues – applications - Data Objects and attribute types, Statistical description of data, Data Preprocessing–Cleaning, Integration, Reduction, Transformation and discretization, Data Visualization, Data similarity and dissimilarity measures.

UNIT III MINING FREQUENT PATTERN AND ASSOCIATION ANALYSIS 9

Mining Frequent Patterns, Associations and Correlations–Mining Methods-Pattern Evaluation Method – Pattern Mining in Multilevel, Multi-Dimensional Space – Constraint Based Frequent Pattern Mining, Classification using Frequent Patterns

UNIT IV CLASSIFICATION AND CLUSTERING 9

Decision Tree Induction–Bayesian Classification–Rule Based Classification– Classification by Back Propagation – Support Vector Machines — Lazy Learners – Model Evaluation and Selection-Techniques to improve Classification Accuracy. Clustering Techniques – Cluster analysis-Partitioning Methods–Hierarchical Methods– Density Based Methods–Grid Based Methods – Evaluation of clustering– Clustering high dimensional data- Clustering with constraints, Outlier analysis-outlier detection methods.

UNIT V APPLICATION AND FUTURE TRENDS IN DATA MINING 9

Financial Data Analysis -Retail and Telecommunication Industries - Biological Data Analysis- Intrusion Detection and Prevention - Recommender Systems –Multimedia Data mining- Ubiquitous Data Mining-Introduction to WEKA-The Explorer–Getting started, Exploring the explorer, Learning algorithms-Display the results

TOTAL : 45 PERIODS

COURSE OUTCOMES

At the end of the course, the students will be able to

- Design a Dataware house system and perform business analysis with OLAP tools.
- Apply uitable pre-processing and visualization techniques for data analysis
- Apply frequent pattern and association rule mining techniques for data analysis
- Apply appropriate classification and clustering techniques for data analysis
- Able to identify the application area of algorithms, and apply them

TEXTBOOKS:

1. JiaweiHan and Micheline Kamber, Data Mining Concepts and Techniques, Third Edition, Elsevier, 2012..
2. Paulraj Ponniah, "Data Ware housing :Fundamentals for IT Professionals", Wiley India

REFERENCES:

1. Alex Berson and Stephen J.Smith, DataWare housing, Data Mining and OLAP, Tata McGraw–Hill Edition, 35th Reprint 2016.
2. K.P.Soman, Shyam Diwakar and V.Ajay, Insight into Data Mining Theory and Practice, Eastern Economy Edition, Prentice Hall of India, 2006.
3. IanH.Witten and EibeFrank, Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, Second Edition.
4. S. Sumathi and S.N. Sivanandam, Introduction to Data Mining and its Applications; https://doi.org/10.1007/978-3-540-34351

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1. https://www.tutorialspoint.com/dwh/dwh_data_warehousing.htm
2. https://www.guru99.com/data-warehouse-architecture.html
3. https://docs.oracle.com/database/121/DMCON/toc.htm
4. https://www.tutorialspoint.com/data_mining/dm_applications_trends.htm

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	3	3	3	2	3	1	2	1	3	1	3	2	2	2
CO-2	3	2	3	3	1	2	2	1	1	2	3	3	3	2	3
CO-3	3	3	3	3	2	2	2	3	2	3	3	3	1	1	1
CO-4	3	2	3	2	3	3	2	2	2	2	3	3	3	2	3
CO-5	3	3	3	2	2	3	3	2	1	2	2	3	2	1	1

PROFESSIONAL ELECTIVE III

SEMESTER VI

JCS1010	CYBER SECURITY AND DIGITAL FORENSICS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To learn computer forensics
- To become familiar with forensics tools
- To learn to analyze and validate forensics data
- To learn ethical hacking
- To learn ethical hacking in web

UNIT I INTRODUCTION TO COMPUTER FORENSICS 9

Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Introduction to Identity Theft & Identity Fraud. Types of CF techniques - Incident and incident response methodology - Forensic duplication and investigation. Preparation for IR: Creating response tool kit and IR team. - Forensics Technology and Systems – Understanding Computer Investigation – Data Acquisition.

UNIT II EVIDENCE COLLECTION AND FORENSICS TOOLS 9

Processing Crime and Incident Scenes – Working with Windows and DOS Systems. Current Computer Forensics Tools: Software/HardwareTools. Suggested Activities: Installing Autopsy tools for conducting hard drive investigations.

UNIT III ANALYSIS AND VALIDATION 9

Validating Forensics Data–Data Hiding Techniques–Performing Remote Acquisition– Network Forensics– Email Investigations–Cell Phone and Mobile Devices Forensics

UNIT IV ETHICAL HACKING 9

Introduction to Ethical Hacking-Foot printing and Reconnaissance-Scanning Networks-Enumeration-System Hacking-Malware Threats–Sniffing

UNIT V ETHICAL HACKING IN WEB 9

Social Engineering - Denial of Service – Session Hijacking – Hacking Webservers –Hacking Web Applications – SQL Injection – Hacking Wireless Networks – Hacking Mobile Platforms

TOTAL:45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students willbe able to:

- Understand the basics of computer forensics
- Apply a number of different computer forensic tools to a given scenario
- Analyze and validate forensics data
- Identify the vulnerabilities in a given network infrastructure
- Implementreal-world hacking techniques to test system security

TEXT BOOKS:

1. Bill Nelson, Amelia Phillips, Frank Enfinger, Christopher Steuart,"Computer Forensics and Investigations",Cengage Learning, India Edition,2016.
2. CEH official Certfied Ethical Hacking Review Guide,Wiley India Edition, 2015.

REFERENCES:

1. John R.Vacca, "Computer Forensics",Cengage Learning, 2005
2. Marjie T.Britz, "Computer Forensics and Cyber Crime": An Introduction", 3rd Edition, PrenticeHall, 2013.
3. Ankit Fadia, "Ethical Hacking" Second Edition, Macmillan India Ltd, 2006
4. Kenneth C.Brancik "Insider Computer Fraud" Auerbach Publications Taylor & Francis Group–2008.

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO- 1	3	3	3	3								1	3	3	2
CO-2	3	3	3	3	3							3	3	3	3
CO-3	3	3	3	3	3							3	3	3	1
CO-4	3	3	3	3								3	3	3	3
CO-5	3	3	3	3	3							3	3	3	1

JIT1601	INTERNET OF THINGS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand Smart Objects and IoT Architectures
- To learn about various IOT - related protocols
- To build simple IoT Systems using Arduino and Raspberry Pi
- To understand data analytics and cloud in the context of IoT
- To develop IoT infrastructure for popular applications

UNIT I FUNDAMENTALS OF IoT 9

Evolution of Internet of Things - Enabling Technologies - IoT Architectures: one M2M, IoT World Forum (IoTWF) and Alternative IoT models – Simplified IoT Architecture and Core IoT Functional Stack - Fog, Edge and Cloud in IoT - Functional blocks of an IoT ecosystem - Sensors, Actuators, Smart Objects and Connecting Smart Objects.

UNIT II IoT PROTOCOLS 9

IoT Access Technologies: Physical and MAClayers, topology and Security of IEEE 802.15.4, 802.15.4g, 802.15.4e, 1901.2a, 802.11ah and LoRa WAN - Network Layer:IP versions,Constrained Nodes and Constrained Networks - Optimizing IP for IoT: From 6LoWPAN to6Lo, Routing over Low Power and Lossy Networks – Application Transport Methods: Supervisory Control and Data Acquisition – Application Layer Protocols: CoAP and MQTT

UNIT III DESIGN AND DEVELOPMENT 9

Design Methodology - Embedded computing logic - Microcontroller, System on Chips – IoT system building blocks-Arduino-Board details, IDE programming – Raspberry Pi-Interfaces and Raspberry Pi with Python Programming

UNIT IV DATA ANALYTICS AND SUPPORTING SERVICES 9

Structured Vs Unstructured Data and Data in Motion Vs Data in Rest - Role of Machine Learning - No SQL Databases - Hadoop Ecosystem - Apache Kafka, Apache Spark - EdgeStreaming Analytics and Network Analytics - Xively Cloud for IoT, Python Web Application Framework - Django-AWS for IoT - System Management with NETCONF - YANG

UNIT V CASE STUDIES / INDUSTRIAL APPLICATIONS 9

Cisco IoT system – IBM Watson IoT platform – Manufacturing –Converged Plantwide Ethernet Model (CPwE) – Power Utility Industry – Grid Blocks Reference Model – Smart and Connected Cities: Layered architecture, Smart Lighting, Smart Parking Architecture and Smart Traffic Control

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to:

- Explain the concept of IoT
- Analyze various protocols for IoT
- Design a PoC of an IoT system using RasperryPi/Arduino
- Apply data analytics and use cloud offerings related to IoT
- Analyze applications of IoT in real time scenario

TEXTBOOKS:

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete,Rob Bartonand Jerome Henry, IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, Cisco Press, 2017.

REFERENCES:

1. Arshdeep Bahga,Vijay Madisetti,"Internet of Things – A hands – on approach", Universities Press, 2015
2. Olivier Hersent, David Boswarthick, Omar Elloumi,"The Internet of Things–Key applications and Protocol", Wiley, 2012 (for Unit 2).
3. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Aves and. David Boyle, "From Machine-to-Machine to the Internet of Things-Introduction to a New Age of Intelligence", Elsevier, 2014.
4. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), "Architecting the Internet of Things", Springer, 2011.
5. Michael Margolis, "Arduino Cookbook, Recipes to Begin, Expand, and Enhance Your Projects", 2nd Edition, O'Reilly Media, 2011.

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1. https://onlinecourses.nptel.ac.in/noc17_cs22/course
2. https://www.coursera.org/specializations/internet-of-things
3. https://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html

Mapping of CO with PO / PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO- 1	3	3	3	2	3	3	1	3	2	1	3	2	3	3	2
CO-2	3	3	3	2	3	2	1	3	2	1	3	2	3	3	2
CO-3	3	3	3	2	3	2	1	3	2	1	3	2	3	3	2
CO-4	3	3	2	2	3	3	1	3	2	2	3	1	3	3	3
CO-5	3	3	3	2	3	2	1	3	2	2	3	2	3	3	3

JCS1011	BUSINESS INTELLIGENCE	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- Be exposed with the basic rudiments of business intelligence system
- Understand the modeling aspects behind Business Intelligence
- Understand of the business intelligence life cycle and the techniques used init
- Be exposed with different data analysis tools and techniques
- Be exposed to areas of interest of Business Intelligence

UNIT I BUSINESS INTELLIGENCE 9

Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence.

UNIT II KNOWLEDGE DELIVERY 9

The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, dimensional analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.

UNIT III EFFICIENCY 9

Efficiency measures – The CCR model: Definition of target objectives – Peer groups –Identification of good operating practices; cross efficiency analysis – virtual inputs and outputs Other models. Pattern matching – cluster analysis, outlier analysis

UNIT IV BUSINESS INTELLIGENCE APPLICATIONS 9

Marketing models – Logistic and Production models – Case studies.

UNIT V FUTURE OF BUSINESS INTELLIGENCE 9

Future of business intelligence – Emerging Technologies, Machine Learning, Predicting the Future, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology-Mobile Business intelligence

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- Explain the fundamentals of business intelligence.
- Link data mining with business intelligence.
- Apply various modeling techniques.
- Explain the data analysis and knowledge delivery stages.
- Apply business intelligence methods to various situations.
- Decide on appropriate technique.

TEXT BOOK:

1. Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision Support and Business Intelligence Systems", 9th Edition, Pearson 2013.

REFERENCES:

1. Larissa T.Moss, S.Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley,2003.
2. Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.
3. David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager"s Guide", Second Edition, 2012.
4. Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", McGraw-Hill,2007.
5. Ralph Kimball, Margy Ross, Warren Thornthwaite, Joy Mundy, Bob Becker, "The Data Warehouse Life cycle Toolkit", Wiley Publication Inc., 2007.

Mapping of CO with PO / PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO- 1	3	3	3	2	3	3	1	3	2	1	3	2	3	3	2
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CO-3	3	3	3	2	3	2	1	3	2	1	3	2	3	3	2
CO-4	3	3	2	2	3	3	1	3	2	2	3	1	3	3	3
CO-5	3	3	3	2	3	2	1	3	2	2	3	2	3	3	3

JCS1012	ADHOC AND SENSOR NETWORKS (Common to CSE & IT)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- Learn the design issues in adhoc and sensor networks.
- Understand the different types of MAC protocols.
- Be exposeto the TCP issues in adhoc networks.
- Learn the architecture and protocols of wireless sensor networks.
- Be familiar with different types of adhoc routing protocols.

UNIT I INTRODUCTION 9

Fundamentals and Characteristics of Wireless Communication Technology – Electromagnetic Spectrum and Radio propagation Mechanisms –-Mobile Ad hoc networks (MANETs) and Wireless sensor networks (WSNs): Concepts–Architecture-DesignchallengesandApplications.

UNIT II MAC PROTOCOLS FOR ADHOC WIRELESS NETWORKS 9

MAC Protocol-Designissues-Classification -self-organizing, Hybrid TDMA/FDMA and CSMA-Contention based protocols- Contention based protocol with Reservation and Scheduling Mechanisms–Multichannel MAC-IEEE802.11

UNIT III ROUTING PROTOCOLS AND TRANSPORT LAYER IN ADHOCWIRELESS NETWORKS 9

Ad hoc network routing protocols – Design issues- Classification: proactive routing, reactive routing (on-demand), hybrid routing – Classification of Transport Layer solutions – TCP over Adhoc wireless Networks.

UNIT IV WIRELESS SENSOR NETWORKS AND ROUTING 9

Single node architecture: hardware and software components of a sensor node–WSN: typical network architectures - data relaying and aggregation strategies - WSN routing and issues – OLSR

UNIT V LOCALIZATION & QOS 9

Localization concept - Classification: Indoor and Sensor Network Localization – Absolute andRelative localization – triangulation – QOS in WSN – Energy Efficient Design – Synchronization - Transport Layer issues.

TOTAL 45 PERIODS

COURSE OUTCOMES:

Upon completion of the course, the student should be able to:

- Explain the concepts, network architectures and characteristics of adhoc and wireless sensor networks
- Analyze the protocol design issues of ad hoc and sensor networks
- Design routing protocols for adhoc and wireless sensor networks with respect to some protocol design issues.
- Design and implementation of different protocols of WSN.
- Evaluate the QoS related performance measurements of adhoc and sensor networks.
- Develop the simulation of different sensor network platform

TEXT BOOK:

1. C.Siva Ram Murthy, and B.S.Manoj, "AdHoc Wireless Networks: Architectures and Protocols", Prentice Hall Professional Technical Reference, 2008.

REFERENCES:

1. Carlos De Morais Cordeiro, Dharma Prakash Agrawal "Ad Hoc & Sensor Networks:Theory and Applications", world Scientific Publishing Company, 2006.
2. FengZhao and Leonides Guibas, "Wireless Sensor Networks", Elsevier Publication–2002.
3. Holger Karland Andreas Willig "Protocols and Architectures for Wireless Sensor Networks",Wiley,2005
4. Kazem Sohraby, Daniel Minoli, & TaiebZnati, "Wireless Sensor Networks-Technology, Protocols, and Applications", John Wiley, 2007.
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4. https://studentsfocus.com/cs6003-asn-notes-adhoc-sensor-networks-lecture-handwritten-notes-cse-7th-sem-anna-university/
5. http://www.cs.ucc.ie/~adrian/cs6003_lectures.html

Mapping of CO with PO / PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO- 1	3	3	3	3	2	3	1	2	1	3	1	3	1	1	1
CO-2	3	2	3	3	1	2	2	1	1	2	3	3	1	1	1
CO-3	3	3	3	3	2	2	2	3	2	3	3	3	1	2	1
CO-4	3	2	3	2	3	3	2	2	2	2	3	3	3	2	1
CO-5	3	3	3	2	2	3	3	2	1	2	2	3	3	3	3

JCS1013	ADVANCED DATABASE TECHNOLOGY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To learn the modeling and design of databases.
- To acquire knowledge on parallel and distributed databases and its applications.
- To study the applications of Object Oriented database
- To understand the principles of intelligent databases and usage of advanced data models.
- To learn the basics of emerging databases such as XML, Cloud and Big Data.

UNIT I PARALLEL AND DISTRIBUTED DATABASES 9

Database System Architectures: Centralized and Client – Server Architectures –Server System Architectures – Parallel Systems – Distributed Systems – Parallel Databases: I/O Parallelism - Inter and Intra Query Parallelism – Inter and Intra operation Parallelism– Distributed DatabaseConcepts-Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier Client Server Architecture – Case Studies.

UNIT II INTELLIGENT DATABASES 9

Active Databases: Syntax and Semantics (Starburst, Oracle,DB2) – Taxonomy – Applications - Design Principles for Active Rules - Temporal Databases: Overview ofTemporal Databases TSQL2- Deductive Databases - Recursive Queries in SQL – Spatial Databases- Spatial Data Types – Spatial Relationships - Spatial Data Structures – Spatial Access Methods – Spatial DB Implementation

UNIT III OBJECT AND XML DATABASES 9

Concepts for Object Databases: Object Identity – Object structure – Type Constructors- Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance. XML Databases: XML - Related Technologies - XML Schema - XML Query Languages –Storing XML in Databases – XML and SQL

UNIT IV MOBILE AND MULTIMEDIA DATABASES 9

Mobile Databases: Locationand Hand off Management – Effect of Mobility on Data Management – Location Dependent Data Distribution - Mobile Transaction Models – Concurrency Control- Transaction Commit Protocols - Multimedia Databases - Image Databases – Audio Databases–Video Databases.

UNIT V EMERGING DATABASE TECHNOLOGIES 9

Web Databases- Geographic Information Systems - Biological Data Management – Cloud Based Databases: Data Storage Systems on the Cloud - Cloud Storage Architectures – Cloud Data Models- Query Languages - Introduction to Big Data – Storage – Analysis.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the students should be able to:

- Demonstrate the usage of high performance database like parallel and distributed database.
- Model the real world data using object oriented database.
- Apply the rule set in the database to implement intelligent databases
- Organize the data using XML database for better interoperability.
- Make use of big data and store in a transparent manner in the cloud.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F.Korth, S.Sudharshan, “Database System Concepts”, Seventh Edition, Tata McGrawHill, 2019.
2. Raghu Ramakrishnan, “Database Management Systems”, Fourth Edition, McGraw-Hill College Publications, 2015.

REFERENCES:

1. Thomas Cannolly and Carolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, Sixth Edition, Pearson Education, 2015.
2. Ramez Elmasri, Shamkant B.Navathe,, “Fundamentals of Database Systems”, Seventh Edition, Pearson Education, 2017.

3. V.Subramaniam, “Principles of Multimedia Databases”, Morgan Kauffman Publishers, 2008.
4. C.J.Date, A.Kannan and, S.Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.
5. Vijay Kumar, “Mobile Database Systems”, Third Edition, John Wiley & Sons, 2006.

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1. https://www.tutorialspoint.com/dbms/index.htm
2. https://www.academia.edu/34567765/Advanced_Database_Management_System
3. https://www.sisense.com/blog/quick-guide-database-technologies/
4. https://webuilddatabases.com/technology/
5. https://webuilddatabases.com/technology/

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO- 1	3	3	3	3	2	3	1	2	1	3	1	3	2	1	3
CO-2	3	2	3	3	1	2	2	1	1	2	3	3	1	1	1
CO-3	3	3	3	3	2	2	2	3	2	3	3	3	1	1	1
CO-4	3	2	3	2	3	3	2	2	2	2	3	3	3	1	2
CO-5	3	3	3	2	2	3	3	2	1	2	2	3	1	2	1

JEI1002	DIGITAL SIGNAL PROCESSING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To classify signals and systems.
- To learn the discrete time systems.
- To study various discrete Fourier transformation techniques and their computation.
- To impart knowledge about filters and their design for digital implementation.
- To introduce about digital signal processor and its applications.

UNIT I INTRODUCTION TO SIGNALS AND SYSTEMS 9

Classification of systems: Continuous, discrete, linear, causal, stable, dynamic, recursive, time variance; classification of signals: continuous and discrete, energy and power; mathematical representation of signals; sampling techniques; quantization, quantization error, Nyquist rate, aliasing effect.

UNIT II DISCRETE TIME SYSTEM ANALYSIS 9

Z-transform and its properties, inverse z-transforms; difference equation – Solution by ztransform, application to discrete systems-Stability analysis, frequency response– Convolution–Discrete Time Fourier transform.

UNIT III DISCRETE FOURIER TRANSFORM AND COMPUTATION 9

Discrete Fourier Transform-properties, magnitude and phasere presentation-Computation of DFT using FFT algorithm– DIT and DIF using radix2 FFT–Butterfly structure.

UNIT IV DESIGN OF DIGITAL FILTERS 9

FIR & IIR filter realization–Parallel & cascade forms. FIR design: Windowing Techniques – Need and choice of windows–Linear phase characteristics. Analog filter design–Butter worth and Che by shev approximations; IIR Filters, digital design using impulse in variant and bilinear transformation .

UNIT V DIGITAL SIGNAL PROCESSORS ANDAPPLICATIONS 9

Introduction, commercial Digital Signal Processor – Architecture – Features – Addressing Formats – Functional modes –Image processing techniques-Application of DSP in Image processing, Radar system.

TOTAL:45 PERIODS

COURSE OUTCOMES:

At the end of the course, the student will be able

CO1: To understand and apply signals and systems.

CO2: To gain knowledge about the discrete time systems.

CO3: To understand various discrete Fourier transformation techniques and their computation.

CO4: To acquire knowledge about filters and their design for digital implementation.

CO5: To understand digital signal processor and its applications.

TEXT BOOKS:

1. J.G.Proakisand D.G.Manolakis, 'Digital Signal Processing Principles, Algorithms and Applications', Pearson Education, New Delhi, PHI.2003.
2. S.K. Mitra, 'Digital Signal Processing – A Computer Based Approach', McGraw Hill Edu, 2013.
3. Robert Schilling & Sandra L.Harris, 'Introduction to Digital Signal Processing using Matlab', Cengage Learning, 2014.

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1. Poorna Chandra S, Sasikala. B ,'Digital Signal Processing', Vijay Nicole/TMH,2013.
2. B.P.Lathi, 'Principles of Signal Processing and Linear Systems', Oxford UniversityPress,2010.
3. Taan S. ElAli, 'Discrete Systems and Digital Signal Processing with Mat Lab',CRCPress, 2009.

4. Sen M.kuo, woonseng…s.gan, “Digital Signal Processors, Architecture,I mplementations & Applications, Pearson, 2013.
5. Dimitris G.Manolakis, Vinay K. Ingle, “Applied Digital Signal Processing”, Cambridge,2 012.
6. Lonnie C.Ludeman, “Fundamentals of Digital Signal Processing”, Wiley, 2013.

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2. www.electronicstutorial.net
3. https://www.eetimes.com
4. https://www.analog.com
5. https://www.sciencedirect.com

OPEN ELECTIVE 3
SEMESTER VI

JCS9007	ESSENTIALS OF SOFTWARE PROJECT MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the Software Project Planning and Evaluation techniques.
- To plan and manage projects a teach stage of the software development lifecycle (SDLC).
- To learn about the activity planning and risk management principles.
- To manage software projects and control software deliverables.
- To develop skills to manage the various phases involved in project management and people management.
- To deliver successful software projects that support organization‘s strategic goals.

UNIT I PROJECT EVALUATION AND PROJECT PLANNING 9

Importance of Software Project Management – Activities – Methodologies – Categorization ofSoftware Projects – Setting objectives – Management Principles – Management Control –Project portfolio Management– Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNIT II PROJECT LIFE CYCLE AND EFFORT ESTIMATION 9

Software process and Process Models – Choice of Process models – Rapid Application development– Agile methods – SCRUM-KANBAN – Dynamic System Development Method - Extreme Programming – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points - COCOMO II – a Parametric Productivity Model

UNIT III ACTIVITY PLANNING AND RISK MANAGEMENT 9

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Formulating Network Model – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Risk Planning –Risk Management – PERT technique – Monte Carlo simulation – Resource Allocation –Creation of critical paths – Cost schedules.

UNIT IV PROJECT MANAGEMENT AND CONTROL 9

Framework for Management and control – Collection of data – Visualizing progress – Cost monitoring – Earned Value Analysis – Prioritizing Monitoring – Project tracking – Change control – Software Configuration Management – Managing contracts – Contract Management-Project Recovery.

UNIT V STAFFING IN SOFTWARE PROJECTS 9

Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham – Hackman job characteristic model – Stress – Health and Safety – Ethical andProfessional concerns – Working in teams – Decision making – Organizational structures –Dispersed and Virtual teams –Communications genres–Communicationplans –Leadership.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- Understand Project Management principles while developing software.
- Gain extensive knowledge about the basic project management concepts, frame work and the process models.
- Obtain adequate knowledge about software process models and software effort estimation techniques.
- Estimate the risks involved in various project activities.
- Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.
- Learn staff selection process and the issues related to people management

TEXT BOOK:

1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – FifthEdition,TataMcGraw Hill, New Delhi,2012.

REFERENCES:

1. Robert K. Wysocki ―Effective Software Project Management‖ – Wiley Publication, 2011.
2. Walker Royce:―Software Project Management‖-Addison-Wesley, 1998.
3. Gopalaswamy Ramesh,―Managing Global Software Projects‖–McGraw Hill Education (India), Fourteenth Reprint 2013.
4. DavidJ.AndersonandEliSchragenheim,―Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results‖, Prentice Hall,2003.
5. Hazza and Dubinsky, ―Agile Software Engineering, Series: Undergraduate Topics inComputer Science‖, Springer, 2009.

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2. https://www.geeksforgeeks.org/software-engineering-software-project-management-spm/
3. https://www.cprime.com/resources/what-is-agile-what-is-scrum/
4. https://www.atlassian.com/agile
5. https://www.tutorialspoint.com/agile/index.htm

Mapping of CO with PO

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	3	1	2	1	3	1	3
CO2	3	2	3	3	1	2	2	1	1	2	3	3
CO3	3	3	3	3	2	2	2	3	2	3	3	3
CO4	3	2	3	2	3	3	2	2	2	2	3	3
CO5	3	3	3	2	2	3	3	2	1	2	2	3
AVG	3	3	3	3	2	3	2	2	2	2	3	3

JCS9008	FUNDAMENTALS OF BIG DATA	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To learn big dat aconcepts, architecture, business analysis and tools
- Define big data for business intelligence
- Analyze business case studies for big data analytics
- Explain managing of Big dataWithout SQL
- Develop map-reduce analytics using Hadoop and related tools

UNIT I UNDERSTANDING BIG DATA 9

What is big data – why big data –.Data!, Data Storage and Analysis, Comparison with OtherSystems, Rational Database Management System , Grid Computing, Volunteer Computing, convergence of key trends–unstructured data–industryexamples of big data–web analytics – big data and marketing –fraud and big data – risk and big data – credit risk management –big data and algorithmic trading–big data and health care – big data in medicine – advertising and big data – big data technologies – introduction to Hadoop – open source technologies – cloud and big data – mobile business intelligence – Crowd sourcing analytics – inter and trans firewall analytics.

UNIT II NOSQL DAT AMANAGEMENT 9

Introduction to NoSQL – aggregate data models – aggregates – key-value and document datamodels – relationships – graph databases – schema less databases – materialized views –distribution models – shading — version –map reduce – partitioning and combining–composingmap-reducecalculations.

UNIT III BASICS OF HADOOP 9

Data format –analyzing data with Hadoop– scalingout – Hadoop streaming–Hadoop pipes – design of Hadoop distributed file system (HDFS) – HDFS concepts – Java interface – dataflow – Hadoop I/O – data integrity – compression – serialization – Avro – file-based datastructures.

UNIT IV MAP REDUCE APPLICATIONS 9

MapReduce workflows – unit tests with MRUnit – test data and local tests – anatomy of Map Reduce job run – classic Map-reduce – YARN – failures in classic Map-reduce and YARN – job scheduling– shuffle and sort – task execution – Map Reduce types – input formats – output formats

UNIT V HADOOP RELATED TOOLS 9

Hbase–data model and implementations – Hbase clients – Hbase examples – praxis.Cassandra– Cassandra data model – Cassandra examples – Cassandra clients – Hadoop integration. Pig–Grunt – pig data model –Pig Latin – developing and testing Pig Latin scripts. Hive – data types and file formats – Hive QL data definition – Hive QL data manipulation –Hive QL queries.

TOTAL 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to

- Describe big data and use cases froms elected business domains
- Explain No SQL big data
- Install, configure,and run Hadoop and HDFS
- Perform map-reduce analytics using Hadoop
- Familiar with Hadoop tools

TEXT BOOKS:

1. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012.
2. Eric Sammer, "Hadoop Operations", O'Reilley, 2012.

REFERENCES:

1. Vignesh Prajapati, Big data analytics with R and Hadoop, SPD2013.
2. E.Capriolo, D.Wampler, and J.Rutherglen," Programming Hive", O'Reilley,2012.
3. Lars George,"HBase: The Definitive Guide", O'Reilley, 2011.

WEBSITE REFERENCES:

1. https://www.tutorialspoint.com/big_data_analytics/index.htm
2. https://www.javatpoint.com/what-is-big-data
3. https://www.guru99.com/bigdata-tutorials.html

Mapping of CO with PO/PSO

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	3	1	2	1	3	1	3
CO2	3	2	3	3	1	2	2	1	1	2	3	3
CO3	3	3	3	3	2	2	2	3	2	3	3	3
CO4	3	2	3	2	3	3	2	2	2	2	3	3
CO5	3	3	3	2	2	3	3	2	1	2	2	3
AVG	3	3	3	3	2	3	2	3	2	2	3	3

JCS9009	SECURITY PRACTICES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To learn the fundamentals of practices followed in system and web security
- To have an understanding of the basic security concepts in networks
- To deploy the security essentials in IT Sector
- To be exposed to the concepts of Cyber Security and encryption Concepts
- To perform a detailed study of Privacy and Storage security and related Issues.

UNIT I SYSTEM SECURITY 9

Building a secure organization – A Cryptography primer – detecting system Intrusion - Preventing system Intrusion - Fault tolerance and Resilience in cloud computing environments

UNIT II NETWORK SECURITY 9

Firewalls -. IP Security-. VPN - Intrusion Detection - Web Security- SSL – TLS- Local Area Network Security - Wireless Network Security - Cellular Network Security - Optical Network Security – Overview of web security – Secured Web Programming.

UNIT III SECURITY MANAGEMENT 9

Information security essentials for IT Managers – Security Management System – Policy Driven System Management - IT Security – Identity Management System - Intrusion and Detection and Prevention System.

UNIT IV CYBER SECURITY 9

Introduction – Computer Security – Threats – Harm – Vulnerabilities – Controls – Authentication - Access Control and Cryptography – Web - User Side - Browser Attacks - Web Attacks Targeting Users – Obtaining User or Website Data – Email Attacks

UNIT V PRIVACY AND STORAGE SECURITY 9

Privacy on the Internet - Privacy Enhancing Technologies - Personal privacy Policies - Detection of Conflicts in security policies - privacy and security in environment monitoring systems. Storage Area Network Security - Storage Area Network Security Devices – Risk management - Physical Security Essentials.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the students should be able to:

- Understand the core fundamentals of system security and web security
- Apply the security concepts related to networks in wired and wireless scenario
- Implement and Manage the security essentials in IT Sector
- Explain the concepts of Cyber Security and encryption Concepts
- Attain a through knowledge in the area of Privacy and Storage security and related issues.

TEXT BOOKS:

1. JohnR.Vacca, Computer and Information Security Handbook, Third Edition, Elsevier2017.
2. Michael E.Whitman, Herbert J.Mattord, Principal of Information Security, Fifth Edition, Cengage Learning, 2015.

REFERENCES:

1. Richard E.Smith, Elementary Information Security, Second Edition, Jones and Bartlett Learning, 2016
2. Charles P. Pfleeger Shari Lawrence Pfleeger Jonathan Margulies, Security in Computing, 5th Edition, Pearson Education, 2015
3. William Stallings, Cryptography and Network Security: Principles and Practice, PHI 5th Edition, 2010.

WEBSITE REFERENCES:

1. https://www.tutorialspoint.com/information_security_cyber_law/network_security.htm
2. https://www.synopsys.com/glossary/what-is-cyber-security.html
3. https://www.sciencedirect.com/science/article/pii/S1877050916315812
4. https://www.sciencedirect.com/topics/computer-science/security-management
5. https://www.oreilly.com/library/view/web-security-privacy/0596000456/ch04.html

Mapping of CO with PO / PSO

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	3	1	2	1	3	1	3
CO2	3	2	3	3	1	2	2	1	1	2	3	3
CO3	3	3	3	3	2	2	2	3	2	3	3	3
CO4	3	2	3	2	3	3	2	2	2	2	3	3
CO5	3	3	3	2	2	3	3	2	1	2	2	3
AVG	3	3	3	3	2	3	2	3	2	2	3	3

SEMESTER 7

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JCS1701	Big Data Analytics	PC	3	3	0	0	3
2	JCS1702 (Integrated)	Cloud Computing	PC	4	2	0	2	3
3		Professional Elective - IV	PE	3	3	0	0	3
4		Open Elective –IV	OE	3	3	0	0	3
5	JNC1361	Essence of Indian Traditional Knowledge	NCM	3	3	0	0	0
PRACTICALS								
6	JBA1711	Entrepreneurship for Engineers	EEC	2	0	0	2	1
7	NMS0001	Professional Readiness for Innovation ,Employability and Entrepreneurship	EEC	6	0	0	6	3
8	JCS1711	Big Data Analytics Laboratory	PC	4	0	0	4	2
9	JCS1731	Project work – Phase I	EEC	6	0	0	6	3
TOTAL				34	14	0	20	21

JCS1701	BIG DATA ANALYTICS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To know the fundamental concepts of bigdata and analytics.
- To explore tools and practices for working with bigdata.
- To analyse about association and recommendation rules.
- To learn about stream computing.
- To know about the research that requires the integration of large amounts of data.

UNIT-I INTRODUCTIONTOBIGDATA 9

Evolution of Bigdata-Best Practices for Bigdata Analytics-Bigdata characteristics– Validating the Promotion of the Value of Big Data - Use Cases- Characteristics of Big Data Applications - Perception and Quantification of Value-Understanding BigData Storage.

UNIT-II CLUSTERING AND CLASSIFICATION 9

Overview of Clustering - K-means - Use Cases -Overview of the Method- Determining the Number of Clusters - Classification: Decision Trees - Overview - Algorithms-Evaluation-NaïveBayes-Bayes'Theorem-NaïveBayesClassifier.

UNIT-III ASSOCIATION AND RECOMMENDATION SYSTEM 9

Association Rules - Overview - Apriori Algorithm - Evaluation of Candidate Rules - Applications of Association Rules - Finding Association & finding similarity - Recommendation System: Collaborative Recommendation- Content Based Recommendation - Knowledge Based Recommendation- Hybrid Recommendation.

UNIT-IV HADOOP FILE SYSTEM AND MAP-REDUCE 9

Hadoop Architecture, Internals of Hadoop File Systems. Map-Reduce Programming: Developing Distributed Programs and issues, Developing Map-Reduce programs in Java, Reduce works on HDFS, Examples: Running simple word count Map-Reduce program on the cluster, analyze call data records.

UNIT-V NOSQL DATA MANAGEMENT FOR BIG DATA AND VISUALIZATION 9

NoSQL Databases: Schema-less Models": Increasing Flexibility for Data Manipulation-Key Value Stores- Document Stores - Tabular Stores - Object Data Stores - Graph Databases Hive - Sharding –- Hbase – Analyzing big data with twitter - Big data for E-Commerce Big data for blogs Review of Basic Data Analytic Methods using R.

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

- Work withbigdatatools anditsanalysis techniques.
- Analyzedatabyutilizingclusteringandclassificationalgorithms.
- Apply different mining algorithms and recommendation systems for largevolumesofdata.
- Performon Hadoop and Map reduce programming.
- Explore NoSQLdatabasesandmanagement.

TEXT BOOKS

1. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", Morgan Kaufmann/Elsevier Publishers, 2013.
2. Sridhar Alla, “Big Data Analytics with Hadoop 3”, Packt Publications, May 2018.
3. Adam Shook, Donald Miner, “Map Reduce Design Patterns”, O’Reilly Media, Inc., 2012.
4. Anand Rajaraman and Jeffrey David Ullman, “Mining of MassiveDatasets”, Cambridge University Press, 2012.
5. EMC Education Services, "Data Science and Big Data Analytics:Discovering, Analyzing, Visualizing and Presenting Data", Wiley publisher, 2015.

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1. Bart Baesens, "Analytics in a Big Data World: The Essential Guide to Data Science and its Applications",Wiley Publishers,2015.
2. DietmarJannach and MarkusZanker, "Recommender Systems: An Introduction", Cambridge University Press,2010.
3. Kim H. Pries and Robert Dunnigan, "Big Data Analytics: A Practical Guide for Managers "CRC Press,2015.
4. Jimmy Lin and Chris Dyer, "Data-Intensive Text Processing with MapReduce", Synthesis Lectures on Human Language Technologies, Vol. 3, No. 1, Pages 1-177, Morgan Claypool publishers,2010.

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3. https://www.analyticssteps.com/blogs/what-big-data-analytics-definition-advantages-and-types
4. https://www.softwaretestinghelp.com/hadoop-mapreduce-tutorial/
5. https://www.techopedia.com/definition/28988/big-data-visualization

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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CO-3	3	3	-	3	2	-	-	-	-	-	-	-	2	-	-
CO-4	3	3	-	3	3	1	-	-	-	-	-	-	3	-	-
CO-5	3	-	-	3	3	-	-	-	-	-	-	-	2	-	

JCS1702	Cloud Computing	L	T	P	C
		2	0	2	3

COURSE OBJECTIVES

- To understand the concept of cloud computing.
- To learn the evolution of cloud from the existing technologies.
- To apply the knowledge on the various issues in cloud computing.
- Analyse storage architectures, processes, components and how they relate to virtualization.
- To identify the key aspects of developing applications using a framework.

UNIT-I INTRODUCTION TO CLOUD COMPUTING 9

Introduction to Cloud – Definition and Evolution of Cloud – Underlying Principles of Parallel and Distributed Computing – Cloud Characteristics – Elasticity in Cloud – Features of Today's Cloud, On-demand Provisioning.

UNIT-II CLOUD ENABLING TECHNOLOGIES 9

Service Oriented Architecture – REST and Systems of Systems – Web Services – Publish Subscribe Model – Virtualization Platforms & Techniques - Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization – Virtualization Structures – Tools and Mechanisms – Virtualization of CPU – Memory – I/O Devices –Virtualization Support and Disaster Recovery.

UNIT-III CLOUD ARCHITECTURE, SERVICES AND STORAGE 9

Layered Cloud Architecture Design – NIST Cloud Computing Reference Architecture – Public, Private and Hybrid Clouds - laaS – PaaS – SaaS – Architectural Design Challenges – Cloud Storage – Storage-as-a-Service – Advantages of Cloud Storage – Cloud Storage Providers – Google Cloud, Amazon S3, Windows Azure, IBM Cloud.

UNIT-IV RESOURCE MANAGEMENT AND SECURITY IN CLOUD 9

Inter Cloud Resource Management – Resource Provisioning and Resource Provisioning Methods – Global Exchange of Cloud Resources – Technical and Legal Issues in Cloud Computing - Security Overview – Cloud Security Challenges – Software-as-a-Service Security – Security Governance – Virtual Machine Security – IAM – Security Standards.

UNIT-V CLOUD TECHNOLOGIES AND ADVANCEMENTS 9

Hadoop – MapReduce in Google Cloud Platform– Virtual Box -- Google App Engine – Programming Environment for Google App Engine – Cloud Computing Development Tools.– Open Stack, SaltStack , AWS Cloud Development Kit (AWS CDK) , Windows Azure SDK – Federation in the Cloud – Four Levels of Federation – Federated Services and Applications – Future of Federation.

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

- Describe the main concepts, key technologies, strengths and limitations of cloud computing.

- Classify the key and enabling technologies that help in the development of cloud.
- Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
- Explain the core issues of cloud computing such as resource management and security.
- Recognize various Cloud Technologies and Advancements

TEXT BOOKS

1. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
2. SunilkumarManvi, Gopal K. Shyam,"Cloud Computing: Concepts and Technologies", CRC Press, Taylor & Francis Publishers, 2021.

REFERENCES

1. Rajiv Misra, Yashwant Singh Patel ,"Cloud and Distributed Computing: Algorithms and Systems", WILEY Publishers, 2020.
2. Rittinghouse, John W., and James F. Ransome, ―Cloud Computing: Implementation, Management and Security, CRC Press, 2017.
3. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, ―Mastering Cloud Computing‖, Tata Mcgraw Hill, 2013.
4. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing - A Practical Approach‖, Tata Mcgraw Hill, 2009.
5. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice), O'Reilly, 2009.

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1. https://nptel.ac.in/courses/101/104/106105167
2. https://www.coursera.org/learn/introduction-to-cloud
3. https://www.ibm.com/in-en/cloud/learn/soa
4. https://www.geeksforgeeks.org/rest-api-architectural-constraints/
5. https://aws.amazon.com/pub-sub-messaging/

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	**3**	**3**	**2**	**-**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**2**	**-**
CO-2	**3**	**3**	**2**	**-**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**2**	**-**
CO-3	**3**	**3**	**3**	**-**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**2**	**-**
CO-4	**3**	**3**	**3**	**-**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**1**	**-**
CO-5	**2**	**2**	**3**	**3**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**1**	**-**

JNC1361	ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE	L	T	P	C
		3	0	0	0

COURSE OBJECTIVES:

- To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.

UNIT I INTRODUCTION TO TRADITIONAL KNOWLEDGE 6

Define traditional knowledge (TK), nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT II PROTECTION OF TRADITIONAL KNOWLEDGE 6

The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT III LEGAL FRAME WORK AND TK 6

A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act);
B: The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indicators act 2003.

UNIT IV TRADITIONAL KNOWLEDGE AND INTELLECTUAL PROPERTY 6

Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT V TRADITIONAL KNOWLEDGE IN DIFFERENT SECTORS6

Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

At the end of the course, the student should be able:

1. To understand the concept of Traditional knowledge and its importance
2. To know the need and importance of protecting traditional knowledge.
3. To know the various enactments related to the protection of traditional knowledge.
4. To understand the concepts of Intellectual property to protect the traditional knowledge.
5. To know the applications of traditional knowledge in various fields.

REFERENCE BOOKS:

1. Amit Jha, “Traditional Knowledge System in India”, 2009.
2. Basanta Kumar Mohanta and Vipin Kumar Singh, “Traditional Knowledge System and

Technology in India", Pratibha Prakashan, 2012.
3. Amit Jha, "Traditional Knowledge System in India", Atlantic publishers,2002
4. Kapil Kapoor, MichelDanino, "Knowledge Traditions and Practices of India"

WEBSITE REFERENCES:

1. https://www.youtube.com/watch?v=LZP1StpYEPM
2. http://nptel.ac.in/courses/121106003/

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	-	-	1	1	1	1	1	-	-	-	-	-	1	1	1
CO-2	-	-	1	1	1	1	1	-	-	-	-	-	1	1	1
CO-3	-	-	1	1	1	1	1	-	-	-	-	-	1	1	1
CO-4	-	-	1	1	1	1	1	-	-	-	-	-	1	1	1
CO-5	-	-	1	1	1	1	1	-	-	-	-	-	1	1	1

JBA 1711	ENTREPRENEURSHIP FOR ENGINEERS	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- To provide exposure on insight of entrepreneurship
- To investigate the feasibility study for the new venture.
- To identify the right process for successful business plan

Sl.No	LIST OF ACTIVITIES	No.of Periods
1	Insight of Entrepreneurship	1
2	Business Idea	1
3	Business sources	1
4	Business Plan	1
5	Financial Plan	1
6	Market Survey	2
7	Feasibility report	2
8	Case study	3
9	Entrepreneurship Que Card	2
10	Prevention of Sickness & Measures	1

TOTAL: 20 PERIODS

COURSE OUTCOMES:

Students will be able,

- To procure knowledge on setting up of new venture
- To draft and approval of financial plan and appraisal of new project
- Toimpart the knowledge of effectiveness of innovation in entrepreneurship

REFERENCES

1. Hisrich,RobertD.,Michael Peters and Dean Shepherded, Entrepreneurship,TataMc GrawHill,2014.
2. SS.Khanka,Entrepreneurial Development,ThirdEdition,S.Chand&company,NewDelhi2001.
3. Srinivasan, Case Studies in marketing Indian context,sixth edition PHI learning private Limited2014.
4. Lall,Madhurima,and ShikhaSahai,Entrepreneurship,ExcelBook,NewDelhi.2008.

WEBSITES:

- https://ideadrop.co/innovation-management/top-five-favourite-idea-generationtechniques/
- https://www.bajajfinserv.in/what-are-the-sources-of-finance-for-entrepreneurs
- https://www.babson.edu/academics/undergraduate-school/core-experiences/foundations-of-management-and-entrepreneurship/
- https://www.businessgig.com/business-plan-preparation
- https://www.financierworldwide.com/the-impact-of-social-entrepreneurship-on-economic-growth.

NMS0001	PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP	L	T	P	C
		0	0	6	3

COURSE OBJECTIVES:

- To empower students with overall Professional and Technical skills required to solve a real world problem.
- To mentor the students to approach a solution through various stages of Ideation, Research, Design Thinking, Workflows, Architecture and building a prototype in keeping with the end-user and client needs.
- To provide experiential learning to enhance the Entrepreneurship and employability skills of the students.

This course is a four months immersive program to keep up with the industry demand and to have critical thinking, team based project experience and timely delivery of modules in a project that solves world problems using emerging technologies.

To prepare the students with digital skills for the future, the Experiential Project Based Learning is introduced to give them hands-on experience using digital technologies on open-source platforms with an end-to-end journey to solve a problem. By the end of this course, the student understands the approach to solve a problem with team collaboration with mentoring from Industry and faculties. This is an EEC category course offered as an elective, under the type, “Experiential Project Based Learning”.

Highlights of this course:

- Students undergo training on emerging technologies
- Students develop solutions for real-world use cases
- Students work with mentors to learn and use industry best practices
- Students access and use Self-Learning courses on various technologies, approaches and methodologies
- Collaborate in teams with other students working on the same topic
- Have a dedicated mentor to guide

COURSE OUTCOMES:

On completion of the course, the students will be able to:

- Upskill in emerging technologies and apply to real industry-level use cases
- Understand agile development process
- Develop career readiness competencies, Team Skills / Leadership qualities
- Develop Time management, Project management skills and Communication Skills
- Use Critical Thinking for innovative Problem Solving
- Develop entrepreneurship skills to independently work on products

The course will involve 40-50 hours of technical training, and 40-50 hours of project development

		L	T	P	C
JCS1711	**Big Data Analytics Laboratory**	**0**	**0**	**4**	**2**

COURSE OBJECTIVES

- To implement Map Reduce programs for processing big data
- To realize storage of big data using H base, Mongo DB.
- To analyse big data using linearmodels.
- To analyze big data using machine learning techniques such as SVM / Decision tree classifications.
- To implement clustering algorithms.

LIST OF EXPERIMENTS

Hadoop Framework

1. Install, configure and run Hadoop and HDFS
2. Implement word count / frequency programs using MapReduce
3. Implement a Map Reduce program that processes a weather dataset

R Languiage

4. Implement Linear and logistic Regression
5. Implement SVM / Decision tree classification techniques
6. Implement clustering techniques
7. Visualize data using any plotting framework
8. Implement an application that stores big data in Hbase / MongoDB / Pig using Hadoop / R.

TOTAL: 60 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

- Process big data using Hadoop framework
- Build and apply linear and logistic regression models
- Perform data analysis with machine learning methods
- Perform graphical data analysis
- Implementing Hadoop and R frameworks

LIST OF SOFTWARE (OPEN SOURCE)

- Hadoop
- YARN
- R Package
- Hbase
- MongoDB

TEXT BOOKS

1. Big Data Analytics Paperback – 1 March 2020 by G. Sudha Sadasivam (Author), R. Thirumahal (Author).
2. Big Data, Black Book: Covers Hadoop 2, MapReduce, Hive, YARN, Pig, R and Data Visualization Paperback – 1 January 2016.
3. Gareth James, Daniela Witten, Trevor Hastie and Robert Tibshirani, ―An Introduction to Statistical Learning with Applications in R‖, Springer Publications, 2015(Corrected 6 th Printing)
4. Alan Gates and Daniel Dai, "Programming Pig – Dataflow scripting with Hadoop", O'Reilley, 2nd Edition, 2016.

REFERENCES

1. Hadley Wickham,‖ggplot2 – Elegant Graphics for Data Analysis‖, Springer Publications,2nd Edition, 2016
2. Kristina Chodorow, "MongoDB: The Definitive Guide – Powerful and Scalable Data Storage", O'Reilley, 2nd Edition, 2013
3. Lars George, "HBase: The Definitive Guide", O'Reilley, 2015.
4. Tom White, ―Hadoop: The Definitive Guide – Storage and Analysis at Internet Scale‖, O'Reilley, 4th Edition, 2015.

WEBSITE REFERENCES

1. **https://www.geeksforgeeks.org/integration-of-hadoop-and-r-programming-language/**
2. **https://www.researchgate.net/publication/262378989_Integrating_R_and_Hadoop_for_Big_Data_Analysis**
3. **https://www.youtube.com/watch?v=IWjwtegs2ochttps://www.cs.carleton.edu/faculty/dmusican/cs348w16/hadoop/hadoopLab.html**

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	2	-	3	2	-	-	-	1	2	-	-	2	1	-
CO-2	3	3	-	2	2	-	-	-	1	3	-	-	1	1	-
CO-3	2	3	2	2	2	-	-	-	-	3	-	-	2	1	-
CO-4	2	2	1	2	1	-	-	-	1	3	-	-	1	1	-
CO-5	1	2	1	1	1	-	-	-	3	3	-	-	1	1	-

JCS1731	PROJECT WORK - PHASE - 1	L	T	P	C
		0	0	6	3

COURSE OBJECTIVES:

- To identify a specific problem for the present need of the society and collecting information related to the same through detailed literature survey.
- To develop the methodology to solve the identified problem.
- To design, analyze and simulate the chosen problem using the software package.
- To train the students in preparing project reports and to face reviews and viva-voce examination.

METHOD OF EVALUATION:

The students in a group of 3 to 4 work on a topic approved by the Head of the Department under the guidance of a faculty member, prepare a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee is constituted by the Head of the Department. The project work is evaluated based on oral presentation and the project report, jointly by external and internal examiners.

TOTAL :90 PERIODS

COURSE OUTCOMES:

On completion of the phase - 1 project work, the students will be able to

- Analyze and formulate the problem
- Identify the methodology needed to solve the problem.
- Identify the tools and techniques required to solve the problem.
- Work with team mates to acquire the required material needed to find solutions to the chosen problem.
- Effectively communicate the outcomes of the findings.

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO-2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO-3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO-4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO-5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

PROFESSIONAL ELECTIVE 4 – SEMESTER 7

JCS1014	INFORMATION RETRIEVAL TECHNIQUES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To understand the basics of information retrieval.
- To know the concepts of Boolean retrieval and index construction.
- To understand concepts of rank-ordering for query and evaluation in information retrieval system.
- To learn about enhancement techniques and probability theory for scoring.
- To explore web searching and web crawling.

UNIT I - INTRODUCTION 9

Information Retrieval – Early Developments – The IR Problem – The User‘s Task – Information versus Data Retrieval - The IR System – The Software Architecture of the IR System – The Retrieval and Ranking Processes - The Web – The e-Publishing Era – How the web changed Search – Practical Issues on the Web – How People Search – Search Interfaces Today – Visualization in Search Interfaces.

UNIT II - BOOLEAN RETRIEVAL AND INDEX CONSTRUCTION 9

Boolean retrieval: Processing Boolean queries - The extended Boolean model versus ranked retrieval - Index construction: Hardware basics - Blocked sort-based indexing - Single-pass in-memory indexing - Distributed indexing - Dynamic indexing - Other types of indexes.

UNIT III – RANK-ORDERING FOR QUERY AND EVALUATION 9

Scoring, term weighting and the vector space model: Parametric and zone indexes - Term frequency and weighting - The vector space model for scoring - Variant TF-IDF functions - Evaluation in information retrieval: Information retrieval system evaluation - Standard test collections - Evaluation of unranked retrieval sets - Evaluation of ranked retrieval results - Assessing relevance.

UNIT IV - RETRIEVAL ENHANCEMENT AND PROBABILITY THEORY 9

Relevance feedback and query expansion: Relevance feedback and pseudo relevance feedback -Global methods for query reformulation - Probabilistic information retrieval: The Probability Ranking Principle - The Binary Independence Model - Bayesian network approaches to IR

UNIT-V WEB SEARCH AND WEB CRAWLING 9

Web search: Web characteristics - The web graph - 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.

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

1. Describe the basics of information retrieval.
2. Implement Boolean retrieval techniques and index construction algorithms.
3. Apply ordering process and performance evaluation metric for IR.
4. Apply enhancement techniques and probability theory for scoring.
5. Analyze search engine functionality.

TEXT BOOKS

1. Modern Information Retrieval: The Concepts and Technology behind Search - Ricardo Baeza-Yates and Berthier Ribeiro-Neto, Second Edition, ACM Press Books, 2011.
2. Introduction to Information Retrieval - Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, Cambridge University Press, 2017.
3. Search Engines: Information Retrieval in Practice – W. Bruce Croft, Donald Metzler, and Trevor Strohman, Pearson Education, 2009

REFERENCES

1. Cheng Xiang Zhai, Statistical Language Models for Information Retrieval (Synthesis Lectures Series on Human Language Technologies), Morgan & Claypool Publishers, 2008.
2. Modern Information Retrieval - Baeza-Yates Ricardo and Berthier Ribeiro – Neto, 2nd edition, Addison-Wesley, 2011.
3. Information Retrieval: Implementing and Evaluating Search Engines - Stefan Buttcher, Charlie Clarke, Gordon Cormack, MIT Press, 2016.

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1. https://medium.com/voice-tech-podcast/information-retrieval-using-boolean-query-in-python-e0ea9bf57f76
2. https://dl.acm.org/doi/abs/10.1145/3415148
3. http://orion.lcg.ufrj.br/Dr.Dobbs/books/book5/chap14.htm
4. https://academic.oup.com/comjnl/article-pdf/35/3/243/1406352/35-3-243.pdf
5. https://www.cs.ucy.ac.cy/courses/EPL660/lectures/lecture13.pdf

Mapping of CO with PO/PSO

	PROGRAM OUTCOMES												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	1	2	2	3	-	-	-	-	-	2	3	3	2	2
CO-2	3	3	3	3	3	-	-	-	-	-	2	3	3	2	2
CO-3	3	3	3	3	3	-	-	-	-	-	2	3	3	3	3
CO-4	3	2	3	3	3	-	-	-	-	-	2	3	2	3	3
CO-5	3	1	2	2	3	-	-	-	-	-	2	3	3	3	3

JGE1001	PROFESSIONAL ETHICS IN ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To create an awareness on Human Values in Engineering Ethics.
- To enable the students to create an awareness on Engineering Ethics
- To instill the Engineering as Experimentation process.
- To impart knowledge on safety, responsibilities and rights of Engineers.
- To impart knowledge on global issues.

UNIT-I HUMAN VALUES 10

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect forothers – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation –Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

UNIT-II ENGINEERING ETHICS 9

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories.

UNIT-III ENGINEERING AS SOCIAL EXPERIMENTATION 9

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics –A Balanced Outlook on Law.

UNIT-IV SAFETY , RESPONSIBILITIES AND RIGHTS 9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interes – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

UNIT-V GLOBAL ISSUES 9

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors –Moral Leadership –Code of Conduct – Corporate Social Responsibility.

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

- Understand the concept of Human Values
- Understand about the Engineering Ethics concepts.
- Understand the concept of Moral and Social Values
- Gain knowledge on safety, responsibilities and rights of Engineers.
- Understand the concept of global issues.

TEXT BOOKS

1. MikeW.Martinand Roland Schinzinger, "Ethics in Engineering",Tata McGraw Hill, NewDelhi,2003.
2. Govindarajan M,Natarajan S, SenthilKumarV.S, "Engineering Ethics",Prentice Hall of India, NewDelhi, 2004.
3. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.

REFERENCES

1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
2. John R Boat right, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
3. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.

4. Laura P. Hartman and Joe Desjardins, “Business Ethics: Decision Making for Personal Integrity and Social Responsibility” McGraw Hill education, India Pvt.Ltd., New Delhi, 2013.

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1. www.nptel.ac.in
2. https://www.nspe.org/resources/ethics
3. https://www.slideshare.net/
4. https://www.tutorialspoint.com/engineering_ethics/engineering_ethics
5. https://sites.tufts.edu/

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	1	2	-	1	-	-	1	3	-	-	1	1	1	3	2
CO-2	1	2	-	1	-	-	1	3	-	-	1	1	2	3	2
CO-3	1	2	-	1	-	-	1	3	-	-	1	1	3	1	1
CO-4	1	2	-	1	-	-	1	3	-	-	1	1	1	2	2
CO-5	1	2	-	1	-	-	1	3	-	-	1	1	3	-	3

JGE1004	Intellectual Property Rights	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To recognize the importance of IP and to educate the pupils on basic concepts of Intellectual Property Rights.
- To identify the significance of practice and procedure of Patents.
- To make the students to understand the statutory provisions of different forms of IPRs in simple forms.
- To learn the procedure of obtaining Patents, Copyrights, Trade Marks &Industrial Design
- To enable the students to keep their IP rights alive.

UNIT-I INTRODUCTION 9

Importance of human creativity and its recognition and protection - Concepts of Property and Rights - Different forms of IPRs - Industrial Property- Role of IPRs in R and D-technological Research, Inventions and Innovations – Important examples of IPR- IPR in India and Abroad – Genesis and Development – the way from WTO to WIPO –TRIPS-Government Schemes in IPR – Career Opportunities in IP.

UNIT-II PATENTS 9

Patents - Elements of Patentability: Novelty , Non Obviousness (Inventive Steps), Industrial Application - Non - Patentable Subject Matter - Registration Procedure, Rights and Duties of Patentee, Assignment and licence , Restoration of lapsed Patents, Surrender and Revocation of Patents, - Patent office --Infringement of IPRs, Enforcement Measures, Emerging issues – Case Studies.

UNIT-III PATENT SEARCH AND PATENT DRAFTING 9

Patent Searches − Overview and Importance-Tools and Methodologies for Patent Searchesand Free Patents Online for patent searchesPatent Drafting-Introduction to Specification-Structure of Provisional and Complete Specification Understanding information in a Patent Specification / Bibliographic data of a Patent document [IPO, US,WIPO]

UNIT-IV COPYRIGHTS AND TRADEMARKS 9

Nature of Copyright - Subject matter of copyright: original literary, dramatic, musical, artistic works; cinematograph films and sound recordings - Registration Procedure, Term of protection, Ownership of copyright, Related Rights - Distinction between related rights and copyrights

Concept of Trademarks - Different kinds of marks (brand names, logos, signatures, symbols, well known marks, certification marks and service marks) - Non Registrable Trademarks - Registration of Trademarks

UNIT-VDESIGN,GEOGRAPHICAL INDICATION, PLANT VARIETY PROTECTION AND TRADE SECRETS 9

Design: meaning and concept of novel and original - Procedure for registration, effect of registration and term of protection - Geographical Indication (GI) Geographical indication: meaning, and difference between GI and trademarks - Procedure for registration, effect of registration and term of protection- Plant variety protection: meaning and benefit sharing and farmers' rights – Procedure for registration, effect of registration and term of protection- Confidential Information and Trade Secrets

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

- Distinguish and explain various forms of IPRs.
- Classify criteria's to fit one's own intellectual work in particular form of IPRs
- Apply statutory provisions to protect particular form of IPRs
- Analyse rights and responsibilities of holder of Patent, Copyright, Trademark, Industrial Design etc.
- Discern procedure to protect different forms of IPRs national and international

TEXT BOOKS

1. Nithyananda, K V. (2019). *Intellectual Property Rights: Protection and Management*. India, IN: Cengage Learning India Private Limited.
2. Neeraj, P., &Khusdeep, D. (2014). *Intellectual Property Rights*. India, IN: PHI learning Private Limited.
3. Dr. S.R.Myneni, "Law of Intellectual Property", 9th Ed, Asia law House, 2019

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1. World Intellectual Property Organisation. (2004). *WIPO Intellectual property Handbook*. Retrieved from https://www.wipo.int/edocs/pubdocs/en/intproperty/489/wipo_pub_489.pdf
2. Ahuja, V K. (2017). *Law relating to Intellectual Property Rights*. India, IN: Lexis Nexis.

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1. Cell for IPR Promotion and Management (http://cipam.gov.in/)
2. World Intellectual Property Organisation (https://www.wipo.int/about-ip/en/)
3. Office of the Controller General of Patents, Designs & Trademarks (http://www.ipindia.nic.in/)

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	-	1	3	-	-	2	1	-	1	1	1	3	3	3
CO-2	3	1	2	3	2	-	2	1	-	1	1	1	2	2	2
CO-3	3	1	2	3	2	-	2	1	-	1	1	1	1	1	1
CO-4	3	-	1	1	-	-	1	1	-	1	1	1	1	1	1
CO-5	3	-	1	1	-	-	1	1	-	1	1	1	1	1	1

		L	T	P	C
JCS1015	OPERATIONS RESEARCH	3	0	0	3

COURSE OBJECTIVES

- To formulate and to find solutions of Linear Programming Problem
- To solve problems in transportation and assignment of jobs
- To learn sequencing techniques
- To analyze the project scheduling techniques
- To learn game theory

UNIT-I INTRODUCTION AND LINEAR PROGRAMMING 9

Introduction to Operations Research – Operations Research Modelling Approach – Linear Programming Problem (LPP) – Assumptions of LPP – Formulation of LPP – Graphical Method – Simplex Method – Big M Method – Dual simplex Method – Primal Dual Problems.

UNIT-II TRANSPORTATION AND ASSIGNMENT 9

Transportation Problem: North West Corner Rule – Minimum Cost Method – Vogel's Approximation Method – Stepping Stone Method – Modified Distribution (MODI) Method. Assignment Problem: Hungarian Algorithm – Solving unbalanced problem.

UNIT-III INTEGER PROGRAMMING AND SEQUENCING 9

Integer Programming: Cutting Plane Algorithm – Branch and Bound Algorithm.
Sequencing Models: Processing n-jobs through two machines, n-jobs through three machines, n-jobs through m-machines – Graphic solution.

UNIT-IV NETWORK MODEL 9

Network construction – Critical Path method – Project evaluation and Review technique – Resource Analysis in Network Scheduling.

UNIT-V GAME THEORY AND METAHEURISTICS 9

Game Theory: Formulation of Two-Person, Zero-Sum Games – Solving Simple Games – Games with Mixed Strategies – Graphical Solution Procedure.

Metaheuristics: Nature of Metaheuristics – Tabu Search – Simulated Annealing – Genetic Algorithms.

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

- Develop mathematical models and solve LPP
- Solve transportation and assignment problems
- Propose optimal sequence of jobs on machines
- Solve project management problems
- Illustrate game theory

TEXT BOOKS

1. Hillier and Liebermann, Introduction to Operations Research, Ninth Edition, McGraw Hill Education, 2010
2. G. Srinivasan, Operations Research: Principles and Applications, Second Edition, PHI, 2010

REFERENCES

1. Gupta P.K. and Hira D.S., Operations Research, Sixth Edition, S. Chand Publications, 2006.
2. Panneerselvam R, Operations Research, Second Edition, Prentice Hall of India, 2010.
3. Taha H A, Operations Research: An Introduction, Tenth Edition, Pearson Education Limited, 2017

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1. https://sites.pitt.edu/~jrclass/or/or-intro.html
2. https://users.cs.duke.edu/~brd/Teaching/Bio/asmb/current/Handouts/munkres.html
3. https://s2.smu.edu/~olinick/cse3360/lectures/b-and-b/l22.html
4. https://www.cmu.edu/cee/projects/PMbook/10_Fundamental_Scheduling_Procedures.html
5. http://www.laits.utexas.edu/~anorman/05/qqgame.html

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	2	2	2	-	2	2	-	3	3	3	3	-	3
CO-2	3	3	2	2	2	-	2	2	-	3	3	3	3	-	3
CO-3	3	3	2	2	2	-	2	2	-	3	3	3	3	-	3
CO-4	3	3	2	2	2	-	2	2	-	3	3	3	3	-	3
CO-5	3	3	2	2	2	-	2	2	-	3	3	3	3	-	3

JBA1038	PRINCIPLES OF MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To infer the basic concepts of Management.
- To explain the importance of planning and decision-making.
- To assess organizational structure and human resource planning.
- To discuss thevarious component of leading function
- To explain the various techniques of controlling using computers.

UNIT I CONCEPT AND APPROACHES IN MANAGEMENT 9

Definition of Management– Science or Art– Manager Vs Entrepreneur - types of managers -Managerial roles and skills–EvolutionofManagement– Scientific, human relations,system and contingency approaches-Current trends and issues in Management.

UNIT II PLANNING 9

Nature and purpose of planning – planning process – types of planning – objectives – setting objectives –policies – Planning premises – Strategic Management – Planning Tools and Techniques – Decision making steps and process.

UNIT III ORGANISING 9

Nature and purpose–Formal and informal organization –organization chart–organization Structure–types Line and staff authority–departmentalization–delegation of authority–centralization and decentralization-JobDesign-Human Resource Management–HRPlanning, global Recruitment and selection,Training and Development, Performance Management , Career planning and management.

UNIT IV LEADING 9

Foundations of individual and group behaviour–motivation–motivation theories–motivational techniques –job satisfaction–job enrichment–leadership–types and theories of leadership–communication–process of communication –barrier in communication – effective communication –communication and IT.

UNITV CONTROLLING 9

System and process of controlling – budgetary and non-budgetary control techniques – use of Computers andIT in Management control – Productivity problems and management – control and performance – direct and preventive control.

TOTAL:45 PERIODS

COURSE OUTCOMES:

Studentswill beable to,

- Discuss the concept of managerial functions.
- Applydecision-making strategies for uncertainty situations.
- Infer about Recruitment and selection process.
- Demonstrate leadership quality and effective communication skill
- Apply the skills to estimate productivity.

TEXT BOOKS:

1. StephenA.Robbins & DavidA.Decenzo & Mary Coulter,"Fundamentals of Management"PearsonEducation, 9thEdition, , 2013.
2. Harold Koontz & HeinzWeihrich "Essentials of management" TataMcGrawHillEducation,10th edition, 2015.

REFERENCES:

1. Robert Kreitner & Mamata Mohapatra, "Management",Biztrantra,2008.
2. JAFStoner, Freeman R.E and Daniel RGilbert "Management",Pearson Education,6thEdition,2004.
3. TripathiPC & ReddyPN, "Principles of Management",TataMcGraw Hill,5th edition,2012.
4. P.C.Tulsian,"Business Management",Pearson India,4th edition,2013.
5. C.B.Gupta,"Management Concepts Practices",SultanChand,9th edition,2016.

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1. https://study.com/academy/lesson/types-of-business
2. https://www.businessmanagementideas.com/planning/steps-involved-in-planning-process
3. https://www.ciesin.com.columbia.edu/decentralisation/differentforms.html
4. https://www.toppr.com/communicatio/barriers-in-communication
5. https://www.businessmanagementideas.com/management/controlling-process

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	-	-	-	-	2	2	-	-	1	-	3	-	-	1	-
CO-2	-	-	-	-	2	2	-	-	1	-	3	-	-	1	-
CO-3	-	-	-	-	2	2	-	-	1	-	3	-	-	1	-
CO-4	-	-	-	-	2	2	-	-	1	-	3	-	-	1	-
CO-5	-	-	-	-	2	2	-	-	1	-	3	-	-	1	-

JCS1016	SOFTWARE TESTING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To learn the principle of developing test cases and identify defects.
- To learn the design of test cases.
- To learn the levels of testing
- To understand test management and test plan.
- To apply automation testing.

UNIT I INTRODUCTION TO TESTING PROCESS 9

Testing as an Engineering Activity – Testing as a Process – Testing Maturity Model- Testing axioms – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Defect Classes – The Defect Repository and Test Design –Defect Examples- Developer/Tester Support of Developing a Defect Repository.

UNIT-II TEST CASE DESIGN STRATEGIES 9

Test case Design Strategies –Black Box Testing Approach to Test design – Cause-effect graphing –State Transition Testing – Random Testing – Requirements based testing – Using White Box Approach to Test design – static testing and structural testing –Loop Testing- Mutation Testing –Evaluating Test Adequacy Criteria.

UNIT-III LEVELS OF TESTING 9

The need for Levels of Testing – Unit Testing– Integration testing– Scenario testing –System Testing – Acceptance testing – Performance testing– Regression Testing –Ad-hoc testing – Alpha, Beta Tests – Usability and Accessibility testing – Configuration testing –Compatibility testing – Testing the documentation – Website testing

UNIT-IV TEST MANAGEMENT 9

People and organizational issues in testing – Test Planning – Test management – Test process –Test Reporting– Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group- The Structure of Testing Group- The Technical Training Program - Integrating Testing Activities in the Software Life Cycle

UNIT-V TEST AUTOMATION AND TEST TOOLS 9

Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool–Process Model for automation– Selecting a test tool – Test Tools – challenges in automation – Case Studies- CppTest -- Selenium IDE - LoadRunner

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

- Describe the process and principle behind testing and identifying defects.
- Design test cases suitable for software development for different domains
- Compare and use various levels of testing
- Create and document a Test plan based on the given requirement.
- Choose and Use automatic testing tools.

TEXT BOOKS

1. Srinivasan Desikan and Gopalaswamy Ramesh, “Software Testing – Principles and Practices”, Pearson Education, 2009.
2. Ron Patton, “Software Testing”, Second Edition, Sams Publishing, Pearson Education, 2007.

REFERENCES

1. Ilene Burnstein, “Practical Software Testing: A Process-Oriented Approach”, Springer New York, 2013.
2. Ali Mili, FairouzTchier “Software Testing Concepts and Operations”, Wiley Publication · 2015
3. Rajiv Chopra “Software Testing: Principles and Practices” Mercury Learning & Information 2018
4. Paul C. Jorgensen ,Byron DeVries “Software Testing: A Craftsman’s Approach, Fifth Edition “Auerbach Publications; 5th edition 2021
5. Paul Ammann, Jeff Offutt "Introduction to Software Testing", Second Edition Cambridge University Press 2018

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1. https://nptel.ac.in/courses/106105150
2. https://www.javatpoint.com/software-testing-tutorial
3. https://www.guru99.com/software-testing.html

4. https://artoftesting.com/software-testing-tutorial
5. https://www.softwaretestinghelp.com/manual-testing-tutorial-1/

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	3											3	2	3
CO-2	3		3	3						3	2	2	3		3
CO-3	3	3									2	2	3		3
CO-4	3	3	3					3		3	3	2		3	
CO-5	3				3							2	3		3

OPEN ELECTIVE 4 – SEMESTER 7

		L	T	P	C
JCS9010	SOFTWARE TESTING	3	0	0	3

COURSE OBJECTIVES

- To interpret the principle of developing test cases and identifying defects.
- To design test cases for software development on various domains.
- To describe different types of testing.
- To Illustrate test management and test automation techniques.
- To apply test metrics and measurements.

UNIT I INTRODUCTION 9

Testing as an Engineering Activity – Testing as a Process – Testing axioms – Basic definitions – Software Testing Principles – The Tester‟s Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design – Defect Examples

UNIT-II TEST CASE DESIGN STRATEGIES 9

Test case Design Strategies – Using Black Box Approach to Test Case Design — Random Testing – Requirements based testing –Using White Box Approach to Test design– Test Adequacy Criteria – static testing vs. structural testing

UNIT-III LEVELS OF TESTING 9

The need for Levels of Testing – Unit Test – Unit Test Planning –Integration tests — Scenario testing –System Testing – Acceptance testing – Performance testing— Regression Testing – Ad-hoc testing – Alpha, Beta Tests.

UNIT-IV TEST MANAGEMENT 9

People and organizational issues in testing – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process –Test Reporting.

UNIT-V TEST AUTOMATION 9

Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool–challenges in automation

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to:

- Describe the process of testing
- Design test cases suitable for software development for different domains
- Compare and use various levels of testing
- Create and document a Test plan based on the given requirement.
- Choose and use automatic testing tools.

TEXT BOOKS

1. Srinivasan Desikan and Gopalaswamy Ramesh, “Software Testing – Principles and Practices”, Pearson Education, 2009.
2. Ron Patton, “Software Testing”, Second Edition, Sams Publishing, Pearson Education, 2007.

REFERENCES

1. Ilene Burnstein, “Practical Software Testing”, Springer International Edition, 2003.
2. Ali Mili, FairouzTchier “Software Testing Concepts and Operations”, Wiley Publication · 2015
3. Rajiv Chopra “Software Testing: Principles and Practices” Mercury Learning & Information 2018
4. Aditya P. Mathur, “Foundations of Software Testing _ Fundamental Algorithms and Techniques”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008
5. Paul Ammann, Jeff Offutt "Introduction to Software Testing", Second Edition Cambridge University Press 2018

WEBSITE REFERENCES

1. https://nptel.ac.in/courses/106105150
2. https://www.javatpoint.com/software-testing-tutorial
3. https://www.guru99.com/software-testing.html
4. https://artoftesting.com/software-testing-tutorial
5. https://www.softwaretestinghelp.com/manual-testing-tutorial-1/

Mapping of CO with PO

	Program Outcomes											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO-1	3	3										
CO-2	3		3	3						3	2	2
CO-3	3	3									2	2
CO-4	3	3	3					3		3	3	2
CO-5	3				3							2

JCS9011	INTODUCTION TO ENTERPRISES RESOURCE PLANNING	L	T	P	C
		3	0	0	3

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COURSE OBJECTIVES

- To learn the concept of ERP and the ERP model
- To understand how ERP is used to integrate business processes; define and analyse a process
- To learn the elements of a value chain, and explain how core processes relate
- To identify how the organizational infrastructure supports core business processes;
- To learn effect of a new product launch on the three core business processes.

UNIT-I INTRODUCTION TO ERP 9

ERP Introduction- Benefits, Origin- Evolution and Structure: Conceptual Model of ERP, the Evolution of ERP- the Structure of ERP.

UNIT-II BUSINESS PROCESS REENGINEERING 9

Business Process Reengineering- Data warehousing- Data Mining- Online Analytic Processing (OLAP)- Product Life Cycle Management (PLM)- LAP, Supply chain Management.

UNIT-III ERP DYNAMICS 9

ERP Marketplace and Marketplace Dynamics: Market Overview- Marketplace Dynamics- the Changing ERP Market. ERP- Functional Modules: Introduction, Functional Modules of ERP Software- Integration of ERP- Supply chain and Customer Relationship Applications.

UNIT-IV ERP IMPLEMENTATION 9

ERP Implementation Basics- ERP Implementation Life Cycle- Role of SDLC/SSAD, Object Oriented Architecture- Consultants, Vendors and Employees.

UNIT-V ERP AND E-COMMERCE 9

ERP & E-Commerce, Future Directives- in ERP, ERP and Internet, Critical success and failure factors, Integrating ERP into organizational culture. Using ERP tool: either SAP or ORACLE format to case study.

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon completion of the course, the students will be able to

- Describe the concept of ERP and its models.
- Illustrate Business Process and Re-Engineering Methods.
- Apply ERP solutions and functional modules.
- Implement ERP lifecycles and frameworks
- Explore emerging trends on ERP

TEXT BOOKS

1. Rajesh Ray, “Enterprise Resource Planning”, Tata McGraw Hill, 2017.
2. Vinod Kumar Garg and Venkitakrishnan N K, “Enterprise Resource Planning Concepts and Practice”, PHI,2007
3. Ellen F Monk and Bret Wagner, “Concepts in Enterprise Resource Planning”, Cengage Learning, 2012.

REFERENCES

1. Alexis Leon, “Enterprise Resource Planning”, 4th Edition, Tata McGraw Hill, 2020.
2. Klaus-Dieter Gronwald, “Integrated Business Information Systems A Holistic View of the Linked Business Process Chain ERP-SCM-CRM-BI-Big Data”, Springer Berlin Heidelberg, 2021.
3. Alexis Leon, “Erp Demystified”, 3rd Edition, Tata McGraw Hill, 2014.
4. Rahul V. Altekar “Enterprise Wide Resource Planning : Theory And Practice”, PHI,
5. Vinod Kumar Garg and Venkitakrishnan N K, “Enterprise Resource Planning – A Concepts and Practice”, PHI, 2007.
6. Veena Bansal, “Enterprise Resource Planning”- Pearson Education, ISBN 9788131787038, 2013.

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1. https://www.oracle.com
2. https://www.geeksforgeeks.org

3. https://www.tutorialspoint.com
4. https://www.sap.com
5. https://www.techtarget.com
6. https://www.javatpoint.com

Mapping of CO with PO

	Program Outcomes											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO-1	2	1	1	1	3	-	-	-	-	-	3	1
CO-2	2	2	3	1	3	-	-	-	-	-	3	1
CO-3	2	1	-	1	-	-	-	-	-	-	3	-
CO-4	2	1	1	1	3	-	-	-	-	-	3	-
CO-5	2	2	3	1	3	-	-	-	-	-	3	1

		L	**T**	**P**	**C**
JCS9012	**BASICS OF MACHINE LEARNING**	**3**	**0**	**0**	**3**

COURSE OBJECTIVES:

- To study about the basics of machine learning and parameter estimation methods.
- To know the basics of supervised learning models and linear and non-linear models.
- To learn dimensionality deduction approaches and various unsupervised algorithms.
- To study various graphical models and design and analysis of machine learning experiments.

UNIT I INTRODUCTION 9

Machine Learning: Types and uses of Machine Learning; Parametric Methods: Maximum Likelihood Estimation - Bias and Variance - Bayes' Estimator and Classification – Regression - Model Selection Procedures;

UNIT II SUPERVISED LEARNING I 9

Supervised Learning: Learning a Class – Probably Approximately Correct (PAC) Learning – Learning Multiple Classes – Regression – Model Selection and Generalization - Dimensions of Supervised Machine Learning Algorithm; Bayesian Decision Theory: Classification - Discriminant Functions - Association Rules.

UNIT III SUPERVISED LEARNING II 9

Decision Trees: Univariate Trees – Pruning - Rule Extraction and Learning Rules - Multivariate Trees; Multilayer Perceptron (MLP): The Perceptron - Training a Perceptron - MLP as a Universal Approximator - Back propagation Algorithm - Training Procedures - Deep Learning.

UNIT IV DIMENSIONALITY REDUCTION AND UNSUPERVISED LEARNING 9

Subset Selection - Principal Component Analysis – Feature Embedding - Factor Analysis – Singular Value Decomposition and Matrix Factorization - Multidimensional Scaling; Clustering: K-means – Expectation-Maximization - Spectral and Hierarchical - Choosing Number of Clusters.

UNIT V GRAPHICAL MODELS AND PERFORMANCE ANALYSIS 9

Example Graphical Models – Belief Propagation – Markov Random Fields – Learning the Structure of a Graphical Model – Influence Diagram; Factors, Response and Strategy – Guidelines – Cross Validation and Resampling Methods – Measuring Classifier Performance.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon completion of the course, the students will be able to,

- Estimate the parameter for each model.
- Develop a classifier for an application using Bayes theory and Support Vector Machine.
- Implement a neural network and decision tree model for an application of your choice using an available tool.
- Use a tool to implement typical clustering algorithms for different types of applications.
- Design and implement any graphical model.

TEXT BOOKS

1. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, Prentice Hall of India, 3rd Edition, 2014.
2. Stephen Marsland, "MACHINE LEARNING -An Algorithmic Perspective", Second Edition, 2015.

REFERENCES

1. MehryarMohri, Afshin Rostamizadeh, AmeetTalwalkar " Foundations of Machine Learning", MIT Press, 2012.
2. Tom Mitchell, "Machine Learning", McGraw Hill, 3rd Edition, 1997.
3. Peter Flach, "Machine Learning: The Art and Science of Algorithms that Make Sense of Data", First Edition, Cambridge University Press, 2012.
4. CharuC.Aggarwal, "Data Classification Algorithms and Applications", CRC Press, 2014.
5. Charu C. Aggarwal, "DATA CLUSTERING Algorithms and Applications", CRC Press, 2014.

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1. https://onlinecourses.nptel.ac.in/noc22_cs29/preview
2. https://onlinecourses.nptel.ac.in/noc21_cs85/preview
3. https://www.simplilearn.com/tutorials/machine-learning-tutorial
4. https://www.javatpoint.com/machine-learning
5. https://machinelearningmastery.com/start-here/

Mapping of CO with PO

	Program Outcomes											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO-1	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**
CO-2	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**
CO-3	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**
CO-4	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**
CO-5	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

SEMESTER 8

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	JNC1861	Indian Constitution	NCM	3	3	0	0	0
PRACTICALS								
2	JCS1851	Comprehension and Technical Seminar	EEC	2	0	0	2	1
3	JCS1832	Project work – Phase II	EEC	18	0	0	18	9
TOTAL				23	3	0	20	10

JNC1861	INDIAN CONSTITUTION	L	T	P	C
		3	0	0	0

COURSE OBJECTIVES:

- To understand the importance of Indian constitution, Administration, Concept and Development of Human Rights, election commission.

UNIT I INTRODUCTION TO INDIAN CONSTITUTION 9

Constitution' meaning of the term, Indian Constitution- Sources and constitutional history, Features- Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy

UNIT II UNION GOVERNMENT AND ITS ADMINISTRATION 9

Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions; **State Government and its Administration** Governor: Role and Position, CM and Council of ministers, State Secretariat: Organization, Structure and Functions

UNIT III 9

A: Local Administration District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation,

B: Pachayati raj: Introduction, PRI: Zila Pachayat, Elected officials and their roles, CEO Zila Pachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

UNIT IV CONCEPT AND DEVELOPMENT OF HUMAN RIGHTS 9

Meaning Scope and Development of Human Rights, United Nations and Human Rights – UNHCR, UDHR 1948, ICCPR 1996 and ICESCR 1966, Human Rights in India: Protection of Human Rights Act, 1993 (NHRC and SHRC), First, Second and Third Generation Human Rights, Judicial Activism and Human Rights.

UNIT V ELECTION COMMISSION 9

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

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

1. Know the sources, features and principles of Indian Constitution.
2. Learn about Union Government, State government and its administration.
3. Get acquainted with Local administration and Pachayati Raj.
4. Be aware of basic concepts and developments of Human Rights.
5. Gain knowledge on roles and functioning of Election Commission.

REFERENCES:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd. New Delhi
2. SubashKashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. D.C. Gupta, Indian Government and Politics
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government and Politics Hans
7. J. Raj Indian Government and Politics
8. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd. New Delhi
9. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right), Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

E-RESOURCES:

1. nptel.ac.in/courses/109104074/8
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/
4. www.hss.iitb.ac.in/en/lecture-details
5. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution.

JCS1851	COMPREHENSION & TECHNICAL SEMINAR	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- To revamp the knowledge gained in the semester and prepare the students to face interview both at the academic and the Industrial Sector
- To encourage the students to study about the recent developments in the field
- To prepare and present technical reports
- To encourage the students to use various teaching aids such as Power point presentation and Demonstrative models

METHOD OF EVALUATION:

COMPREHENSION:

One period is allotted for comprehension. During this period, a test with objective type questions from competitive exams is conducted in identified technical courses. The evaluation is purely internal. Average of all the test marks shall be calculated , a weightage of 50 marks is awarded to the comprehension component.

TECHNICAL SEMINAR:

Three periods are allotted for the technical seminar. During the seminar session each student is expected to prepare and present a technical topic for duration of 10 minutes.

Each student is expected to make presentation at least twice during the semester and the student is evaluated based on various parameters such as topic chosen, content delivery, communication skills and presentation. A faculty guide is allotted who shall guide and

monitor the progress and attendance of all the students. Equal weightage is considered for the two seminar sessions for a total weightage of 50 marks.

The total mark awarded for the course shall be the sum of marks scored out of 50 each for the two components. Evaluation is purely internal.

TOTAL : 30 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to

- Consolidate all the engineering concepts acquired in the course of study.
- Enrich their technical knowledge.
- Prepare and present technological developments.
- Communicate effectively the concepts related to the various topics.
- Face the interviews with confidence during the placement drives.

JCS1832	PROJECT WORK - PHASE - 2	L	T	P	C
		0	0	18	9

COURSE OBJECTIVES:

- To develop the ability to solve a specific problem related to their subject expertise.
- To develop the methodology to solve the identified problem.
- To design, analyze and implement the chosen problem using the hardware components.
- To validate the simulation, hardware results with the theoretical results.
- To train the students in preparing project reports and to face reviews and viva-voce examination.

METHOD OF EVALUATION:

The students in a group of 3 to 4 work on a topic approved by the Head of the Department under the guidance of a faculty member, prepare a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee is constituted by the Head of the Department. The project work is evaluated based on oral presentation and the project report, jointly by external and internal examiners.

TOTAL: 270 PERIODS

COURSE OUTCOMES:

On Completion of the project work, the student will be able to

- Apply the technical knowledge acquired for solving real world problems.
- Develop skills such as self learning, critical thinking, problem solving, project management and finance.
- Apply modern tools and techniques.
- Work with team mates and collectively work towards the success of the project.
- Communicate effectively to present the outcomes of the project both in written and oral forms.

Mapping of CO with PO/PSO

	Program Outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO-1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO-2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO-3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO-4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO-5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3