

JERUSALEM COLLEGE OF ENGINEERING

(An Autonomous Institution)

Approved by AICTE & Affiliated to Anna University

Accredited by NAAC with 'A' Grade

Chennai – 600 100



DEPARTMENT OF COMPUTER SCIENCE

AND ENGINEERING

CURRICULUM

REGULATION 2023

CHOICE BASED CREDIT SYSTEM

JERUSALEM COLLEGE OF ENGINEERING
(AN AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY,
CHENNAI)

B.E. COMPUTER SCIENCE AND ENGINEERING

REGULATION 2023

CHOICE BASED CREDIT SYSTEM

COURSE SUMMARY SHEET

S.No	Category	Credits as per Semester								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1	HS	4	4	-	-	-	1	2	-	11
2	BS	10	9	3	3	3	-	-	-	28
3	ES	8	3	-	-	-	-	-	-	11
4	PC	-	5	17	12	14	12	-	10	70
5	PE	-	-	-	3	3	6	6	-	18
6	OE	-	-	-	3	3	3	3	-	12
7	EEC	-	2		3	2	3	6	-	16
TOTAL (B.E)		22	23	20	24	25	25	17	10	166

JERUSALEM COLLEGE OF ENGINEERING
(AN AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY,
CHENNAI)

B.E. COMPUTER SCIENCE AND ENGINEERING
REGULATION 2023
CHOICE BASED CREDIT SYSTEM

SEMESTER 1

S. No	COURSE CODE	COURSE TITLE	T/P/I	CATEGORY	CONTACT PERIODS	L	T	P	C
1	JHS2121	English for Communicative Competence	I	HS	4	2	0	2	3
2	JGE2102	Heritage of Tamils	T	HS	1	1	0	0	1
3	JMA2121	Matrices and Calculus	I	BS	4	2	0	2	3
4	JPH2101	Engineering Physics 1	T	BS	3	3	0	0	3
5	JCY2101	Engineering Chemistry	T	BS	3	3	0	0	3
6	JGE2101	Basic Engineering	T	ES	3	3	0	0	3
7	JCS2121	Programming in C	I	ES	5	3	0	2	4
8	JPC2111	Engineering Physics and Chemistry Laboratory	P	BS	2	0	0	2	1
9	JGE2111	Basic Engineering Laboratory	P	ES	2	0	0	2	1
TOTAL					27	17	0	10	22

SEMESTER 2

S. No	COURSE CODE	COURSE TITLE	T/P/I	CATEGORY	CONTACT PERIODS	L	T	P	C
1	JHS2221	English for Science and Technology	I	HS	4	2	0	2	3
2	JGE2202	Tamils and Technology	T	HS	1	1	0	0	1
3	JMA2221	Statistics for Engineers	I	BS	4	2	2	0	3
4	JPH2201	Engineering Physics 2	T	BS	3	3	0	0	3
5	JCY2201	Environmental Science and Sustainability	T	BS	2	2	0	0	2
6	JGE2221	Engineering Graphics	I	ES	4	2	0	2	3
7	JCS2201	Python Programming	T	PC	3	3	0	0	3
8	JPC2211	Engineering Physics and Environmental Science Laboratory	P	BS	2	0	0	2	1
9	JCS2211	Python Programming Laboratory	P	PC	4	0	0	4	2
10	JGE2241	Gaming and Crafts studio	P	EEC	4	0	0	4	2
TOTAL					31	15	2	14	23

SEMESTER 3

S. No	COURSE CODE	COURSE TITLE	T/P/I	CATEGORY	CONTACT PERIODS	L	T	P	C
1	JMA2302	Mathematical Foundations for Computer Science	T	BS	4	2	2	0	3
2	JIT2301	Object Oriented Programming	T	PC	3	3	0	0	3
3	JCS2301	Data Structures and Algorithms	T	PC	3	3	0	0	3
4	JAL2301	Data Science	T	PC	3	3	0	0	3
5	JIT2321	Digital Principles and Computer Organization	I	PC	5	3	0	2	4
6	JNC2361	Non-Credit Mandatory Course 1	T	NCM	3	3	0	0	-
7	JCS2311	Data Structures and Algorithms Laboratory	P	PC	4	0	0	4	2
8	JIT2311	Object Oriented Programming Laboratory	P	PC	4	0	0	4	2
9	JPT2041	Soft Skills and Aptitude	P	EEC	2	0	0	2	*
TOTAL					31	17	2	12	20

***Only Internal Assessment**

SEMESTER 4

S. No	COURSE CODE	COURSE TITLE	T/P/I	CATEGORY	CONTACT PERIODS	L	T	P	C
1	JMA2402	Applied Linear Algebra	T	BS	4	2	2	0	3
2	JCS2401	Database Management Systems	T	PC	3	3	0	0	3
3	JIT2421	Operating Systems	I	PC	5	3	0	2	4
4	JCS2402	Design and Analysis of Algorithms	T	PC	3	3	0	0	3
5	-	Professional Elective 1	T	PE	3	3	0	0	3
6	-	Open Elective 1	T	OE	3	3	0	0	3
7	JCS2411	Database Management Systems Laboratory	P	PC	4	0	0	4	2
8	JPT2041	Soft Skills and Aptitude	P	EEC	2	0	0	2	1
9	JGE2442	Advanced IT Infrastructure Laboratory	P	EEC	4	0	0	4	2
TOTAL					27	17	2	12	24

SEMESTER 5

S. No	COURSE CODE	COURSE TITLE	T/P/I	CATEGORY	CONTACT PERIODS	L	T	P	C
1	JMA2501	Optimization Techniques	T	BS	4	2	2	0	3
2	JCS2501	Computer networks	T	PC	3	3	0	0	3
3	JCS2502	Software Engineering and Design	T	PC	3	3	0	0	3
4	JCS2521	Automata Theory and Compiler Design	I	PC	5	3	0	2	4
5	-	Professional Elective 2	T	PE	3	3	0	0	3
6	-	Open Elective 2	T	OE	3	3	0	0	3
7	JCS2511	Computer networks Laboratory	P	PC	4	0	0	4	2
8	JCS2512	Software Engineering and Design Laboratory	P	PC	4	0	0	4	2
9	JPT2042	Technical Skills and Aptitude	P	EEC	2	0	0	2	*
10	JGE2542	MERN Stack Development Laboratory	P	EEC	4	0	0	4	2
TOTAL					33	17	2	14	25

*Only Internal Assessment

SEMESTER 6

S. No	COURSE CODE	COURSE TITLE	T/P/I	CATEGORY	CONTACT PERIODS	L	T	P	C
1	JCS2621	Internet and web Programming	I	PC	5	3	0	2	4
2	JCS2601	Cryptography and Network security	T	PC	3	3	0	0	3
3	JCS2602	Cloud Computing	T	PC	3	3	0	0	3
4	-	Professional Elective 3	T	PE	3	3	0	0	3
5	-	Professional Elective 4	T	PE	3	3	0	0	3
6	-	Open Elective 3	T	OE	3	3	0	0	3
7	JHS2541	Professional Communication	P	HS	2	0	0	2	1
8	JCS2611	Cryptography and Network security Laboratory	P	PC	4	0	0	4	2
9	JPT2042	Technical Skills and Aptitude	P	EEC	2	0	0	2	1
10	JGE2642	Computational Intelligence Laboratory	P	EEC	4	0	0	4	2
TOTAL					32	18	0	14	25

SEMESTER 7

S. No	COURSE CODE	COURSE TITLE	T/P/I	CATEGORY	CONTACT PERIODS	L	T	P	C
1	-	Professional Elective 5	T	PE	3	3	0	0	3
2	-	Professional Elective 6	T	PE	3	3	0	0	3
3	-	Open Elective 4	T	OE	3	3	0	0	3
4	JNC2761	Non-Credit Mandatory Course 2	T	NCM	3	3	0	0	-
5	JHS2741	Universal Human values	I	HS	3	1	0	2	2
6	JGE2751	Entrepreneurship Development	I	EEC	4	2	0	2	3
7	JCS2741	Comprehension and Technical Seminar	P	EEC	2	0	0	2	1
8	JCS2742	Internship	P	EEC	-	-	-	4**	2
TOTAL					20	15	0	4	17

**** Internship of one month must be undertaken in industry through semester 4, 5 and 6 leading to 2 credit in semester 7**

SEMESTER 8

S. No	COURSE CODE	COURSE TITLE	T/P/I	CATEGORY	CONTACT PERIODS	L	T	P	C
1	JCS2831	Project Work	P	PC	20	0	0	20	10
TOTAL					20	0	0	20	10

OPEN ELECTIVES**OPEN ELECTIVES – I**

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	JCS9201	Fundamentals of Data Structures	OE	3	3	0	0	3
2.	JCS9202	Fundamentals of Software Engineering	OE	3	3	0	0	3

OPEN ELECTIVES – II

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	JCS9203	Basics of Python Programming	OE	3	3	0	0	3
2.	JCS9204	Operating System Essentials	OE	3	3	0	0	3

OPEN ELECTIVES – III

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	JCS9205	Foundations of Cryptography	OE	3	3	0	0	3
2.	JCS9206	Foundations of Artificial Intelligence	OE	3	3	0	0	3

OPEN ELECTIVES – IV

S.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	JCS9207	Basics of Software Testing	OE	3	3	0	0	3
2.	JCS9208	Cyber Law and Ethics	OE	3	3	0	0	3

PROFESSIONAL ELECTIVE COURSES: VERTICALS

Vertical I Data Science	Vertical II Creative Media	Vertical III Cyber Security	Vertical IV IoT	Vertical V Artificial Intelligence and Machine Learning	Vertical VI Automation Tools
JCS2001 Foundation of Data science	JCS2009 Principles of Multimedia	JCB2001 Cyber Security Fundamentals and Practices	JIT2009 Internet of Things: Architecture Protocols And Applications	JAL2401 Principles of Artificial Intelligence	JAD2001 Agile Methodology
JCS2002 Big data analytics	JCS2010 3D Modeling and Rendering	JCB2002 Cryptography and Cryptanalysis	JIT2010 Programming For IOT Boards	JAL2501 Machine Learning	JIT2004 Devops
JCS2003 Recommender systems	JCS2011 Augmented reality and Virtual reality	JCB2003 Cyber Forensics	JIT2011 Industrial IoT 4.0	JAL2001 Cognitive Science	JAD2003 Software Testing using Selenium
JCS2004 Web and Speech Analysis	JCS2012 Digital Marketing and Commerce	JCB2004 Intrusion Detection and Prevention	JIT2012 IoT in HealthCare	JAL2002 Knowledge Representation and Reasoning	JAD2004 Pandas For Data Analysis
JCS2005 Social media analytics	JCS2013 Computer Graphics and Animation	JCB2005 Hardware Security	JIT2013 Robotics in IOT	JAL2003 Time Series Analysis and Prediction	JAD2005 Data Visualization Using Tableau
JCS2006 Data exploration and visualization	JCS2014 Video processing and Analytics	JCB2006 Cloud Security	JIT2014 Mobile Application Development For IOT	JAL2601 Neural Networks and Deep Learning	JAD2006 Jenkins Automation for Server
JCS2007 Health care analytics	JCS2015 Game Development	JCB2007 Ethical Hacking	JIT2015 Cognitive IOT	JAL2602 Natural Language Processing	JAD2007 Cloud Computing Tools
JCS2008 Image and video Analytics	JCS2016 Media Security	JCB2008 Web Application Security	JIT2016 Privacy Security for IOT	JAL2004 Robotic Process Automation Tool	JAD2008 Infrastructure Build Tool Using Terraform

CURRICULUM 2023 - REGULATION 2023

SEMESTER 1 (COMMON TO ALL BRANCHES)

S.No.	Course Code	Course Title	T/P/I	Category	Contact Period	L	T	P	C
1	JHS2121	English for Communicative Competence	I	HS	4	2	0	2	3
2	JMA2101	Matrices and Calculus	T	BS	4	2	2	0	3
3	JPH2101	Engineering Physics 1	T	BS	3	3	0	0	3
4	JCY2101	Engineering Chemistry	T	BS	3	3	0	0	3
5	JGE2101	Basic Engineering	T	ES	3	3	0	0	3
6	JCS2121	Programming in C	I	ES	5	3	0	2	4
7	JGE2102	Heritage of Tamils	T	HS	1	1	0	0	1
8	JPC2111	Engineering Physics and Chemistry Laboratory	P	BS	2	0	0	2	1
9	JGE2111	Basic Engineering Laboratory	P	ES	2	0	0	2	1
TOTAL					27	17	2	8	22

JHS2121	ENGLISH FOR COMMUNICATIVE COMPETENCE	L	T	P	C
		2	0	2	3

Course Objectives:

- To enable the students of Engineering to develop their reading and other language skills
- To facilitate the learners to reflect and share their ideas effortlessly
- To develop their skills to communicate thoughts effectively in social contexts
- To expose them to different genres to develop their understanding and expression
- To train the students to improve their writing skills for efficient communication

UNIT I Analytical Grammar and Information Sharing 12

Parts of speech – Functional units – Tenses – Affixes; Reading comprehension: short general passages for skimming and scanning

Language Practice

Reading: Biographical essays, short stories; **Speaking:** Self-introduction, peer introduction; **Listening:** Inspiring speeches, newscasts; **Writing:** Journal writing

UNIT II Foundational Grammar and Expressing Thoughts 12

Framing questions – Prepositions – Compound nouns – Contextual meaning; Letter writing (informal letters)

Language Practice

Reading: Travelogues; **Speaking:** Small talks, Just A Minute (JAM); **Listening:** Anecdotes, stories, podcasts; **Writing:** Fill in the blanks in short dialogues

UNIT III Functional Grammar and Social Communication 12

Articles – Subject-verb agreement – Synonyms and antonyms – Email etiquette; Dialogue writing

Language Practice

Reading: Adverts; **Speaking:** Role play, storytelling / completion; **Listening:** Messages from social network; **Writing:** Writing messages for social network / emails

UNIT IV Structural Grammar and Visual Communication 12

Modal verbs – Simple, complex and compound sentences – Discourse markers – Correction of errors; Interpretation of posters on social issues

Language Practice

Reading: Excerpts from literature; **Speaking:** Asking for / giving directions - Picture description; **Listening:** Talks on English and language skills; **Writing:** Reporting on events / incidents

UNIT V - Transformational Grammar and Written Communication 12

Degrees of comparison – Reported speech – Connotations – One-word substitutes (general); Essay writing: narrative / descriptive / expository / argumentative

Language Practice

Reading: Newspaper articles, social media messages (educational contexts); **Speaking:** Group discussions (general topics); **Listening:** Formal and informal talks, Ted talks; **Writing:** Writing short stories / poems (guided)

TOTAL: 60 PERIODS

Course Outcomes:

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

- To comprehend reading passages and express themselves
- To communicate their thoughts confidently and skillfully
- To participate in activities of daily life using appropriate communicative strategies
- To be creative and critical in expressing themselves
- To write effectively and persuasively and produce different types of writing

Text Books:

1. Department of English, Anna University, English for Engineers & Technologists, Volume 2, Orient BlackSwan Private Limited, Chennai, 2022.
2. Dhanavel, SP. English and Communication Skills for Students of Science and Engineering. Orient BlackSwan Private Limited, Chennai, 2011.
3. Interact English: Lab Manual for Undergraduate Students. Orient BlackSwan Private Limited, Chennai, 2017.

Reference Books:

1. Chellammal, V. Learning to Communicate. Allied Publishing House, New Delhi, 2004.
2. Raman, Meenakshi & Sangeetha Sharma. Technical Communication: Principles and Practices. Oxford University Press, New Delhi. 2015.
3. Regional Institute of English. English for Engineers. Cambridge University Press, New Delhi. 2008.
4. Rizvi M, Ashraf. Effective Technical Communication, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2017.

Web Links:

1. www.esl-lab.com
2. www.englishgrammar.org
3. www.englishclub.com
4. www.usingenglish.com
5. www.esl.about.com
6. www.bbc.co.uk/learningenglish/
7. <https://esl-bits.net/>
8. <https://elt.oup.com/>
9. <https://learnenglish.britishcouncil.org>
10. <https://quizizz.com/>

Mapping of PO with CO

PO/CO	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	1	-	1	1	1	3	-	1
CO2	-	-	-	1	-	1	1	1	3	-	1
CO3	-	-	-	1	-	1	1	1	3	-	1
CO4	-	-	-	1	-	1	1	1	3	-	1
C05	-	-	-	1	-	1	1	1	3	-	1
AVG	-	-	-	1	-	1	1	1	3	-	1

JMA2101	MATRICES AND CALCULUS	L	T	P	C
		2	2	0	3

COURSE OBJECTIVES:

- To equip students with the knowledge of matrices required for applications in engineering.
- To enable students understand the concepts of multivariable calculus.
- To introduce concepts of integral calculus as tools required for applications in engineering.
- To familiarize students in the concepts of vector calculus and its applications.
- To help students understand theory of analytic functions and provide knowledge of Cauchy Residue theorem and its applications.

UNIT I MATRICES

12

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Reduction of a quadratic form to canonical form – Nature of quadratic forms.

UNIT II FUNCTIONS OF SEVERAL VARIABLES

12

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 INTEGRAL CALCULUS

12

Double integrals in Cartesian coordinates – Change of order of integration – Area enclosed by plane curves – Triple integrals – Volume of solids.

UNIT IV VECTOR CALCULUS

12

Gradient and directional derivative – Divergence and curl – Irrotational and Solenoidal vector fields.

Green's theorem, Gauss' divergence theorem, Stoke's theorem – Verification and evaluation in simple problems.

UNIT V COMPLEX ANALYSIS

12

Analytic functions – Cauchy-Riemann equations – Milne-Thomson rule (given real or imaginary part) – Bilinear transformation.

Residues – Application of Cauchy's Residue theorem for evaluation of real integrals (Circular contour and semi-circular contour only).

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able

- To apply matrix method in reducing quadratic form to canonical form.
- To solve simple optimization problems through differential calculus.
- To evaluate multiple integrals required for solving area and volume

- problems.
- To apply vector calculus for verifying Green's, Gauss' and Stoke's theorems.
- To solve problems arising in analytic functions and solve real integrals through Cauchy Residue theorem.

TEXT BOOKS:

1. Grewal B S, "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2018.
2. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, New Delhi, 10th Edition, 2016.
3. Anuradha P and Sudhakar V, "Matrices and Calculus", Scitech Publications, 1st Edition, Chennai, 2019.

REFERENCES:

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, 8th Edition, 2022.
3. Srimantha Pal and Bhunia S C, "Engineering Mathematics" Oxford University Press, 1st Edition, 2015.
4. Weir, M D and Joel Hass, "Thomas Calculus", 15th Edition, Pearson India, 2022.

WEB REFERENCES:

1. <https://nptel.ac.in/courses/111107112>
2. <https://nptel.ac.in/courses/111108157>
3. <https://nptel.ac.in/courses/111107108>
4. <https://nptel.ac.in/courses/111106141>
5. <https://nptel.ac.in/courses/111103070>

CO-PO MAPPINGS:

PO/CO	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1	1	2	3	-	-	2	-	-	1
CO2	2	1	1	2	3	-	-	2	-	-	1
CO3	2	1	1	2	3	-	-	2	-	-	1
CO4	2	1	1	2	3	-	-	2	-	-	1
C05	2	1	1	2	3	-	-	2	-	-	1
AVG	2	1	1	2	3	-	-	2	-	-	1

JPH2101	ENGINEERING PHYSICS-1	L	T	P	C
		3	0	0	3

OBJECTIVES:

To enable the students to understand the basics of Properties of Matter To expand their knowledge about thermal properties of materials
 To enhance their understanding of Photonics
 To familiarize the students with the principles of quantum mechanics
 To enrich their knowledge on Solid State of Materials

UNIT I - PROPERTIES OF MATTER

9

Elasticity – Stress-strain diagram and its uses - factors affecting elastic moduli and tensile strength - 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 II - THERMAL PHYSICS

9

Fundamentals of thermal energy - expansion joints – Bimetallic strips - Thermal conductivity, conduction in solids, Differential equation of one dimensional heat flow – Forbes's and Lee's disc method - Conduction through compound media- Solar heater

UNIT III - LASERS AND FIBER OPTICS

9

Spontaneous and stimulated emission-Population inversion -Einstein's A and B coefficients derivation – Laser Principle – Nd:YAG and Semiconductor lasers (homojunction & heterojunction) Principle and propagation of light in optical fiber, Derivation of Numerical aperture and Acceptance angle – Fiber optical communication (Block diagram) – Active and passive sensors – Medical endoscope.

UNIT IV - BASIC 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 - Schrödinger's wave equation –Time independent and time dependent equations –Physical significance of wave function –Particle in a one dimensional box –Scanning Transmission electron microscope.

UNIT V - SOLID STATE 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, Surface defects and Volume defects.

TOTAL: 45 PERIODS

OUTCOMES:

Students will be able

- To apply their knowledge in analyzing the elastic property of any materials
- To assess the thermal properties of materials
- To use modern optical fiber communication systems and tools in real life situations
- To compute problems in Quantum Physics
- To comprehend the structure of solid materials

TEXT BOOKS:

1. Dr. Beula Shanthi John, Dr.P.Mani, "Engineering Physics-I", Dhanam Publications, First Edition, 2019.
2. Bhattacharya, D.K. & Poonam, T. "Engineering Physics- I". Oxford University Press, 2015.
3. Gaur, R.K. & Gupta, S.L. "Engineering Physics". Dhanpat Rai Publishers, 2012.
4. S. O. Pillai, "Solid State Physics", New Age International Publications, Revised Edition.
5. Pandey, B.K. & Chaturvedi, S. "Engineering Physics". Cengage Learning India, 2012.
6. Kittel, C. —Introduction to Solid State Physics. Wiley, 2005.

REFERENCES:

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".
4. Rajendran V, "Engineering Physics", Tata McGraw Hill, 2009.
5. Arumugam M, "Materials Science", Anuradha Publications, 2015.
6. William F Smith, "Material Science and Engineering", Tata McGraw - Hill Publications, 2008.
7. John D. Cutnell, "Cutnell and Johnson Physics", Wiley Publications, 2018.

Website References

1. <https://archive.nptel.ac.in/courses/115/104/115104109/>
2. <https://archive.nptel.ac.in/courses/105/105/105105177/>
3. <https://archive.nptel.ac.in/courses/102/105/102105090/>
4. <https://archive.nptel.ac.in/courses/115/104/115104096/>
5. <https://archive.nptel.ac.in/courses/108/104/108104113/>

CO-PO Mapping

PO/CO	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	-	-	1	1	1	-	-	1
CO2	3	2	1	-	-	1	-	-	-	-	1
CO3	3	2	1	-	-	-	-	-	-	-	1
CO4	3	2	1	-	-	-	-	-	-	-	1
C05	3	2	1	-	-	-	-	-	-	-	1
AVG	3	2	1	-	-	1	1	1	-	-	1

JCS2121	PROGRAMMING IN C	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES

- To understand the concepts of C Language.
- To implement programs using basic constructs of C
- To develop C programs using Arrays and Strings
- To develop modular applications in C using functions and Pointers.
- To be able to use File operations and Structures in C.

UNIT I INTRODUCTION TO C PROGRAMMING

9

Introduction to programming paradigms - Simple model of Computer - Algorithms and Flowcharts - Structure of C program - Applications of C Language - Data Types – Constants
- Enumeration - Keywords – Number System.

UNIT II OPERATOR AND EXPRESSIONS

9

Data Input and Output statements – Operators: Arithmetic Operators, Relational Operators, Logical Operators, Increment and Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation – Decision Making and Branching – Looping statements.

UNIT III ARRAYS AND STRINGS

9

Arrays – Initialization – Declaration – One dimensional array – Two dimensional arrays - String - String operations: length, compare, concatenate, copy – Arrays of strings - Simple programs: Sorting, Searching and Matrix operations.

UNIT IV FUNCTIONS AND POINTERS

9

Function – Definition of function – Function Prototypes - Pass by value - Pass by reference - Recursion. Pointers: Definition- Initialization -Pointer Arithmetic- Pointers and Arrays.

UNIT V STRUCTURES, UNION AND FILES

9

Structure - Structure Definition - Structure Declaration - Nested structures - Array of structures - Union - Storage Classes - Files - Types of file processing: Sequential access, Random access - Sequential access file - Random access file - Command line arguments.

TOTAL: 45 PERIODS

LIST OF EXPERIMENTS

1. Usage of Basic Linux commands.
2. C Programming using Simple I/O Statements, operators and expressions.
3. C Programming using decision making and looping.
4. Simple programming for one dimensional and two dimensional arrays.
5. Solving problems using Strings.

6. C Programming using user defined functions (Pass by value and Pass by reference).
7. C Programming using Recursion.
8. C Programming using Pointers and Array of Pointers.
9. C Programming using structures and union.
10. C Programming using storage classes.
11. C Programming using Files.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

- Develop efficient algorithms for solving a problem.
- Develop simple applications using various operators in C.
- Design and Implement applications using Array and Strings.
- Develop applications using Functions and Pointers.
- Design and Develop applications using Structures and Files.

TEXT BOOKS

1. Paul J. Deitel, Harvey M. Deitel, “C: How to Program”, 9th Edition, Prentice Hall.
2. Reema Thareja, “Programming in C”, Oxford University Press, Second Edition, 2016.
3. E. Balaguruswamy, “Programming in ANSI C”, 8th Edition, 2019, McGraw Hill Education.
4. Yashavant P. Kanetkar. “Let Us C”, BPB Publications, 16th edition 2017.

REFERENCE BOOKS

1. Pradip Dey, Manas Ghosh, “Programming in C”, 2nd Edition, 2018, Oxford University Press, ISBN: 978-01-9949-147-6.
2. Kernighan B.W and Dennis M. Ritchie, “The C Programming Language”, 2nd Edition, 2015, Pearson Education India, ISBN: 978-93-3254-944-9.
3. Jacqueline A Jones and Keith Harrow, “Problem Solving with C”, Pearson Education. ISBN: 978-93-325-3800-9.
4. PradipDey, ManasGhosh, “Programming in C - As per the latest AICTE syllabus”, First Edition, Oxford University Press, 2018.
5. Byron S Gottfried, “Programming with C”, Schaum’s Outlines, Third Edition, McGraw- Hill, 2010.

WEBSITE REFERENCES

1. <http://elearning.vtu.ac.in/econtent/courses/video/BS/14CPL16.html>
2. <https://nptel.ac.in/courses/106/105/106105171/>
3. <https://www.w3resource.com/c-programming-exercises/>
4. <https://www.programiz.com/c-programming/c-structures-pointers>

5. <https://www.sitesbay.com/cprogramming/c-applications>

CO-PO MAPPING

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	2	-	-	3	2	2	-	2	3	1	1
CO2	3	3	3	3	-	-	3	3	3	-	3	3	1	1
CO3	3	3	3	3	-	-	3	3	3	-	3	3	1	2
CO4	3	3	3	3	-	-	3	3	3	-	3	3	2	2
CO5	3	3	3	3	-	-	3	3	3	-	3	3	1	-
AVG	2.8	2.8	2.8	2.8	-	-	3	2.8	2.8	-	2.8	3	1.2	1.2

JCY2101	ENGINEERING CHEMISTRY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To inculcate the significance of water quality parameters and water treatment techniques.
- To acquaint the properties and applications of industrial polymers.
- To acquire knowledge in corrosion of material and its prevention.
- To import knowledge over energy conversion methods and of energy storage devices.
- To acquire knowledge on the basics of nanomaterials and its preparatory methods.

UNIT 1 WATER AND ITS TREATMENT

9

Water quality parameters (pH, TDS, DO, BOD, COD) - Hardness - Types and estimation (EDTA method). Alkalinity – Types and estimation. Water softening methods- Limesoda Process (Cold and Hot methods) - Zeolite Process - Ion exchange process. Desalination of brackish water –reverse osmosis. Municipal water treatment- Primary treatment and Disinfection (UV, Ozonation, Chlorination) - Break point chlorination.

UNIT 2: POLYMER AND COMPOSITES

9

Classification of polymers – Functionality – Types of polymerisation (addition & condensation) – Mechanism of addition polymerisation (free radical, cationic, anionic) - Degree of polymerization - Thermoplastic and Thermosetting. Bio degradable polymer- Polylactic acid, Polyvinyl acetate- Preparation – Properties – applications. Conducting polymer – types – Mechanism – application - Polymer composites – types – properties and application.

UNIT 3 CORROSION

AND ITS PREVENTION 9

Corrosion - chemical, electrochemical corrosion, galvanic corrosion and differential aeration corrosion. Factors influencing the rate of corrosion. Corrosion control - material selection, design aspects, cathodic protection, Corrosion inhibitors - Electroplating (copper) and electroless plating (nickel) – Organic coating (Paints – Constituents and function).

UNIT 4 ENERGY SOURCES AND STORAGE DEVICES

9

Nuclear energy- critical mass light water nuclear power plant and Breeder reactor. Principle, working and applications of solar energy and wind energy. Primary battery (dry cell and alkaline battery). Secondary

battery (lead acid, nickel-cadmium and lithium-ion-battery). H₂-O₂ fuel cell.

UNIT 5 NANOCHEMISTRY

9

Distinction between molecules, nanomaterials and bulk materials - Size-dependent properties - Types of nanomaterials - Nanoparticle, nanocluster, nanorod, nanowire and nanotube. Synthesis of nanomaterials - solvothermal, laser ablation, chemical vapour deposition and electrochemical deposition - General applications of nanomaterial.

TOTAL: 45 PERIODS

COURSE OUTCOMES

- To identify water quality and propose suitable methods to treat water.
- To analyze the compatibility of polymeric materials for biomedical and electronic applications.
- To recognize the nature of corrosive environment and implement preventive methods of corrosion.
- To design different forms of energy sources for suitable applications.
- To identify suitable synthetic method of nanomaterials for specific applications.

TEXT BOOKS:

1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008. S.S. Dara, "A Text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.
3. A.Ravikrishnan, "Engineering Chemistry" Sri Krishna Hitech Publishing Company Pvt.Ltd., 22nd edition, 2023

REFERENCES:

1. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
2. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
3. B.R.Puri, L.R.Sharma, Madan S.Pathana, Principle of physical chemistry, 47th edition, Vishal

publishing Co, 2017.

4. S. Ananda Kumar (Editor)"Eco-friendly Nano-hybrid materials for Advanced Engineering Applications" CRC Press, USA. (2016)
5. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
6. Dara S.S, Umare S.S, "Engineering Chemistry", S. Chand & Company Ltd., New Delhi 2013.

Website reference:

1. <https://nptel.ac.in/courses/113/101/113101098/>
2. <https://nptel.ac.in/courses/113/106/113106093/>

CO-PO Mapping

PO/CO	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	1	2	3	1	3	2	1	1	-	1
CO2	1	1	1	2	1	3	1	-	1	-	1
CO3	1	1	2	2	1	2	-	-	1	-	1
CO4	1	1	2	2	1	2	1	1	1	-	1
C05	1	1	1	2	1	-	-	-	1	-	1
AVG	1	1	1.6	2.2	1	2.5	1.33	1	1	-	1

JGE2101	BASIC ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To provide students with illustrations about mechanical engineering to satisfy societal needs
- To provide them knowledge on refrigeration, air-conditioning and power plants
- To help students acquire knowledge in the basics of surveying and building materials
- To impart knowledge on the electric circuits and working principles of Electrical Machines.
- To provide the knowledge on the Principles and characteristics of various electronic devices and measuring instruments.

UNIT I – BASICS OF MECHANICAL ENGINEERING

9

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. Electric vehicle Technology- Layout, components and control.

UNIT II–REFRIGERATION, AIR CONDITIONING SYSTEM AND POWER PLANT

9

Terminology of Refrigeration and Air Conditioning. Principle of vapour compression and absorption system–Layout of typical domestic refrigerator–Window and Split type room Air conditioner. Classification of power plant and working principle of Thermal and Hydel power plant.

UNIT III - BASICS OF CIVIL ENGINEERING

9

Introduction to Civil Engineering, Types of buildings, Components of a residential building, Building Materials. Surveying: Objects – Classification – Principles – Measurements of Distances and angles. Rain Water Harvesting, Solid Waste Management

UNIT IV ELECTRIC CIRCUITS AND ELECTRICAL MACHINES

9

Basic circuit components - Ohms Law - Kirchhoff's Law – Introduction to AC circuits - Power and power factor –Construction, Principle of operation and characteristics of DC machines ,Transformers and Induction machines.

Types of Materials - N type and P type materials - Principle of operation and Characteristics: PN Junction diode , Zener Diode, BJT, MOSFET. Elements of generalized measurement system -- Operating forces-- Principle of operation of moving coil and moving iron instruments -Errors in measurement - Standards of Measurement.

COURSE OUTCOMES: At the end of the course, the student will be able

- To be acquainted with the concepts in mechanical engineering and vehicle concept.
- To understand the fundamentals of refrigeration, air-conditioning and power plant.
- To summarise the surveying, planning of building, infrastructure and building materials.
- Apply the basic concepts of electric circuits and working principles of electrical machines.
- Gain knowledge on the basics of electronics and choose appropriate instruments for electrical measurement for a specific application.

TEXT BOOKS:

1. G Shanmugam, M S Palanichamy, Basic Civil and Mechanical Engineering, McGraw Hill Education; First edition, 2018.
2. Palanikumar, K. Basic Mechanical Engineering, ARS Publications, 2018.
3. Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis", Mc Graw Hill, 2015.
4. D P Kothari and I.J Nagarath, , " Electrical Machines - Basic Electrical and Electronics Engineering" , Third Reprint , Mc Graw Hill Education (India) Private Limited, , 2016.
5. A.K.Sawhney, " A Course in Electrical & Electronic Measurements & Instrumentation" , Dhanpat Rai and Co, 2010.
6. S Salivahanan , N Suresh Kumar, "Electronic Devices And Circuits ", fifth Edition, Mc Graw Hill, 2022.

REFERENCE BOOKS:

1. Ramamrutham S., "Basic Civil Engineering", Dhanpat Rai Publishing Co.(P) Ltd, 2013.
2. Ali Emadi, "Advanced Electric Drive Vehicles", CRC Press, First edition 2017.

3. Thereja. B.L., “Fundament also f Electrical Engineering and Electronics” , S. Chand &Co.Ltd., 2008.
4. H.S.Kalsi, “Electronic Instrumentation “ , Tata Mc Graw-Hill, 2010.

WEB SITE REFERENCE:

1. <https://archive.nptel.ac.in/courses/112/103/112103262/>
2. <https://archive.nptel.ac.in/courses/112/105/112105129/>
3. <https://archive.nptel.ac.in/courses/105/106/105106201/>
4. <https://archive.nptel.ac.in/courses/105/106/105106201/>
5. <https://youtu.be/LPcQYXjPdIQ?list=PLp6ek2hDcoNCANsWM2mw3qi0387BhfLyV>
6. <https://www.youtube.com/playlist?list=PLMYtBmvT7X7QaLu0b0Jn1QQD4EOuTCA>
7. <https://youtu.be/5ZNeDxfgYAEhttps://youtu.be/36j6hCtL0E>

CO-PO MAPPING

PO/CO	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	1	1	1	1	-	-	-	-	-	-
CO2	1	1	1	1	1	-	-	-	-	-	-
CO3	1	1	1	1	1	-	-	-	-	-	-
CO4	1	1	1	1	1	-	-	-	-	-	-
C05	1	1	1	1	1	-	-	-	-	-	-
AVG	1	1	1	1	1	-	-	-	-	-	-

JGE2111	BASIC ENGINEERING LABORATORY	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES

- To provide an exposure to students with hands-on experience on various basic engineering practices in Civil, Mechanical Engineering
- To impart knowledge on 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 like vehicles.
- To provide exposure to the students with hands-on experience on various basic engineering practices in Electrical and Electronics Engineering
- To kindle your own creativity, ideation and realize the importance of team working.

GROUP A

I CIVIL ENGINEERING

PRACTICE BUILDINGS:

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

PLUMBING WORKS:

- a) Study of pipe line joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.
- b) Hands-on-exercise: Basic pipe connections - Mixed pipe material connection
Pipe connections with different joining components.

II MECHANICAL

ENGINEERING PRACTICE

WELDING AND DRILLING

- (a) Preparation of but joints, lap joints and T-joints by Shielded metal arc welding.
- (b) Drilling Practice

TWO WHEELER DISMANTLING AND DIAGNOSIS

- a. Brake Adjustment and Replacing
- b. Chain Adjustment and lubrication
- c. Air Filter and Spark plug Cleaning
- d. Engine oil Replacement and Carburetor Tuning

STUDY AND DEMONSTRATION ON:

- (a) Study of Lathe Machine, tools and components, Safety aspects
- (b) Study of Sheet Metal work, tools and components, Safety aspects

GROUP B

I ELECTRICAL ENGINEERING PRACTICE

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Staircase 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

1. Study of Electronic components and equipment's - Resistor, colour coding measurement of AC signal parameter (peak-peak, rms period, frequency) using CRO.
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.

COURSE OUTCOMES:

At the end of the course, students will be able

- To fabricate carpentry components and pipe connections including plumbing works.
- To weld various joints in steel plates using arc welding work.
- To understand various mechanism involved in automobiles.
- To illustrate on lathe machine and sheet metal work.
- Carry out basic home electrical works and appliances.
- Measure the electrical quantities.
- Elaborate on the components, gates, soldering practices.

WEBSITE REFERENCE:

1. <https://nptel.ac.in/courses/107106088>
2. www.vikaspublishing.com/engineering-practices-lab
<https://archive.org/mechanicalengineeringworkshoplaboratory>

CO – PO MAPPING

PO/CO	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	1	1	1	1	-	-	-	-	-	-
CO2	1	1	1	1	1	-	-	-	-	-	-
CO3	1	1	1	1	1	-	-	-	-	-	-
CO4	1	1	1	1	1	-	-	-	-	-	-
C05	1	1	1	1	1	-	-	-	-	-	-
AVG	1	1	1	1	1	-	-	-	-	-	-

UNIT I LANGUAGE AND LITERATURE**3**

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE**3**

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT III FOLK AND MARTIAL ARTS**3**

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV THINAI CONCEPT OF TAMILS**3**

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE**3**

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TOTAL : 15 PERIODS**TEXT-CUM-REFERENCE BOOKS**

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருறை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

தமிழர் மரபு

L T P C
1 0 0 1

அலகு I மொழி மற்றும் இலக்கியம்:

3

இந்திய மொழிக் குடும்பங்கள் – திராவிட மொழிகள் – தமிழ் ஒரு செம்மொழி – தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை – சங்க இலக்கியத்தில் பகிர்தல் அறம் – திருக்குறளில் மேலாண்மைக் கருத்துக்கள் – தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் – சிற்றிலக்கியங்கள் – தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி – தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு II மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக் கலை:

3

நடுகல் முதல் நவீன சிற்பங்கள் வரை – ஐம்பொன் சிலைகள் – பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் – தேர் செய்யும் கலை – சுடுமண் சிற்பங்கள் – நாட்டுப்புறத் தெய்வங்கள் – குமரிமுனையில் திருவள்ளுவர் சிலை – இசைக் கருவிகள் – மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் – தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்:

3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு IV தமிழர்களின் திணைக் கோட்பாடுகள்:

3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் – தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் – சங்ககால

நகரங்களும் Fளற முகங்களும் – சங்ககொலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி –
கடல்கடந்த நொடுகளில் கசொழர்களின் தவற்றி.

அலகு V இந்திய கதசிய இயக்கம் மற்றும் இந்திய பைப்பொட்டிற்குத் தமிழர்களின் பங்களிப்பு: 3

இந்திய விடுதலாப்கபொரில் தமிழர்களின் பங்கு – இந்தியொவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பொட்டின் தொக்கம் – சுயமரியொளாத இயக்கம் – இந்திய மருத்Fவத்தில், சித்த மருத்Fவத்தின் பங்கு – கல்தவட்டுகள், ளகதயமுத்Fப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்ச வரலொறு.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலொறு – மக்களும் பண்பொடும் – கக.கக. பிள்ளள (தவளியீடு: தமிழ்நொடு பொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முளனவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – ளவளக நதிக்களரயில் சங்ககொல நகர நொகரிகம் (ததொல்லியல் Fளற தவளியீடு)
4. தபொருளந – ஆற்றங்களர நொகரிகம். (ததொல்லியல் Fளற தவளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	-	-	-	3	3	2	2	-	2
CO2	2	2	-	-	-	3	3	2	2	-	2
CO3	2	2	-	-	-	3	3	3	2	-	2
CO4	2	2	-	-	-	3	3	3	3	-	2
CO5	2	2	-	-	-	3	3	3	3	-	3
AVG	2	2	0	0	0	3	3	2.6	2.4	0	2.2

JPC2111	ENGINEERING PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C
		0	0	2	1

OBJECTIVES:

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

LIST OF EXPERIMENTS

1. Determination of Young's Modulus for the given Uniform bar by Uniform Bending method
2. Determination of Moment of Inertia of the given Circular disc and Rigidity Modulus of thin metal wire using Torsional Pendulum
3. Determination of Planck's constant using different color filters
4. Determine the Wavelength of Mercury Spectrum using Spectrometer.
5. Determine the Thermal conductivity of a Bad conductor using Lee's Disc
6. Determination of Wavelength of the Diode Laser and hence determine the Size of the coated powder particle
7. Estimation of Alkalinity of Water Sample.
8. Estimation of Total, Temporary and Permanent Hardness of Water by EDTA method.
9. Determination of Molecular Weight of a Polymer by Viscosity Average method
10. Estimation of Amount of an Acid by Conductometric Titration
11. Estimation of Ferrous ions by Potentiometric Titration
12. Estimation of Amount of Hydrochloric Acid using p H Meter.

TOTAL: 30 PERIODS

OUTCOMES:

Students will be able

1. To evaluate elasticity of a linear body.
2. To discriminate different wavelengths of optical spectrum and the behavior of particles and waves at the atomic scale.
3. To identify the materials which are utilized for thermal insulation.
4. To estimate and analyse the amount of hardness and alkalinity in water for domestic consumption.
5. To apply the principles of conductivity and viscosity of substances in aqueous solutions for quantitative analysis using analytical instruments.

REFERENCES:

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

WEBSITE REFERENCES

1. <https://www.jhotpotinfo.com/2020/02/determination-of-youngs-modulus-of-bar.html>
2. <https://vlab.amrita.edu/index.php?sub=1&brch=280&sim=1518&cnt=1>
3. <https://vlab.amrita.edu/?sub=1&brch=281&sim=851&cnt=2>
4. http://sites.iiserpune.ac.in/~bhasbapat/phy221_files/Lee%27s%20Method.pdf
5. https://edisciplinas.usp.br/pluginfile.php/4212400/mod_resource/content/0/Dunnivant%2021.pdf
6. [https://chem.libretexts.org/Bookshelves/General_Chemistry/Map%3A_A_Molecular_Approach_\(Tro\)/17%3A_Aqueous_Ionic_Equilibrium/17.04%3A_Titrations_and_pH_Curves](https://chem.libretexts.org/Bookshelves/General_Chemistry/Map%3A_A_Molecular_Approach_(Tro)/17%3A_Aqueous_Ionic_Equilibrium/17.04%3A_Titrations_and_pH_Curves)

CO-PO Mapping

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

SEMESTER 2

JHS2221	ENGLISH FOR SCIENCE AND TECHNOLOGY (COMMON TO ALL BRANCHES)	L T P C 2 0 2 3
---------	---	--------------------

COURSE OBJECTIVES:

- To enable the students of Engineering to comprehend technical texts
- To improve their technical writing skill for better transmission of messages
- To help them acquire language skills required in academic and workplace contexts
- To facilitate them to hone their skills to prepare effective reports
- To equip them with effective communicative skills to meet their future needs

UNIT I COMMUNICATING TECHNICAL INFORMATION 12

Definitions – Conditional clauses – Technical vocabulary; Comprehension of short technical passage and note-making

Language Practice

Reading: Short technical texts / excerpts; **Speaking:** Interviewing on social or global issues; **Listening:** Talks on science, engineering, medicine / interviews of achievers; **Writing:** Sentence Completion, gap filling, verbal aptitude: sentence correction

UNIT II GRAPHICAL ANALYSIS AND INTERPRETATION 12

Purpose statements – Numerical adjectives – Collocation; Process Description - Interpretation of Graphs and Charts

Language Practice

Reading: Emails, invitations; **Speaking:** Describing charts and tables; **Listening:** Process descriptions; **Writing:** Paraphrasing – Developing outlines

UNIT II PERSUASIVE WRITING & INFORMATION DISSEMINATION 12

Cause and effect – Voice (active, personal and impersonal passive) – Words used as nouns and verbs; Instructions – Recommendations

Language Practice

Reading: User manuals, gadget reviews; **Speaking:** Presentation on social / technical topics; **Listening:** Announcements, instructions; **Writing:** Instructions – Recommendations

UNIT IV REPORT WRITING AND GROUP INTERACTION 12

Determiners – Editing - Initialisms and acronyms; Report writing: survey, accident – Minutes of meeting

Language Practice

Reading: Notices, reviews; **Speaking:** Group discussions (technical topics) and debates; **Listening:** IELTS and TOEFL; **Writing:** Writing profiles of personalities and industries

UNIT V CAREER AND BUSINESS COMMUNICATION 12

Adverbials – Misspelt words – Formal and informal English; Letter writing – Job application and resume by mail and email – Inviting and sending quotations and placing orders

Language Practice

Reading: Email invitations to job interviews; **Speaking:** About future / career; **Listening:** Talks by entrepreneurs; **Writing:** Career objective, short-term and long-term goals, tagline

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- To read and understand different types of technical texts
- To write procedural texts logically and sequentially in English
- To communicate effectively in academic and professional contexts
- To prepare effective reports and participate in group activities
- To use language precisely and accurately in business relations

TEXT BOOKS:

1. Department of English, Anna University, English for Engineers & Technologists, Volume 2, Orient BlackSwan Private Limited, Chennai, 2022.
2. Dhanavel, SP. English and Communication Skills for Students of Science and Engineering. Orient BlackSwan Private Limited, Chennai, 2011.
3. Interact English: Lab Manual for Undergraduate Students. Orient BlackSwan Private Limited, Chennai, 2017.

REFERENCE BOOKS:

1. Chellammal, V. Learning to Communicate. Allied Publishing House, New Delhi, 2004.
2. Raman, Meenakshi & Sangeetha Sharma. Technical Communication: Principles and Practices. Oxford University Press, New Delhi. 2015.
3. Regional Institute of English. English for Engineers. Cambridge University Press, New Delhi. 2008.
4. Rizvi M, Ashraf. Effective Technical Communication, Tata McGraw-Hill Publishing Company

WEB LINKS:

- www.esl-lab.com
- www.englishgrammar.org
- www.englishclub.com
- www.usingenglish.com
- www.esl.about.com
- www.bbc.co.uk/learningenglish/
- <https://esl-bits.net/>
- <https://elt.oup.com/>
- <https://learnenglish.britishcouncil.org>
- <https://quizizz.com/>

Mapping of CO with PO

PO/CO	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	1	-	1	1	1	3	-	1
CO2	-	-	-	1	-	1	1	1	3	-	1
CO3	-	-	-	1	-	1	1	1	3	-	1
CO4	-	-	-	1	-	1	1	1	3	-	1
C05	-	-	-	1	-	1	1	1	3	-	1
AVG	-	-	-	1	-	1	1	1	3	-	1

JGE2202	TAMILS AND TECHNOLOGY	L T P C 1 0 0 1
----------------	------------------------------	----------------------------------

UNIT I WEAVING AND CERAMIC TECHNOLOGY 3

Weaving Industry during Sangam Age - Ceramic technology - Black and Red Ware Potteries (BRW) - Graffiti on Potteries.

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY 3

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age - Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III MANUFACTURING TECHNOLOGY 3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel - Copper and gold- Coins as source of history - Minting of Coins - Beads making-industries Stone beads - Glass beads - Terracotta beads -Shell beads/ bone beads - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY 3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoombu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl-Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING 3

Development of Scientific Tamil - Tamil computing - Digitalization of Tamil Books - Development of Tamil Software - Tamil Virtual Academy- Tamil Digital Library- Online Tamil Dictionaries - Sorkuvai Project.

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL — (in print)
2. Social Life of the Tamils - The Classical Period (Dr.S.SingaraveIu) (Published by: International Institute of Tamil Studies.
3. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Publish by: International Institute of Tamil Studies).
4. The Contributions of the Tamils to Indian Culture (Dr.M.VaIarmathi) (Published by:International Institute of Tamil Studies.)
5. Keeladi - ‘Sangam City Civilization on the banks of river Vaigai’ (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
6. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
7. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
8. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) — Reference Book.

Mapping of CO with PO

	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	-	-	2	3	3	2	2	-	2
CO2	2	2	-	-	2	3	3	3	2	-	2
CO3	2	2	-	-	2	3	3	3	2	-	2
CO4	2	2	-	-	2	3	3	3	2	-	2
CO5	2	2	-	-	3	3	3	3	3	-	3
AVG	2	2	0	0	2.2	3	3	2.8	2.2	0	2.2

JMA2201	STATISTICS FOR ENGINEERS	L T P C 2 2 0 3
----------------	---------------------------------	----------------------------------

COURSE OBJECTIVES:

- To provide basic concepts of discrete, continuous random variables and moments.
- To acquaint students in the concepts and problems of standard distributions.
- To familiarize students in problems of correlation and regression.
- To provide students knowledge of testing of hypothesis and its applications.
- To introduce Design of Experiments for practical problem solving.

UNIT I RANDOM VARIABLES 9+3

Discrete and continuous random variables – Moments – Moment generating functions

UNIT II STANDARD DISTRIBUTIONS 9+3

Discrete distributions: Binomial distribution – Poisson distribution – Geometric distribution
Continuous distributions: Uniform distribution – Exponential distribution – Normal distribution

UNIT III STATISTICAL CORRELATION AND REGRESSION 9+3

Correlation coefficient – Rank correlation – Correlation for bivariate data – Regression coefficients – Lines of regression

UNIT IV TESTING OF HYPOTHESIS 9+3

Normal tests for mean and difference of means – t tests for mean and difference of means
– Chi-square test for goodness of fit – Chi-square test for independence of attributes

UNIT V DESIGN OF EXPERIMENTS 9+3

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- To solve problems of discrete and continuous type random variables for finding mean and variance.
- To apply standard probability distributions in solving real time problems.
- To solve correlation problems and to use regression analysis for predicting values of variables.
- To apply hypothesis testing for making statistical inferences in large and small sample real life problems.
- To compare and contrast various design of experiments methods and use them in problems.

TEXT BOOKS:

1. Gupta S C and Kapoor V K, —Fundamentals of Mathematical Statistics, Sultan Chand and Sons, 12th Edition, 2020.
2. Ibe O C, "Fundamentals of Applied Probability and Random Processes", Elsevier, 2nd Edition, 2014.
3. Johnson R A, —Miller & Freund's Probability and Statistics for Engineers, Pearson Education, Asia, 9th Edition, 2018.

REFERENCES:

1. Hwei Hsu, "Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw Hill Edition, New Delhi, 3rd Edition 2014.
2. Trivedi K S, "Probability and Statistics with Reliability, Queueing and Computer Science Applications", John Wiley and Sons, 2nd Edition, 2016.

WEB REFERENCES:

- <https://nptel.ac.in/courses/117105085>
- <https://nptel.ac.in/courses/111105041>
- <https://nptel.ac.in/courses/102101056>
- <https://nptel.ac.in/courses/102106051>

Mapping of CO with PO

	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1	1	2	3	-	-	2	1	-	1
CO2	2	1	1	2	3	-	-	2	1	-	1

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

JPH2201	ENGINEERING PHYSICS – 2	L T P C 3 0 0 3
----------------	--------------------------------	----------------------------------

COURSE OBJECTIVES:

- To enlighten the students on the principles of semiconductor materials and Electron transport properties
- To acquaint them with the applications of magnetic materials
- To impart knowledge on superconducting materials
- To help them acquire a basic understanding of dielectric materials
- To introduce the basic principles in nano electronic devices

UNIT I SEMICONDUCTING MATERIALS 9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors - Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Hall Effect- Hall Coefficient in N-type and P type semiconductors.

UNIT II MAGNETIC MATERIALS 9

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 – Memory devices-ROMs and RAMs(R/W)

UNIT III SUPERCONDUCTING MATERIALS 9

Properties of Superconductors – Josephson junction - Type I and Type II superconductors – BCS theory of superconductivity(Qualitative) – High T_c superconductors - Applications – SQUIDS. Cryotron and Maglev train.

UNIT IV DIELECTRIC MATERIALS 9

Polarization mechanisms in dielectrics– dielectric loss – internal field – Clausius-Mosotti relation- dielectric loss and dielectric breakdown – high-k dielectrics – Types of dielectrics – Applications in transformers and capacitors.

UNIT V NANO ELECTRONIC MATERIALS 9

Size dependence of Fermi energy– quantum confinement – quantum structures - Density of states in quantum well, quantum wire and quantum dot structures - Single electron phenomena and Single Electron Transistor.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- To be familiar with the functioning of semiconductors
- To assess the magnetic properties of materials
- To make use of superconductors in real life situations
- To understand the nuances of advanced solid state physics
- To recognize the uses of Nano electronic materials

TEXT BOOKS:

1. Dr.P.Mani, —Engineering Physics – III, DhanamPublications, First Edition,2019.
2. Dr.G.Senthil Kumar —Engineering Physics – III, VRB Publications, Revised Edition 2018.
3. Gaur, R.K. & Gupta, S.L. —Engineering PhysicsII. Dhanpat Rai Publishers, 2012
4. S.O.Pillai, —Solid State PhysicsII, New Age International Publications, Revised Edition.
5. Bhattacharya, D.K. & Poonam, T. —Engineering PhysicsII. Oxford University Press,2015.
6. Pandey, B.K. & Chaturvedi, S. —Engineering PhysicsII. Cengage Learning India,2012.

REFERENCES:

1. R. Murugesan, —Modern PhysicsII, Sultan chand & sons, 2021.
2. Halliday, D., Resnick, R. & Walker, J. —Principles of PhysicsII. Wiley, 2020.
3. Serway, R.A. & Jewett, J.W. —Physics for Scientists and EngineersII. Cengage Learning,2017.
4. Tipler, P.A. & Mosca, G. —Physicsfor Scientists and Engineers with ModernPhysics‘.

5. Willam F Smith, —Material Science and Engineeringll, Tata McGraw - HillPublications, 4th Edition.

WEBSITE REFERENCES:

- <https://archive.nptel.ac.in/courses/108/108/108108122/>
- <https://archive.nptel.ac.in/courses/115/103/115103038/>
- <https://archive.nptel.ac.in/courses/115/103/115103108/>
- https://www.brainkart.com/article/Dielectric-Materials_6827/
- <https://archive.nptel.ac.in/courses/117/108/117108047/>

CO-PO Mapping

PO/CO	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	-	-	1	-	1	-	-	1
CO2	3	2	1	-	-	2	-	-	-	-	1
CO3	3	2	1	-	-	-	-	-	-	-	1
CO4	3	2	1	-	-	-	-	-	-	-	1
C05	3	21	1	-	-	1	-	-	-	-	1
AVG	3	2	1	-	-	1.33	-	1	-	-	1
JCY2201			ENVIRONMENTAL SCIENCES AND SUSTAINABILITY							L T P C 2 0 0 2	

COURSE OBJECTIVES:

- To study the inter-relationship between living organisms and environment.
- To learn causes, effects and preventive methods of environmental pollution.
- To import knowledge on the needs of renewable and new energy sources.
- To acquire broad knowledge on sustainable development and its values on society.
- To expertise sustainability practices of sustainable habitat, sustainable energy and Green engineering.

UNIT 1 ENVIRONMENT AND BIODIVERSITY 6

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Biodiversity – Types and values. India as a mega diversity nation – hot-spots of biodiversity - endangered and endemic species of India - threats to biodiversity – conservation of biodiversity - In-situ and ex-situ - Field visit

UNIT 2 ENVIRONMENTAL POLLUTION 6

Causes, Effects and preventive measures of water, air, soil and thermal pollution. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection acts - Field visit

UNIT 3 RENEWABLE SOURCES OF ENERGY 6

Energy management and conservation – Need of new energy sources - Applications of Hydrogen energy - Ocean energy resources - Tidal energy conversion. Concept, origin and power plants of geothermal energy.

UNIT 4 SUSTAINABLE DEVELOPMENT 6

Sustainability- concept, needs and challenges- economic and social aspects of sustainability - millennium development goals and protocols- Sustainable Development Goals - targets, indicators and intervention areas. Climate change - Global, Regional and local environmental issues and possible solutions - case studies. Concept of carbon credit and carbon footprint.

UNIT 5 SUSTAINABILITY PRACTICES 6

Zero waste and 3R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency and sustainable transports. Sustainable energy: Energy Cycles - carbon cycle, emission and sequestration. Green Engineering: Sustainable urbanization - Socio-economic and technological change.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

- Recognize the function of ecosystem and contribute to conservation of biodiversity.
- Identify the causes and effects of environmental pollution and practice the preventive measures.
- Recognize various types of new renewable sources of energy and their potential applications.
- Apply the sustainable development goals for technological advancement and societal development.
- Adopt sustainability practices for energy efficiency and sustainable urbanization.

TEXT BOOKS:

1. Anubha Kaushik and C. P. Kaushik's —Perspectives in Environmental Studies, 6th Edition, New Age International Publishers, 2018.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.
3. Sanjay K Sharma, Green Corrosion Chemistry and Engineering: Opportunities and challenges, Wiley-VCH Verlag GmbH & Co. KGaA, Germany (2011)
4. Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.

REFERENCES:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38 . Edition 2010.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.

3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, Third Edition, 2015.
5. Erach Bharucha —Textbook of Environmental Studiesfor Undergraduate Courses| Orient Blackswan Pvt. Ltd. 2013.

Related Links

1. <https://www.hzu.edu.in/bed/E%20V%20S.pdf>
2. <https://catalogimages.wiley.com/images/db/pdf/9781119582052.excerpt.pdf>
3. <https://ncert.nic.in/textbook/pdf/keec109.pdf>

CO-PO Mapping

PO/CO	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	-	-	1	-	1	-	-	1
CO2	1	1	2	-	-	3	2	-	1	-	1
CO3	1	1	1	-	-	3	2	-	1	-	1
CO4	1	1	2	-	-	3	2	-	1	-	1
C05	1	1	2	-	-	3	2	-	1	-	1
AVG	1	1	1	-	-	3	2	-	1	-	1

JGE2221	ENGINEERING GRAPHICS	L T P C 2 0 2 3
---------	----------------------	--------------------

COURSE OBJECTIVES:

- To acquaint students with the importance of graphics in engineering
- To develop their skills in the 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 CONIC SECTIONS AND SPECIAL CURVES

12

Conics - Construction of ellipse, Parabola and hyperbola by eccentricity method, Rectangle method- Drawing of tangents and normal to the above curves. Special curves: Cycloid-Involute- Drawing of tangents and normal to the curves.

UNIT II PROJECTION PLANE SURFACES & ORTHOGRAPHIC PROJECTIONS

12

Introduction to Points, Lines (Only theory not for Exam Practice) – Projection of Plane Surfaces- Projection of polygonal surface and circular lamina inclined to both reference planes. 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 III- PROJECTION OF SOLIDS

12

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

UNIT IV DEVELOPMENT OF SURFACES

12

Introduction to Section of Solids (Only theory not for Exam Practice) Development of lateral surfaces of simple and truncated solids - Prisms, pyramids, cylinders and cones

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS

12

Principles of isometric projection – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones. Conversion of orthographic views into Isometric Drawing (Simple Objects) - Perspective projection of prisms and pyramids by visual ray method.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- To be familiar with the fundamental and standards of engineering graphics.
- To perform free hand sketching of basic geometrical constructions and multiple views of object.
- To project orthographic projections of lines and plane surfaces.
- To draw projection of solids and development of surfaces.
- To interpret isometric and perspective view of objects.

TEXT BOOKS:

1. Natrajan K.V., —A text book of Engineering Graphics, Dhanalakshmi Publishers, Chennai, 2018.
2. Venugopal K and Prabhu Raja V., —Engineering Graphics, New Age International (P) Limited, 2016.

REFERENCES:

1. Bhatt N.D. and Panchal V.M., —Engineering Drawing, Charotar Publishing House, 53rd Edition, 2019.
2. Gopalakrishna K.R., —Engineering Drawing (Vol. I & II combined), Subhas Stores, Bangalore, 2017..
3. Shah M.B and Rana B.C., —Engineering Drawing, Pearson, 2nd Edition, 2009.
4. Publication of Bureau of Indian Standards(BIS):
 - i. IS 10711 - 2001: Technical products Documentation - Size and lay out of drawing sheets.
 - ii. IS 9609 (Parts 0 & 1) - 2001: Technical products Documentation - Lettering.
 - iii. IS 10714 (Part 20) - 2001 & SP 46 - 2003: Lines for technical drawings.
 - iv. IS 11669 - 1986 & SP 46 - 2003: Dimensioning of Technical Drawings.
 - v. IS 15021 (Parts 1 to 4) - 2001: Technical drawings - Projection Method

Website References:

1. [www.pdfdrive.com/engineering drawing-books.html](http://www.pdfdrive.com/engineering-drawing-books.html)
2. <https://freevidelectures.com>
3. <https://nptel.ac.in/courses>

CO-PO MAPPINGS:

PO/CO	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	1	1	1	-	-	-	-	-	-	-
CO2	1	1	1	1	-	-	-	-	-	-	-
CO3	1	1	1	1	-	-	-	-	-	-	-
CO4	1	1	1	1	-	-	-	-	-	-	-
CO5	1	1	1	1	-	-	-	-	-	-	-
AVG	1	1	1	1	-	-	-	-	-	-	-

JCS2201	PYTHON PROGRAMMING	L T P C 3 0 0 3
---------	--------------------	--------------------

COURSE OBJECTIVES

- To provide a basics Python programming concept
- To understand the control structures and string concepts
- To learn different Python collections
- To acquire knowledge on functions, modules and packages
- To comprehend the file and exception handling concepts and GUI

UNIT 1 INTRODUCTION TO PYTHON PROGRAMMING 9

History of Python, Features, Installing Python, Demo Of Interactive and script mode, Identifiers, Reserved Words, Indentation, Comments, Variables, Data Types and its Conversion, Operators and its precedence, Expressions, Input and Print functions. Command-Line arguments.

UNIT 2 CONTROL STRUCTURES AND STRINGS 9

Selective statements – if, if-else, nested if, if –elif ladder statements. Iterative statements - while, for, Nested loops, else in loops, break, continue and pass statement. Strings: Formatting, Comparison, Slicing, Splitting, Stripping, Negative indices, String functions.

UNIT 3 COLLECTIONS 9

List: Create, Access, Slicing, Negative Indices, List Methods, and comprehensions. Tuples: Create, Indexing and Slicing, Operations on tuples. Dictionary: Create, add, and replace values, operations on dictionaries. Sets: Create and operations on set.

UNIT 4 FUNCTIONS, MODULES AND PACKAGES 9

Functions: Types, parameters, arguments: positional arguments, keyword arguments, parameters with default values, functions with arbitrary arguments, Scope of variables: Local and global scope, Recursion and Lambda functions. Date and Time Methods. Modules and Packages.

UNIT 5 FILES, EXCEPTIONS, GRAPHICS AND GUI 9

Files: Open, Read, Write, Append and Close. Tell and seek methods. Errors and Exceptions: Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions, Exception Chaining, User defined Exceptions, Defining Clean-Up actions. Simple graphics: simple 2D drawing shapes and coloring. GUI using Tkinter.

TOTAL: 45 PERIODS

COURSE OUTCOMES

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

- To write basic python programs
- To develop program using control structure and simple string processing.
- To create a code for different collection types and can differentiate them and to compose the code for functions, modules and packages.
- To learn how to handle file and exception.
- To design an user interface using Tkinter.

TEXTBOOKS

1. Eric Matthes, Python Crash Course: A Hands-On, Project-Based Introduction to Programming 2nd Edition, No Starch Press, 2019.
2. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist``, 2nd edition, Updated for Python Shroff O'Reilly Publishers, 2016
(<http://greenteapress.com/wp/thinkpython/>)
3. Alan D. Moore, Python GUI Programming with Tkinter - Develop Responsive and Powerful GUI Applications with Tkinter, Packt Publishing, First Edition, 2018.

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.
- Kenneth A. Lambert, —Fundamentals of Python: First Programs, CENGAGE Learning, 2012.
 - 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

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

CO-PO Mapping

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	-	-	-	-	-	-	-	-	3	1	-
CO2	3	3	3	-	-	-	-	-	-	-	-	3	2	1
CO3	3	3	3	-	-	-	-	-	-	-	-	3	2	2
CO4	3	3	3	-	-	-	-	-	-	-	-	3	1	2
C05	3	3	3	-	-	-	-	-	-	-	-	3	2	2
AVG	3	3	3	-	-	-	-	-	-	-	-	3	1.6	1.8

JPC2211	ENGINEERING PHYSICS AND ENVIRONMENTAL SCIENCE LABORATORY	L T P C 0 0 2 1
---------	---	--------------------

OBJECTIVES:

- To provide students the first hand experience of verifying various concepts learnt in theory courses.

LIST OF EXPERIMENTS:

- Determination of Numerical Aperture of the given Fiber and Estimate the Linearity of the Laser Source.
- Determine the Dispersive power of a given Prism using Spectrometer
- Determination of Thickness of the given thin Wire by forming Interference fringes using air-wedge setup
- Analysis of I-V Characterization of Solar cell
- Determination of Energy gap of the given Semiconductor Diode by

- plotting the graph between current and temperature.
- Determination of Young's Modulus for the given bar by Nonuniform Bending method.
 - Determination of Dissolved oxygen by Winkler's method
 - Estimation of amount of chloride in water.
 - Estimation of the amount of mixture of acids in water
 - Estimation of Iron content in water by Spectrophotometric method
 - Estimation of acetic acid adsorbed on charcoal.
 - Determination of per capita energy consumption and carbon footprint.

TOTAL: 30 PERIODS

COURSE OUTCOMES

At the end of the course, the students will able

- To lucid the effective communication system and to scrutiny the required wavelength.
- To quantify micro sized linear objects and to ascertain band gap of semiconducting materials.
- To configure solar power system as close as possible to its maximum peak power point.
- To quantify the degree of pollution of water samples by measuring water quality parameters.
- To carry out energy audit and practice energy conservation methods.

REFERENCES

- D. Bailey and E. Wright, Practical Fiber Optics, Newnes publications, 2003.
- Fretter W.B. -Introduction to Experimental Physics UCL Press, 2005
- Gurdeep R.Chatwal, Sham K. Anand, Instrumental methods of chemical analysis, Himalaya Publishing House, 2007.

WEBSITE REFERENCES:

- <https://vlab.amrita.edu/?sub=1&brch=281&sim=851&cnt=2>
- <https://anilpangantiwar.tripod.com/expt10.htm>
- <https://praxilabs.com/en/3d-simulations/i-v-characteristics-of-solar-cell-I-physics-simulation>
- <https://vlab.amrita.edu/?sub=2&brch=193&sim=575&cnt=1>
- <https://jigyasa-csir.in/neeri/n32-t1-a2/>

CO-PO Mapping

PO/CO	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	1	2	2	1	1	-	2	1	-	1
CO2	1	1	2	2	1	1	-	2	1	-	1

CO3	1	1	2	2	1	1	-	2	1	-	1
CO4	1	1	2	2	1	2	-	2	1	-	1
C05	1	1	2	2	1	2	-	2	1	-	1
AVG	1	1	2	2	1	1.4	-	2	1	-	1

JGE2241	GAMING AND CRAFTS STUDIO	L T P C 0 0 4 2
----------------	---------------------------------	----------------------------------

OBJECTIVES:

- Understand the fundamental principles of game development and the Unity interface.
- Analyse various game design principles to enhance gameplay experience.
- Evaluate and integrate audio and visual assets to create immersive game environments.
- Create a complete game project that incorporates learned techniques and personalized creative elements.
- Reflect on the game development process and critique peer projects to foster a collaborative learning environment.

UNIT I The World of Game Development and Gaming Fundamentals 12 Introduction to Game Development & Unity , Understanding the core elements of gameplay, such as mechanics, dynamics, and aesthetics.Interactive tutorial on Unity, exploring the interface and

project setup. Navigate Unity and set up a basic project.

UNIT II Game Design Principles, Visual and Audio Design 12 Game Design Principles & Basic Scripting - implementing basic game mechanics.- implement simple player controls and game mechanics using C#.- create responsive player controls using various input methods.- Player Control and Game Technologies - Hands-on scripting for player controls.

UNIT III Game Mechanics, Technology, and Development 12 Creating Game Assets- modelling and texturing basic game assets.- Physics and Interactions - Practical exercises adding physics and collisions to objects.- UI & Menus - UI development sessions for creating intuitive game menus.- Audio and Visual Effects - Implementing background music and particle effects.

UNIT IV Critical Analysis, Feedback, and Ethical Considerations 12 Coding challenges to implement state machines and level progression.- Testing and Debugging - Debugging tools and techniques- Refine gameplay and fix issues, Optimisation

UNIT V Game Project & Presentation 12 Students will work in groups of 4-5 to design and develop a functional video game prototype- The game should incorporate concepts and mechanics from at least two different Genres- A GDD (Game Design Document) will be required as part of this project- Students will present their game prototype and GDD to the class and receive feedback from peers and instructors.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- navigate Unity and set up a basic project, implement simple player controls and game mechanics using C#.
- create responsive player controls using various input methods and import custom assets into Unity.
- Integrate Unity's Physics engine into their game projects and develop functional game menus and UI elements.
- enhance their games with audio cues and visual effects.
- use advanced scripting to manage game states and progression and perform debugging to refine gameplay and fix issues.

WEB RESOURCES:

- <https://www.youtube.com/watch?v=XtQMytORBmM>
- <https://www.youtube.com/watch?v=AmGSEH7QcDg>
- <https://www.youtube.com/watch?v=AmGSEH7QcDg>
- <https://www.youtube.com/watch?v=HAVfA1F3qTo>
- <https://www.youtube.com/playlist?list=PLİbBaEcybmgWnFoWDxgSIatmrzBRWSQ>

· <https://www.youtube.com/watch?v=ldP0c2o1FJI>

· <https://www.youtube.com/watch?v=ldP0c2o1FJI>

CO-PO Mapping

	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	3	1	3	1	1	2	2	1	2	3	2	2
CO2	3	2	3	2	3	1	1	2	2	1	2	3	2	2
CO3	3	2	3	2	3	2	1	2	2	1	2	3	2	3
CO4	3	2	3	2	3	2	1	2	2	1	2	3	2	3
CO5	3	3	3	3	3	1	1	2	2	1	3	3	3	3
AVG	3	2.2	3	2	3	1.4	1	2	2	1	2.2	3	2.2	2.6

JGE3171	PROBLEM SOLVING AND 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.
- Represent compound data using Python lists, tuples, dictionaries.
- Use functions for structuring Python programs.
- To implement basic 2D diagrams and create simple GUI.

LIST OF EXPERIMENTS:

1. Write a python program using simple data types. Get the input from the keyboard. (Do not use built-in functions).
 - a) To find the square and cube of a number
 - b) To find the roots of a quadratic equation
 - c) To find the square root and cube root of a number
 - d) To calculate Simple Interest
2. Using command line arguments get the value from user. (Do not use built-in functions).
 - a) To convert Celsius to Fahrenheit
 - b) Exchange the value of two variables
 - c) To find the area and perimeter of a circle
 - d) To convert inch into meter
3. Exercise programs on conditional statements.
 - a) Write a program to find the grade of a student. Get student name, marks for 20 students.
 - b) Write a code to get the age of a person and print an age group. (Infant, Children, Adolescents, Adults, Older adults)
4. Exercise programs on basic control structures & loops.
 - a) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.
 - b) Write a Python Program to Check the Prime Number using While Loop.
 - c) Write a python program to print Pascal triangle using for loop.
 - d) Write a program to print the multiplication table of the number entered by the user.
5. Programs using strings.
 - a) Make a program that displays your favorite actor/actress and print the word `'_lucky'` inside the string.
 - b) Print the day, month, year in the form —Today is 2/2/2016.
 - c) Write a program that asks console input and searches for a query.
 - d) Given an article, split it based on phrases.
6. Do the program using python collections.
 - a) Create a dictionary containing names of students and marks obtained by them in three subjects. Write a program to replace the marks in three subjects with the total in three subjects, and average marks. Also report the topper of the class.
 - b) Suppose a list contains several words. Write a program to create another list that contains first character of each word present in first list. Also, for the given first letter display the corresponding word from the list along with index.

- c) Suppose a date is represented as a tuple (d, m, y). Write a program to create two date tuples and find the number of days between the two dates.
 - d) Write a program to create a set containing 10 randomly generated numbers in the range 15 to 45. Count how many of these numbers are less than 30. Delete all numbers which are greater than 35.
7. Do program using function and recursive function.
- a) A string is entered through the keyboard. Write a recursive function that checks whether the string is a palindrome or not.
 - b) Write a recursive function to obtain length of a given string.
 - c) Get the height and weight value of five persons. Write a function BMI_Calc() to calculate the BMI. ($BMI = \text{weight}/\text{height}^2$) using all four prototypes.
8. Programs using files and exception.
- a) Write a program to read a file and display its contents along with line numbers before each line. Also, handle EOF error.
 - b) Suppose a file contains student's records with each record containing name and age of a student. Write a program to read these records and display them in sorted order by name. How will you handle if file is not found.
9. Draw simple drawings using turtle and fill it with color.
10. Using DateTime method, Get current local time, UTC time, GMT time, ISO time and Get current time in the specific time zone.
11. Create a simple registration form using Tkinter.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- Write, test, and debug simple Python programs.
- Implement Python programs with conditionals and loops.
- Use Python lists, tuples, dictionaries for representing compound data.
- Develop Python programs step-wise by defining functions and calling them Implement file operations and also draw basic 2D diagrams

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

SOFTWARE REQUIREMENTS

- **PYTHON3 and above**

HARDWARE REQUIREMENTS

- Standalone desktops (or) Server supporting 30 terminals or more

TEXTBOOKS:

1. Allen B. Downey, —Think Python : How to Think like a Computer Scientist, 2nd Edition, O'Reilly Publishers, 2016.

2. Karl Beecher, —Computational Thinking: A Beginner's Guide to Problem Solving and Programming, 1st Edition, BCS Learning & Development Limited, 2017.
3. Alan D. Moore, Python GUI Programming with Tkinter - Develop Responsive and Powerful GUI Applications with Tkinter, Packt Publishing, First Edition, 2018.

REFERENCES:

1. Paul Deitel and Harvey Deitel, —Python for Programmers, Pearson Education, 1st Edition, 2021.
2. G Venkatesh and Madhavan Mukund, —Computational Thinking: A Primer for Programmers and Data Scientists, 1st Edition, Notion Press, 2021.

WEB SITE REFERENCE:

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

CO-PO Mapping

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	-	-	3	2	1	2	3	1	-
CO2	3	3	3	3	3	-	-	3	3	2	2	3	2	1
CO3	3	3	3	3	3	-	-	3	3	2	3	3	2	1
CO4	3	3	3	3	3	2	-	3	3	3	3	2	3	2
CO5	3	3	3	3	3	2	-	3	3	3	3	2	3	3
AVG	3	2.8	3	2.8	3	2	-	3		2.2	2.6	2.8	1.4	1

COURSE OUTCOMES:

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

- Apply propositional logic in practical problems.
- Solve combinatorial problems using counting principle and mathematical induction.
- Demonstrate efficient use of graph theory in solving connectivity and shortest path problems.
- Apply divisibility theory and canonical decompositions in problems.
- Solve practical 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, 2017.
2. Tremblay J.P. and Manohar R., "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Pub. Co. Ltd, New Delhi, 1st Edition, 2017.
3. Koshy. T., "Elementary Number Theory with Applications", Elsevier Publications, New Delhi, 2nd Edition, 2007.

REFERENCES:

1. Grimaldi R.P., "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition, Pearson Education Asia, Delhi, 2007.
2. Niven I, Zuckerman H.S. and Montgomery. H.L., "An Introduction to Theory of Numbers", John Wiley and Sons, Singapore, 2004.

WEB REFERENCES:

- <https://nptel.ac.in/courses/111106086/>
- <https://nptel.ac.in/courses/111106155/>
- <https://nptel.ac.in/courses/111106102/>
- <https://nptel.ac.in/courses/111101137/>
- <https://nptel.ac.in/courses/111103020/>

Mapping of CO with PO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	2	3	-	-	2	-	-	1	3	2	-
CO2	3	2	1	2	3	-	-	2	-	-	1	3	2	-
CO3	3	2	1	2	3	-	-	2	-	-	1	3	3	1
CO4	3	2	1	2	3	-	-	2	-	-	1	3	2	-
CO5	3	2	1	2	3	-	-	2	-	-	1	3	2	1
AVG	3	2	1	2	3	-	-	2	-	-	1	3	2.2	1

- Design an interface, synchronize various tasks and develop an GUI using JavaFX.

TEXT BOOKS:

1. Herbert Schildt, C++: The Complete Reference, 4th Edition, McGraw Hill Education, 2017.
2. Herbert Schildt, Java: The Complete Reference, 11th Edition, McGraw Hill Education, 2019.
3. J. F. DiMarzio, JavaFX A Beginners Guide, McGraw Hill Professional, 2011.

REFERENCE BOOKS:

1. Bjarne Stroustrup, The C++ Programming Language, 4th Edition, Addison-Wesley, 2013
2. E. Balagurusamy, Object Oriented Programming with C++, 8th Edition, McGraw Hill, 2020.
3. E. Balagurusamy, Programming with JAVA - A Primer, Third Edition, McGraw-Hill Professionals, 2014.
4. R. Nageswara Rao and Kogent Solutions Inc., Core Java: An Integrated Approach, Dreamtech Press, 2008.

WEB REFERENCES:

1. [Java Tutorial - GeeksforGeeks](#)
2. [C++ Programming Language - GeeksforGeeks](#)
3. [C++ Tutorial | Learn C++ Programming Language - Scaler Topics](#)
4. [Java Tutorial | Learn Java Programming - Scaler Topics](#)
5. [Learn Java Programming \(programiz.com\)](#)
6. [JavaFX Tutorial \(tutorialspoint.com\)](#)

Mapping of CO with PO/PSO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	3	1	3	1	1	2	2	1	2	3	2	1
CO2	3	2	3	1	3	1	1	2	2	1	2	3	2	1
CO3	3	2	3	2	3	1	1	2	2	1	2	3	2	1
CO4	3	2	3	2	3	1	1	2	2	1	2	3	2	1
CO5	3	2	3	1	3	1	1	2	3	2	2	3	2	1
AVG	3	2	3	1.4	3	1	1	2	2.2	1.2	2	3	2	1

- Model problems as graph problems and implement efficient graph algorithms to solve them.
- Design, implement, and analyze efficient tree structures to meet requirements such as searching, indexing, and sorting.

TEXT BOOKS

1. Michael T. Goodrich, Roberto Tamassia, and Michael H. Goldwasser, “Data Structures & Algorithms in Python”, An Indian Adaptation, John Wiley & Sons Inc., 2021.
2. Devraj Ganguly, “Introduction to Data Structures and Algorithms”: A Conceptual Guide. Paperback – 19 May 2021

REFERENCES:

1. Lee, Kent D., Hubbard, Steve, “Data Structures and Algorithms with Python” Springer Edition 2015
2. Rance D. Necaie, “Data Structures and Algorithms Using Python”, John Wiley & Sons, 2011
3. Aho, Hopcroft, and Ullman, “Data Structures and Algorithms”, Pearson Education, 1983.
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, “Introduction to Algorithms”, Second Edition, McGraw Hill, 2002.
5. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, Fourth Edition, Pearson Education, 2014.

WEB REFERENCES:

1. <https://dl.acm.org/doi/10.5555/577958>
2. <https://www.javatpoint.com/data-structure-tutorial>
3. <https://www.javatpoint.com/data-structures-and-algorithms-in-c-set-1>
4. <https://www.w3schools.in/data-structures/intro>

CO- PO MAPPING:

	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	-	-	-	1	-	2	3	2	-
CO2	3	3	3	2	3	-	-	1	2	1	2	3	3	1
CO3	3	3	3	3	3	-	-	-	2	-	2	3	3	1
CO4	3	3	3	3	3	1	-	1	2	1	2	3	3	2
CO5	3	3	3	3	3	-	-	1	2	1	2	3	3	2

AVG	3	2.8	2.8	2.6	2.8	1	-	1	1.8	1	2	3	2.8	1.5
------------	----------	------------	------------	------------	------------	----------	----------	----------	------------	----------	----------	----------	------------	------------

JAL2301	DATA SCIENCE	L T P C 3 0 0 3
----------------	---------------------	----------------------------------

COURSE OBJECTIVES:

- To understand the data science fundamentals and process.
- To learn to describe the data for the data science process.
- To learn to describe the relationship between data.
- To utilize the Python libraries for Data Wrangling.
- To present and interpret data using visualization libraries in Python.

UNIT I INTRODUCTION TO DATA SCIENCE 9

Data Science: Benefits and uses – Facets of data - Data Science Process - The big data ecosystem and data science - Overview of the data science process – Defining research goals – Retrieving data – Data preparation - Exploratory Data analysis – Build the models – Presenting findings and building applications - Basic Statistical descriptions of data.

UNIT II DESCRIPTIVE STATISTICS - DESCRIBING DATA 9

Types of Data - Types of Variables - Describing Data with Tables and Graphs – Describing Data with Averages - Describing Variability - Normal Distributions and Standard (z) Scores.

UNIT III DESCRIPTIVE STATISTICS - DESCRIBING RELATIONSHIPS 9

Correlation – Scatter plots – Correlation coefficient for quantitative data – Computational formula for correlation coefficient. Regression – A regression line – Least squares regression line – Standard error of estimate – Interpretation of r^2 – Multiple regression equations – Regression towards the mean.

UNIT IV PYTHON LIBRARIES FOR DATA WRANGLING 9

Basics of NumPy arrays – Aggregations – Computations on arrays – Comparisons, masks, boolean logic – Fancy indexing – Sorting arrays - Structured data.
Data manipulation with Pandas – Data indexing and selection – Operating on data – Handling missing data – Hierarchical indexing – Combining datasets – Pivot tables.

UNIT V DATA VISUALIZATION 9

Importing Matplotlib – Line plots – Scatter plots – Visualizing errors – Density and contour plots – Histograms – Plot legends – Colorbars – Subplots – Text and annotation – Three-dimensional plotting - Geographic Data with Basemap - Visualization with Seaborn.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- Define the data science process.
- Understand different types of data description for data science process.
- Gain knowledge on relationships between data.
- Use the Python Libraries for Data Wrangling.
- Apply visualization libraries in Python to interpret and explore data.

TEXT BOOKS

1. Davy Cielen, Arno D. B. Meysman, and Mohamed Ali, “Introducing Data Science”, Manning Publications, 2016.
2. Robert S. Witte and John S. Witte, “Statistics”, Eleventh Edition, Wiley Publications, 2017.
3. Jake VanderPlas, “Python Data Science Handbook”, O’Reilly, 2016.

REFERENCE BOOKS

1. Allen B. Downey, “Think Stats: Exploratory Data Analysis in Python”, Green Tea Press, 2014.
2. Erick Thompson, “Python for Data Science Books in 1. A Practical Beginner's Guide to Learn Python Programming, Introducing Into Data Analytics, Machine Learning, Web Development, with Hands-on Projects”, 2020, ISBN: 9798554509728

WEBSITE REFERENCES

- <https://www.analyticsvidhya.com/blog/2016/02/complete-tutorial-learn-data-science-scratch/> ·
- <https://www.edureka.co/blog/learn-python-for-data-science/>
- <https://towardsdatascience.com/fundamentals-of-statistics-for-data-scientists-and-data-analysts-69d93a05a0e7>
- <https://machinelearningmastery.com/data-visualization-in-python-with-matplotlib-seaborn-and-bokeh/>

CO-PO MAPPING

	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	2	-	-	2	1	2	3	2	1
CO2	3	3	2	2	2	-	-	-	2	-	2	3	2	-
CO3	3	3	3	3	3	1	-	-	1	1	2	3	3	2

1. Verification of Boolean theorems using logic gates.
2. Design and implementation of combinational circuits using gates for arbitrary functions.
3. Implementation of 4-bit binary adder circuits
4. Implementation of 4-bit binary Subtractor circuits.
5. Implementation of code converters.
6. Implementation of BCD adder.
7. Implementation of encoder and decoder circuits.
8. Implementation of functions using Multiplexers
9. Implementation of functions using Demultiplexers.
10. Simulator based study of Computer Architecture.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

- Simplify Boolean functions using KMap
- Design combinational circuits and analyze the design procedures
- State the fundamentals of computer systems and analyze the execution of an instruction
- Analyze different types of control design and identify hazards
- Identify the characteristics of various memory systems and I/O communication

TEXT BOOKS:

1. M. Morris Mano, Michael D. Ciletti, “Digital Design : With an Introduction to the Verilog HDL, VHDL, and System Verilog”, Sixth Edition, Pearson Education, 2018.
2. David A. Patterson, John L. Hennessy, “Computer Organization and Design, The Hardware/Software Interface”, Sixth Edition, Morgan Kaufmann/Elsevier, 2020.

REFERENCES:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Naraig Manjikian, “Computer Organization and Embedded Systems”, Sixth Edition, Tata McGraw-Hill, 2012
2. William Stallings, “Computer Organization and Architecture – Designing for Performance”, Tenth Edition, Pearson Education, 2016.
3. M. Morris Mano, “Digital Logic and Computer Design”, Pearson Education, 2016.

WEB REFERENCES:

- <https://www.geeksforgeeks.org/difference-between-multiplexer-and-demultiplexer/>
- <https://www.geeksforgeeks.org/introduction-of-sequential-circuits/>
- <https://www.geeksforgeeks.org/microarchitecture-and-instruction-set-architecture/>
- NPTEL :: Com <https://archive.nptel.ac.in/courses/106/105/106105163/>
- Difference bet <https://www.geeksforgeeks.org/difference-between-serial-port-and-parallel-ports/>

	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	-	-	-	1	-	2	3	2	-
CO2	3	3	3	2	3	-	-	1	1	1	2	3	2	1
CO3	3	2	2	3	3	-	-	-	2	-	2	3	2	1
CO4	3	3	3	3	3	1	-	1	2	1	2	3	3	2
CO5	3	2	2	2	3	1	-	-	2	1	3	3	3	2
AVG	3	2.6	2.4	2.4	2.8	1	-	1	1.6	1	2.2	3	2.4	1.5

JCS2311	DATA STRUCTURES AND ALGORITHMS LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES

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

LIST OF EXERCISES

1. List ADT using Python with insert, delete, search and modify operations
2. Implementation of Singly linked list.
3. a. Stack ADT using arrays
b. Stack ADT using linked list
4. a. Queue ADT using arrays
b. Queue ADT using linked list
5. Infix to Post fix conversion
6. Binary Search Trees
7. AVL Trees
8. Implement graph traversal techniques BFS and DFS.
9. Bubble sort, Selection sort, Insertion sort
10. Linear search and Binary search
11. Hashing-Linear Probing and Quadratic Probing

TOTAL:60 PERIODS

COURSE OUTCOMES:

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

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

TEXT BOOKS:

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

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

SOFTWARE: Ubuntu C / Python

HARDWARE: Standalone desktops 30 Nos. (or) Server supporting 30 terminals or more

WEBSITE REFERENCES:

- <https://www.geeksforgeeks.org/data-structures/>
- <https://www.worldscientific.com/worldscibooks/10.1142/5256>
- <https://www.programiz.com/dsa>
- <https://www.youtube.com/watch?v=8hly31xKli0>
- <https://www.codechef.com/certification/data-structures-and-algorithms/prepare>

Mapping of CO with PO/PSO

	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	-	-	-	1	-	2	3	2	1
CO2	3	2	3	2	3	-	-	1	2	1	2	3	3	2
CO3	3	3	3	3	3	-	-	1	2	1	2	3	3	2
CO4	3	3	3	2	3	-	-	1	2	1	2	3	3	2
CO5	3	3	3	3	3	-	-	1	2	1	3	3	3	2
AVG	3	2.8	2.8	2.4	2.8	-	-	1	1.8	1	2.2	3	2.8	1.8

JIT2311	OBJECT ORIENTED PROGRAMMING LABORATORY	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To understand basics of Object-Oriented Programming with C++ and Java programming language
- To know the principles of polymorphism and templates
- To define exceptions and use of inheritance
- To develop a java application with threads and interfaces
- To design and build Graphical User Interface Application using JAVA FX

LIST OF EXERCISES

1. a) Develop a C++ code to create a class and object and print the member variables.
b) Develop a C++ program to show the working of default constructor, parametrized constructor and copy constructor and destruct any object.
2. Implement a C++ code to demonstrate the concept of static member function.
3. Develop a menu driven C++ program to find area of two-dimensional objects (any three) using function overloading.
4. (a) Develop a C++ code to overload the unary operators using operator function
(b) Develop a C++ code to overload binary operators using operator function
5. (a) Implement a C++ code to swap any two values using function template.
(b) Implement a C++ code to find the maximum of any three values using a class template.
6. Develop a C++ code to handle division-by-zero and out-of-range exception.
7. a) Implement a Java code to print the sum, multiply, subtract, divide and remainder of two

numbers. Get the input from the user.

- (b) Develop a Java program to print and return the current class instance using this keyword.
8. 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.
9. Develop a Java program to create a 'Geometry' package with relevant classes (For e.g. Circle/ Square/ Polygon and so on.) and export it.
10. Create an interface for 'Playable' with classes Football, Volleyball and basketball.
11. Develop a Java code to implement the concept of Thread.
12. Design and develop an application using JavaFX.

TOTAL :60 Periods

COURSE OUTCOMES

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

- Apply the concepts of classes and objects to solve simple problems
- Develop programs using polymorphism and templates
- Handle the exceptions and inherit a class
- Build Java applications with thread models and interfaces
- Develop an GUI based application in JavaFX using event handling concept and controls

TEXTBOOKS

1. Herbert Schildt, "C++: The Complete Reference", 4th Edition, McGraw Hill Education, New Delhi, 2017.
2. Herbert Schildt, "Java: The Complete Reference", 11th Edition, McGraw Hill Education, New Delhi, 2019.
3. Herbert Schildt, "Introducing JavaFX 8 Programming", 1st Edition, McGraw Hill Education, New Delhi, 2015.

WEBSITE REFERENCES

1. [C++ Programming | Neso Academy](#)
2. cplusplus.com/doc/tutorial/
3. [C++ Tutorial \(w3schools.com\)](http://www.w3schools.com/C++/)
4. [Introduction to Java \(w3schools.com\)](http://www.w3schools.com/Java/)
5. [Java Tutorials for Beginners \(tutorialspoint.com\)](http://www.tutorialspoint.com/java/)

Mapping of CO with PO/PSO

	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	-	-	1	1	1	2	3	2	1

CO2	3	3	3	2	3	-	-	1	2	1	2	3	3	2
CO3	3	3	3	3	3	-	-	1	2	1	2	3	3	2
CO4	3	2	3	2	3	1	-	1	2	1	3	3	3	3
CO5	3	3	3	2	3	1	-	2	2	1	3	3	3	3
AVG	3	2.6	2.8	2.2	3	1	-	1.2	1.8	1	2.4	3	2.8	2.2

JNC2361	DISASTER RISK REDUCTION AND MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVE

- To impart knowledge on concepts related to disaster, disaster risk reduction, disaster management
- To acquaint with the skills for planning and organizing disaster response

UNIT I HAZARDS, VULNERABILITY AND DISASTER RISKS 9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Types of Disasters: Natural, Human induced, Climate change induced –Earthquake, Landslide, Flood, Drought, Fire etc – Technological disasters- Structural collapse, Industrial accidents, oil spills -Causes, Impacts including social, Economic, political, environmental, health, psychosocial, etc.- Disaster vulnerability profile of India and Tamil Nadu - Global trends in disasters: urban disasters, pandemics, Complex emergencies, - Inter relations between Disasters and Sustainable development Goals

UNIT II DISASTER RISK REDUCTION (DRR) 9

Sendai Framework for Disaster Risk Reduction, Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community Based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions / Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Early Warning System – Advisories from Appropriate Agencies.- Relevance of indigenous Knowledge, appropriate technology and Local resources.

Components of Disaster Management – Preparedness of rescue and relief, mitigation, rehabilitation and reconstruction- Disaster Risk Management and post disaster management – Compensation and Insurance- Disaster Management Act (2005) and Policy - Other related policies, plans, programmers and legislation - Institutional Processes and Framework at State and Central Level- (NDMA – SDMA-DDMA-NRDF- Civic Volunteers)

UNIT IV TOOLS AND TECHNOLOGY FOR DISASTER MANAGEMENT 9

Early warning systems -Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment. - Elements of Climate Resilient Development –Standard operation Procedure for disaster response – Financial planning for disaster Management

UNIT V DISASTER MANAGEMENT: CASE STUDIES 9

Discussion on selected case studies to analyse the potential impacts and actions in the contest of disasters-Landslide Hazard Zonation: Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.- Field work-Mock drill -

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Taimpo (2016), Disaster Management and Preparedness, CRC Publications
2. Singh R (2017), Disaster Management Guidelines for earthquakes, Landslides, Avalanches and tsunami, Horizon Press Publications
3. Singhal J.P. “Disaster Management”, Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN- 13: 978-9380386423
4. Tushar Bhattacharya, “Disaster Science and Management”, McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]

REFERENCES

1. Govt. of India: Disaster Management Act, Government of India, New Delhi, 2005. 2. Government of India, National Disaster Management Policy, 2009. 3. Shaw R (2016), Community based Disaster risk reduction, Oxford University Press

COURSE OUTCOME:

CO1: To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)

CO2: To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction

CO3: To develop disaster response skills by adopting relevant tools and technology CO4:

Enhance awareness of institutional processes for Disaster response in the country and

CO5: Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

Mapping of CO with PO/PSO

	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	2	2	1	-	2	1	-	-	2
CO2	2	3	1	-	-	3	3	2	1	2	1	-	2	3
CO3	2	2	-	-	-	3	3	2	1	3	2	-	2	3
CO4	2	2	2	3	2	2	2	-	-	2	2	-	1	3
CO5	2	3	2	2	-	3	3	2	-	2	1	-	1	3
AVG	2	2.4	1.66	1.5	2	2.6	2.6	1.75	1	2.2	1.4	-	1.5	2.8

JPT2041	SOFT SKILLS AND APTITUDE	L	T	P	C
		0	0	2	*

OBJECTIVE:

1. To make students analyze and solve problems in technical as well as aptitude. Enhance the technical skills and basics of programming language
2. To make the students understand how to apply the practical knowledge with real time applications.
3. To make the students think and draw a conclusion from different scenarios.
4. To help the students understand C programming concepts

UNIT-I

SOFT SKILLS AND APTITUDE – I

6

Synonyms - Antonyms - Odd Words - Idioms and Phrases - Error Spotting - Interpersonal Communication- Sentence Correction - Resume Writing Skills - Interview Skills.

UNIT-II

SOFT SKILLS AND APTITUDE-II

6

Reading Comprehension - Sentence Improvement - Jumbled Sentences - Parts of speech - Fact, Inference, Judgements - . Paragraph formation -Fill in the Blanks - Group Discussion - Mock Interview Sessions.

UNIT III

QUANTITATIVE APTITUDE

6

Number Theory - Divisibility rule - LCM and HCF - Simplification - Surds and Indices - Average - Percentage

UNIT IV

LOGICAL REASONING

6

Number and letter Series - Coding and Decoding - Ranking and Ordering - Odd man out - Image Based Relationships

UNIT V

TECHNICAL APTITUDE IN C-I

6

Pointers - Pointer dereferencing - Functions - Call by value, Call by reference - Structures - Structure Pointers - Arrays - One Dimensional, Two Dimensional, Multi Dimensional - Sorting - Time Complexity - Strings - String Methods.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

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

TEXT BOOKS:

1. Dr.RS 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

REFERENCES:

1. Data Communications and Networks- 2nd edition -Achyut S Godbole- and AtulKahate Tata McGraw-Hill, 2017.

2. Computer Networking - James F. Kurose & Keith W. Ross- PEARSON, 6th EDITION, 2017.
3. Computer Communications and Networking Technologies - Michael A. Gallo & William M. Hancock- BROOKS&COLE, 2001.

WEB REFERENCES:

- <https://www.indiabix.com/aptitude questions-and-answers>
- <https://m4maths.com placement-puzzles php>
- www.freshersworld.com

Mapping of CO with PO/PSO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	-	-	-	-	3	3	3	3	-	-	2
CO2	2	2	2	-	-	-	-	3	3	3	3	-	-	2
CO3	2	3	2	2	2	-	-	3	3	3	3	-	-	3
CO4	2	3	2	2	2	-	-	3	3	3	3	-	-	3
C05	3	3	2	2	3	-	-	3	3	3	3	-	-	3
AVG	2.2	2.6	2	2	2.2	-	-	3	3	3	3	-	-	2.6

JMA2402	APPLIED LINEAR ALGEBRA	L T P C 2 2 0 3
----------------	-------------------------------	----------------------------------

COURSE OBJECTIVES:

- To impart knowledge of consistency of system of equations through Rouché-Capelli theorem.
- To familiarize students in the concepts of vector spaces, bases and dimension.
- To enable students understand concepts of linear transformation, Eigenvalues, Eigenvectors and Diagonalizability.
- To introduce inner product spaces, orthogonalization and least square approximations.

UNIT I MATRICES AND SYSTEM OF LINEAR EQUATIONS 9+3

Matrices – Row Echelon form – Rank – Non-homogeneous system of linear equations – Homogeneous system of linear equations – Rouché-Capelli theorem (without proof) – Consistency – Gauss Jordan method – Gauss Seidel method

UNIT II VECTOR SPACES 9+3

Definition of field – Vector spaces – Subspaces – Properties – Linear combinations – Linear independence and linear dependence – Span – Bases and dimensions

UNIT III LINEAR TRANSFORMATION 9+3

Linear transformation – Properties – Kernel and Range – One-to-One correspondence – Rank and Nullity – Dimension theorem

UNIT IV DIAGONALIZATION 9+3

Matrix representations of linear transformations – Eigenvalues and eigenvectors – Diagonalizability

UNIT V INNER PRODUCT SPACES 9+3

Inner products and norms – Gram Schmidt orthogonalization process – Least square approximation

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- Apply Rouché-Capelli theorem for solving system of equations.
- Solve problems occurring in vector spaces and subspaces.
- Conceptualize linear transformation and use it in real-time problems.
- Demonstrate efficient use of matrix representations and diagonalization.
- Solve problems using orthogonalization process and use least square approximations.

TEXT BOOKS:

1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 44th Edition, 2021.
2. Kreyszig Erwin., "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
3. Friedberg. A.H., Insel. A.J. and Spence. L., “Linear Algebra”, Prentice Hall of India, New Delhi, 2004.

REFERENCES:

1. Kumaresan. S., “Linear Algebra – A Geometric Approach”, Prentice – Hall of India, New Delhi, Reprint, 2010.
2. 4. Lay D.C., “Linear Algebra and its Applications”, 5th Edition, Pearson Education, 2015.

WEB REFERENCES:

- <https://nptel.ac.in/courses/111107105/>
- <https://nptel.ac.in/courses/108104174/>
- <https://nptel.ac.in/courses/111104137/>
- <https://nptel.ac.in/courses/111106135/>
- <https://nptel.ac.in/courses/111108157/>

Mapping of CO with PO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	-	-	2	-	-	1	3	2	-
CO2	3	2	2	2	3	-	-	2	-	-	1	3	2	-
CO3	3	2	2	2	3	-	-	2	-	-	1	3	3	1

CO4	3	2	2	2	3	-	-	2	-	-	1	3	3	2
C05	3	2	2	2	3	-	-	2	-	-	1	3	3	2
AVG	3	2	2	2	3	-	-	2	-	-	1	3	2.6	1.6
JCS2401		DATABASE MANAGEMENT SYSTEMS									L T P C 3 0 0 3			

COURSE OBJECTIVES:

- To learn the working of various data models and get exposed to SQL querying
- To design data base with ER models 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–Concurrency Control–Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Transaction Recovery- SavePoints –Isolation Levels–SQL Facilities for Concurrency and Recovery.

UNIT IV DATA ORGANIZATION AND QUERY OPTIMIZATION 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 DATABASES 9

OODBMS- - Object-Based Databases - OO Data Model - OO Languages – Object Relational Databases - ODMG Object Model - XML – Structure of XML - Temporal Databases – Mobile Databases – Spatial Databases.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

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

TEXTBOOKS

1. Abraham Silberschatz, HenryF. Korth, S.Sudharshan, “Database System Concepts”, Seventh Edition, TataMcGraw Hill,2020
2. Ramez Elmasri, Shamkant B.Navathe, “Fundamentals of Database Systems”, Seventh Edition, Pearson Education, 2017.

REFERENCES

1. Raghu Ramakrishnan, Johannes Gehrke , “Database Management Systems”, Third 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.

WEBSITE REFERENCE

- <https://www.tutorialspoint.com/dbms/index.htm>
- <https://www.mygreatlearning.com/academy/learn-for-free/courses/database-management-systems-dbms>
- <https://www.w3schools.in/dbms/>
- https://sqlzoo.net/wiki/SQL_Tutorial

Mapping of CO with PO/PSO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	1	1	2	2	1	1	3	2	2
CO2	3	2	3	1	2	1	1	1	2	1	1	3	2	2
CO3	3	3	2	2	2	1	1	2	2	1	1	3	2	2
CO4	3	2	3	2	3	1	1	2	2	1	1	3	2	2
C05	3	2	2	2	3	2	2	1	2	1	1	2	3	2
AVG	3	2.2	2.6	1.8	2.6	1.2	1.2	1.6	2	1	1	2.8	2.2	2

JCS2402	DESIGN AND 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 - Asymptotic notations- Basic Efficiency classes.

UNIT II FUNDAMENTALS OF THE ANALYSIS OF ALGORITHM 9 **EFFICIENCY**

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

UNIT III ANALYSIS OF SORTING AND SEARCHING ALGORITHM 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-Merge sort, Quick Sort, Binary Search.

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 salesman problem.

TOTAL:45 HOURS

COURSE OUTCOMES:

At the end of the course, the student should 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, backtracking and branch & bound techniques.

TEXT BOOKS

1. AnanyLevitin, “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”, PHIPvt. 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

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

Mapping of CO with PO/PSO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	1	1	1	1	1	2	3	2	1
CO2	3	3	2	3	2	1	1	1	1	1	2	3	3	1
CO3	3	3	2	2	2	1	1	1	1	1	2	3	3	1
CO4	3	3	3	2	2	1	1	1	1	1	2	3	3	2
C05	3	3	3	3	2	1	1	1	1	1	2	3	3	2
AVG	3	2.8	2.4	2.2	2	1	1	1	1	1	2	3	2.8	1.4

JIT2421	OPERATING SYSTEMS	L T P C 3 0 2 4
----------------	--------------------------	----------------------------------

COURSE OBJECTIVES:

- To understand the basics and functions of operating systems.
- To analyze scheduling algorithms and process synchronization.
- To interpret various memory management schemes.
- To classify and familiar with storage management and file systems.
- To be familiar with the basics of virtual machines and Mobile OS

PREREQUISITE:

Computer Architecture

UNIT I COMPONENTS OF AN OS 9

Computer System - Elements and organization; Operating System Overview - Objectives and Functions - Evolution of Operating System; Operating System Structures – Operating System Services - User Operating System Interface - System Calls – System Programs .

UNIT II PROCESS MANAGEMENT 9

Processes - Process Concept - Process Scheduling- Inter-process Communication; CPU Scheduling - Scheduling criteria - Scheduling algorithms; Process Synchronization - The Critical-Section problem - Synchronization hardware – Semaphores – Mutex - Classical problems of synchronization - Monitors; Deadlock - Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

UNIT III MEMORY MANAGEMENT 9

Main Memory - Swapping - Contiguous Memory Allocation – Paging - Structure of the Page Table - Segmentation, Segmentation with paging; Virtual Memory - Demand Paging – Copy on Write - Page Replacement - Allocation of Frames –Thrashing.

UNIT IV STORAGE MANAGEMENT 9

Mass Storage system – Disk Structure - Disk Scheduling and Management; File-System Interface - File concept - Access methods - Directory Structure - Directory organization - File system mounting - File Sharing and Protection; File System Implementation - File System Structure - Directory implementation - Allocation Methods - Free Space Management

UNIT V VIRTUAL MACHINES AND MOBILE OS 9

Virtual Machines – History, Benefits and Features, Building Blocks, Types of Virtual Machines and their Implementations, Virtualization; Mobile OS - iOS and Android Architecture , SDK Frameworks.

TOTAL: 45 PERIODS

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. Write C programs to implement the various CPU Scheduling Algorithms
5. Bankers Algorithm for Dead lock Avoidance
6. Implementation of Dead lock Detection Algorithm
7. Implementation of the following Memory Allocation Methods for fixed partition a) FirstFit b) WorstFit c) BestFit
8. Implementation of Paging Technique of Memory Management
9. Implementation of the following Page Replacement Algorithms a) FIFO b) LRU c) LFU

TOTAL: 30 PERIODS

COURSE OUTCOMES:

At the end of the course, the student should 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 in memory management and storage management techniques
- Analyze the File System Interface, Directory Structure
- Compare iOS and Android Operating Systems.

TEXT BOOKS:

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. Andrew S. Tanenbaum, “Modern Operating Systems”, Second Edition, Addison Wesley, 2014.
2. Charles Crowley, “Operating Systems: A Design-Oriented Approach”, TataMcGraw Hill Education, 2018.
3. D M Dhamdhare, “Operating Systems: A Concept-Based Approach”, Second Edition, Tata McGraw Hill Education

WEB REFERENCES:

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													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	1	1	1	1	1	2	3	2	1
CO2	3	3	3	3	2	2	2	2	2	1	2	3	3	2
CO3	3	2	3	2	2	1	1	1	1	1	2	3	3	2
CO4	3	2	2	2	2	1	1	1	1	1	2	3	2	2
CO5	3	2	2	2	2	2	2	2	2	2	2	3	2	2
AVG	3	2.2	2.4	2	2	1.4	1.4	1.4	1.4	1.2	2	3	2.4	1.8

JCS2411	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

PREREQUISITE:

- Basics of Programming Concepts

LIST OF EXPERIMENTS

1. Data Definition Commands, Data Manipulation Commands for inserting, deleting, updating and retrieving Tables and Transaction Control statements.
2. Database Querying – Simple queries, Nested queries, Sub queries and Joins.
3. Creation of Views, Sequences, Indexes, Savepoint and commit constraints.
4. Database Programming: Implicit and Explicit Cursors with PL/SQL block.
5. Creation of PL/SQL Procedures and Functions.
6. Creation of PL/SQL Triggers.
7. Exception Handling.
8. Database Design using ER modeling, Normalization and Implementation for any application.
9. Database Connectivity with Front End Tools
10. Mini project (Application Development) in one 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:

At the end of the course, the student should 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 use Views
- Develop PL/SQL procedures, functions and packages
- Develop applications using Front-end & Back-end Tools and also to handle report generation.

REFERENCE BOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Seventh Edition, Tata McGraw Hill, 2020.

WEB REFERENCES

- <https://www.w3schools.com/sql/default.asp>
- https://www.tutorialspoint.com/dbms/er_diagram_representation.html
- https://www.tutorialspoint.com/python/python_database_access.html
- <https://sqlzoo.net>

Mapping of CO with PO/PSO

	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	1	3	1	1	1	1	1	1	3	1	1
CO2	3	3	2	2	3	1	1	1	1	1	1	3	2	1
CO3	3	2	3	2	3	1	1	2	2	1	1	3	2	2
CO4	3	2	3	2	3	1	1	2	2	1	1	3	2	2

CO5	3	2	3	2	3	1	1	2	3	2	1	3	2	2
AVG	3	2.2	2.6	1.8	3	1	1	1.6	1.8	1.2	1	3	1.8	1.6

JGE2442	ADVANCED IT INFRASTRUCTURE LABORATORY	L T P C 0 0 4 2
----------------	--	----------------------------

COURSE OBJECTIVES:

- Equip students with a strong foundation in network design, implementation, and troubleshooting.
- Develop skills in managing servers and data storage in enterprise environments.
- Provide comprehensive knowledge and skills to secure IT infrastructure.
- Train students in deploying and managing virtualized environments and automating IT tasks.
- Prepare students for designing, implementing, and managing cloud infrastructure

LIST OF MODULES

Module 1:

Networking Lab: Setting up a basic network, IP Address, VLAN and Routing Configurations

- Introduction to OSI and TCP/IP models, IP addressing.
- Subnetting and IP configuration exercises.
- Introduction to VLANs and Routing Protocols (OSPF, BGP).
- Network Performance tools and introduction to QoS.
- Fundamentals of SDN and network troubleshooting.

Module 2:

Server and Storage Lab: Hands-on installation of server operating systems, Server configuration exercises Including Setting up Storages.

- Server architectures and installation of server OS (Windows and Linux).
- Configuration and management of Windows and Linux servers.
- Introduction to Data Storage Technologies (DAS, NAS, SAN).
- Understanding RAID levels and implementation.
- Exploring advanced storage solutions (Storage virtualization and flash storage).

Module 3:

Security Lab: Configuring Firewalls, Penetration Techniques and Tools, Security Audit and Compliance Checks

- Basics of encryption, firewalls, and VPNs.
- Setting up and managing IDS/IPS.
- Ethical hacking basics and security auditing.
- Advanced security practices and compliance.
- Incident response and introduction to digital forensics.

Module 4:

Virtualization & Automation Lab: Creating Virtual Machines, Managing Containers, Ansible Playbook and CICD Pipelines Using Jenkin.

- Introduction to virtualization technologies and setting up VMs.
- Containerization with Docker and Kubernetes basics.
- Managing containers.
- Introduction to automation with Ansible and PowerShell.
- Implementing CI/CD pipelines and Infrastructure as Code.

Module 5:

Cloud Computing Lab: AWS or Azure Cloud – Services Deployment, AI and Machine Learnings on Cloud

- Cloud service models and initial setup in AWS, Azure, or Google
- Cloud.
- Cloud architecture and scalable systems design.
- Multi-cloud and hybrid cloud strategies.
- Serverless computing and cloud-native technologies.
- AI and machine learning integration in cloud environments.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- Design networking and perform troubleshooting
- Managing data storage in enterprise environments
- Implement security in IT infrastructure
- Understand virtualization
- Implement cloud infrastructure

Mapping of CO with PO/PSO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	2	2	2	2	2	2	3	2	2
CO2	3	2	3	2	3	2	2	2	2	2	2	3	2	2
CO3	3	2	2	2	3	3	3	2	2	2	2	3	2	3
CO4	3	2	2	2	3	2	2	1	1	1	2	3	2	2
C05	3	3	3	3	3	2	2	2	2	2	2	3	3	3
AVG	3	2.4	2.6	2.4	3	2.2	2.2	1.8	1.8	1.8	2	3	2.2	2.4

JPT2041	SOFTSKILLS AND APTITUDE	L T P C 0 0 4 2
----------------	--------------------------------	----------------------------------

OBJECTIVES:

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

UNIT - I SOFT SKILLS AND APTITUDE-III 5

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 5

Importance of Time – Time Management techniques – The art of prioritizing and scheduling – Stress – Positive and Negative Stress - Stress Management techniques – SWOT Analysis

UNIT III QUANTITATIVE APTITUDE 6

Profit and Loss and Discount – Simple and Compound interest - Ratio and Proportions – Allegations and Mixtures – Problem on Ages

UNIT IV LOGICAL REASONING 6

Directions – Blood Relation – Linear and Circular Arrangement – Cross variables – Set Theory

UNIT V TECHNICAL APTITUDE IN C-II 8

Strings - Storage Classes – Pointers – Preprocessor 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

At the end of the course, the student 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
- Use Logical reasoning skills to solve problems differently
- Apply C programming concepts for coding

TEXT BOOKS:

1. Dr. R.S Agrawal, “Quantitative Aptitude” and Non Verbal Reasoning published in 2000.
2. S.Chand – A Modern Approach to Logical Reasoning Published in 2000.
3. Pradip Dey, ManasGhosh, "Fundamentals of Computing and Programming in C. First

WEBSITES:

- <https://www.indiabix.com/aptitude/questions-and-answers/>
- <https://m4maths.com/placement-puzzles.php>
- [www.freshers](http://www.freshersworld.com) world.com
- www.careerride.com
- www.youtube.com/watch/python
- [www.youtube.com/watch/concepts of python](http://www.youtube.com/watch/concepts%20of%20python)
- <https://stackoverflow.com/>
- <https://www.w3schools.com/>
- <https://www.geeksforgeeks.org/>

Mapping of CO with PO/PSO

PO,PSO	Program Outcomes
--------	------------------

/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	-	-	-	-	3	3	3	3	-	-	2
CO2	2	2	2	-	-	-	-	3	3	3	3	-	-	2
CO3	2	3	2	2	2	-	-	3	3	3	3	-	-	3
CO4	2	3	2	2	2	-	-	3	3	3	3	-	-	3
C05	3	3	2	2	3	-	-	3	3	3	3	-	-	3
AVG	2.2	2.6	2	2	2.2	-	-	3	3	3	3	-	-	2.6

JMA2501	OPTIMIZATION TECHNIQUES	L	T	P	C
		2	2	0	3

- To enable students understand linear programming problems.
- To impart knowledge of duality in linear programming problems and build concepts in transportation and assignment problems.
- To outline various methods for solving non-linear programming problems.
- To introduce problem solving using dynamic programming and game theory.
- To familiarize students in Markovian and Non Markovian queue models.

Formulation – Types of Solutions of an LPP – Graphical solution – Simplex method – Big M method – Two phase method

Duality in linear programming problems – Dual Simplex method – Transportation and Assignment problems

Lagrangian method – Kuhn-Tucker conditions – Wolfe’s method – Beale’s method

Bellman's principle of optimality – Forward and Backward recursion – Capital budgeting problem – Reliability improvement problem – Cargo loading problem
Game Theory – Two person Zero sum games – Saddle point – Dominance Rule – Method of matrices – Graphical solution

Markovian queues (without proof) – Single and multiple server, Infinite and finite queueing models – Little's formula
Non-Markovian queues – M/G/1 queue – Pollaczek Khinchine formula (without proof) – M/D/1 model

TOTAL: 60 PERIODS

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

- Solve linear programming problems through simplex and other methods.
- Demonstrate efficient use of duality in linear programming problems and solve transportation and assignment problems.
- Solve non-linear programming problems through standard methods.
- Conceptualize dynamic programming and game theory and use it in real-time problems.
- Apply Little's formula for finding standard parameters of Markovian and Non Markovian queue problems.

TEXT BOOKS:

1. Panerselvam R., "Operations Research", Prentice Hall of India, Fourth Print, 2016.
2. Hamdy A Taha "Introduction to Operations Research", Prentice Hall India, 10th Edition, 2019.
3. Gross D., and Harris C.M., "Fundamentals of Queueing Theory", Wiley Student 4th Edition, 2014

REFERENCES:

1. G. Srinivasan., "Operations Research – Principles and Applications", 2nd Edition, PHI, 2010.
2. Bernard. W.Taylor., "Introduction to Management Science", Pearson Publications, 12th Edition, 2016.

WEB REFERENCES:

- <https://nptel.ac.in/courses/111104027/>
- <https://nptel.ac.in/courses/110105082/>
- <https://nptel.ac.in/courses/111105100/>
- <https://nptel.ac.in/courses/110101133/>
- <https://nptel.ac.in/courses/111103159/>

Mapping of CO with PO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	-	-	2	-	-	1	3	2	-
CO2	3	2	2	2	3	-	-	2	-	-	1	3	2	-
CO3	3	2	2	2	3	-	-	2	-	-	1	3	2	-
CO4	3	2	2	2	3	-	-	2	-	-	1	3	3	2

C05	3	2	2	2	3	-	-	2	-	-	1	3	3	2
AVG	3	2	2	2	3	-	-	2	-	-	1	3	2.4	2

JCS2501	COMPUTER NETWORKS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To learn the basic concepts of layered approach in Computer Networks and different transmission media of physical layer.
- To know functions of Data link layer and Media access layer.
- To learn the functions of network layer and the various routing protocols.
- To familiarize the functions and protocols of Transport layer.
- To familiarize the application layer services.

Prerequisite : Digital Principles and Computer Organization

UNIT 1 INTRODUCTION AND PHYSICAL LAYER 9

Building a network-Layered Network Protocol Architectures- Telecommunications and Cellular Networks overview- Design issues- OSI Model- TCP/IP protocol suite- Physical layer-Basics of communications- Transmission Media-Performance.

UNIT 2 DATA-LINK LAYER & MEDIA ACCESS 9

Link layer Services - Framing - Error control - Flow control - Media access control (TDMA, FDMA, CSMA, CSMA/CD)- Ethernet IEEE 802.3 - Wireless LAN IEEE 802.11 -Bluetooth -Performance analysis: related protocols such as ICMP, NAT, ARP and RARP.

UNIT 3 NETWORK LAYER 9

Network layer – Hierarchical network architecture-IPv4 and IPv6 addressing- Routing protocols: Distance-vector and Link-state approaches (RIP, OSPF, BGP) – Multicast Addressing– Multicast routing protocols (DVMRP, PIM).

UNIT 4 TRANSPORT LAYER 9

Overview of Transport layer-Reliable end- to- end transmission protocols- UDP, TCP- Connection management-Flow control- Retransmission-TCP Congestion control-Congestion avoidance(DEC bit, RED)-QoS.

Socket Interface and Socket programming, Example protocols: DNS, SMTP, FTP, HTTP-Electronic Mail (POP3, IMAP, MIME)-HTTP-web services.

TOTAL: 45 HOURS

COURSE OUTCOMES:

At the end of the course, the student should 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.

REFERENCES:

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.

WEB REREFERENCES:

1. <https://www.geeksforgeeks.org/physical-layer-in-osi-model/>
2. <https://www.tutorialspoint.com/medium-access-control-sublayer-mac-sublayer>
3. <https://www.cse.iitk.ac.in/users/dheeraj/cs425/lec12.html>
4. <https://www.gatevidyalay.com/tcp-congestion-control-tcp-protocol-tcp/>
5. <https://w3.cs.jmu.edu/kirkpams/OpenCSF/Books/csf/html/Socket.html>

Mapping of CO with PO/PSO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	2	2	1	1	1	2	3	2	2
CO2	3	3	2	2	3	2	2	1	1	1	2	3	2	2
CO3	3	3	3	3	3	2	2	1	1	1	2	3	3	2
CO4	3	2	2	2	3	2	2	1	1	1	2	3	2	2
C05	3	2	2	1	3	2	2	1	1	1	2	3	2	2
AVG	3	2.4	2.2	2	3	2	2	1	1	1	2	3	2.2	2

JCS2502	SOFTWARE ENGINEERING AND DESIGN	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand Software Engineering Lifecycle Models
- To Perform software requirements analysis
- To gain knowledge of the System Analysis and Design concepts using UML.
- To understand software testing and maintenance approaches
- To work on project management scheduling using DevOps

Prerequisite : Database Management System

UNIT I SOFTWARE PROCESS AND AGILE DEVELOPMENT 9

Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models –Introduction to Agility-Agile Process-Extreme programming-XP Process

UNIT II REQUIREMENTS ANALYSIS AND SPECIFICATION 9

Requirement analysis and specification – Requirements gathering and analysis – Software Requirement Specification– Object modelling using UML – Use case Model – Class diagrams – Interaction diagrams – Activity diagrams – State chart diagrams – Data Flow Diagram

9

UNIT IV SOFTWARE TESTING AND MAINTENANCE

9

UNIT V PROJECT MANAGEMENT

9

TOTAL: 45 PERIODS

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

1. Len Bass, Ingo Weber and Liming Zhu, “DevOps: A Software Architect’s Perspective”, Pearson Education, 2016
2. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, Fundamentals of Software Engineering, 2nd edition, PHI Learning Pvt. Ltd., 2010.
3. Craig Larman, Applying UML and Patterns, 3rd ed, Pearson Education, 2005.
4. Rajib Mall, Fundamentals of Software Engineering, 3rd edition, PHI Learning Pvt. Ltd., 2009.

5. Stephen Schach, Object-Oriented and Classical Software Engineering, 8th ed, McGraw-Hill, 2010.

WEB REFERENCES:

- <https://www.javatpoint.com/software-engineering-object-oriented-design>
- <https://www.geeksforgeeks.org/software-engineering>

Mapping of CO with PO/PSO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	1	-	-	-	2	3	3	2	2
CO2	3	3	2	2	2	1	-	-	-	3	2	3	2	2
CO3	3	3	2	3	3	-	-	-	-	-	2	3	3	2
CO4	3	3	3	3	3	-	-	-	2	-	2	3	3	2
CO5	3	3	3	3	3	1	-	-	2	2	3	3	3	2
AVG	3	3	2.4	2.6	2.6	1	-	-	2	2.3	2.4	3	2.6	2

JCS2521	AUTOMATA THEORY AND COMPILER DESIGN	L 3	T 0	P 2	C 4
---------	--	--------	--------	--------	--------

COURSE OBJECTIVES:

- To understand automata theory and to construct regular expressions.
- To design context free grammar and push down automata.
- To learn the various phases of compiler and parsing techniques.
- To understand intermediate code generation.
- To learn code generator and code optimization.

Prerequisite :Mathematical Foundation of Computer Science

UNIT I AUTOMATA AND REGULAR EXPRESSIONS

9

Need for Automata Theory – Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) –Finite Automata with Epsilon Transitions – Conversion of NFA into DFA – Regular Expressions –Finite Automata and Regular Expressions– Minimization of DFA

UNIT II CONTEXT FREE GRAMMAR AND PUSH DOWN AUTOMATA

9

Context-Free Grammar (CFG) – Constructing Parse Trees – Ambiguous Grammars – PushDown Automata (PDA) – Definition – Languages – Equivalence of PDAs to CFGs – CFG to PDA – PDA to CFG – Deterministic PDA – Normal Forms for CFGs

UNIT III LEXICAL ANALYSIS AND SYNTAX ANALYSIS 9

The Structure of a Compiler – Lexical Analysis – Role of Lexical Analyzer – Specification of Tokens – Lex – Syntax Analysis – Role of Parser – Top-Down Parsing – Recursive Descent Parser – Predictive Parser for LL(1) Grammar – Bottom-Up Parsing – Shift-Reduce Parser – LR Parser – LR (0) Items – Simple LR – LR(1) Items – Canonical-LR – Lookahead-LR – Yacc

UNIT IV SYNTAX DIRECTED TRANSLATION AND INTERMEDIATE CODE GENERATION 9

Syntax-Directed Definitions – Evaluation Orders for SDDs – Applications of Syntax-Directed Translation – Intermediate-Code Generation – Directed Acyclic Graph – Three-Address Code – Types and Declarations – Translation of Expressions – Type Checking – Backpatching

UNIT V CODE GENERATION AND CODE OPTIMIZATION 9

Issues in the Design of a Code Generator – The Target Language – Basic Blocks and Flow Graphs – A Simple Code Generator – Principal Sources of Optimization – Optimization of Basic Blocks – Peephole Optimization – Introduction to Data-Flow Analysis

TOTAL: 45 PERIODS

LIST OF EXERCISES

1. Construct a Finite Automata using C
2. Develop C program to validate the Regular Expression.
3. Write a program in LEX to recognize different tokens: Keywords, Identifiers, Constants, Operators and Punctuations.
4. Write a program to implement a Recursive Descent Parsing with back tracking.
5. Use YACC to generate Three-Address code for a given expression.
6. Write a C program to implement code optimization techniques.
7. Develop a C program to convert intermediate code into target code.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

- Construct finite automata.
- Write regular expressions and design context free grammar and pushdown automata.

- Understand the different phases of a compiler, design a lexical analyser for a sample language and apply different parsing algorithms.
- Understand semantics rules (SDT) and intermediate code generation.
- Implement code generation and apply code optimization techniques.

TEXT BOOKS:

1. Hopcroft J.E., Motwani R., Ullman J.D., "Introduction to Automata Theory, Languages and Computations", 3rd Edition, Pearson Education, 2007.
2. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, "Compilers: Principles, Techniques and Tools", Second Edition, Pearson Education, 2007.

REFERENCES:

1. Harry R Lewis and Christos H Papadimitriou, "Elements of the Theory of Computation", 2nd Edition, Prentice Hall of India, 2015.
2. John C Martin, "Introduction to Languages and the Theory of Computation", 4th Edition, Tata McGraw Hill, 2011.
3. K.L.P. Mishra and N. Chandrasekaran, "Theory of Computer Science: Automata Languages and Computation", 3rd Edition, Prentice Hall of India, 2006.
4. Allen I. Holub, "Compiler Design in C", Prentice-Hall Software Series, 1993.
5. Keith D Cooper and Linda Torczon, "Engineering a Compiler", Morgan Kaufmann Publishers, Elsevier Science, 2004.
6. V. Raghavan, "Principles of Compiler Design", Tata McGraw Hill Education Publishers, 2010.

WEB LINKS:

1. <https://ocw.mit.edu/courses/18-404j-theory-of-computation-fall-2020/>
2. https://onlinecourses.nptel.ac.in/noc21_cs83/preview
3. https://onlinecourses.nptel.ac.in/noc25_cs70/preview
4. <https://nitw.ac.in/tlc/cdlab/>
5. <https://nptel.ac.in/courses/106108113>
6. https://onlinecourses.nptel.ac.in/noc25_cs13/preview

CO-PO MAPPING:

PO, PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	-	-	-	-	-	2	3	2	-
CO2	3	3	2	2	2	-	-	-	-	-	2	3	2	-
CO3	3	3	3	2	3	-	-	-	-	-	2	3	3	-
CO4	3	3	2	2	3	-	-	-	-	-	2	3	3	-
C05	3	3	3	2	3	-	-	-	-	-	2	3	3	2

AVG	3	3	2.4	2	2.6	-	-	-	-	-	2	3	2.6	2
------------	----------	----------	------------	----------	------------	---	---	---	---	---	----------	----------	------------	----------

JCS2511	COMPUTER 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 EXERCISES :

1. Learn to use terminal commands like tcpdump, netstat, if config, ns look up and trace route.
2. Write a code to implement ARP/RARP protocols.
3. Write a Simulation program for Congestion Control Algorithms
4. Write a Simulation program for Distance Vector and Link State Routing algorithm.
5. Write a Simulation program for Error correction code CRC.
6. Write a socket program for HTTP web page upload and download.
7. Write a socket program for Echo client and echo server.
8. Write a socket program for Chat.
9. Write a socket program for File transfer.

TOTAL: 60 PERIODS

COURSE OUTCOMES

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

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

TEXTBOOKS:

1. Behrouz A. Forouzan, "Data Communications and Networking", Fifth Edition TMH, 2017.
2. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.

REFERENCES:

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. Andrew S. Tanenbaum, David Wetherall, "Computer Networks", Fifth Edition, Pearson Education, 2013.

WEB SITE REFERENCE:

1. <https://www.youtube.com/watch?v=ZAJYDHpVplg>
2. <https://www.linuxjournal.com/article/5929>

Mapping of CO with PO/PSO:

PO, PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	1	1	2	2	1	2	3	2	2
CO2	3	2	2	1	3	1	1	2	2	1	2	3	2	2
CO3	3	3	2	3	3	2	2	2	2	1	2	3	3	2
CO4	3	2	2	2	3	1	1	2	2	1	2	3	2	2
CO5	3	3	3	3	3	2	2	2	2	1	2	3	3	2
AVG	3	2.4	2.4	2.2	3	1.4	1.4	2	2	1	2	3	2.4	2

JCS2512	SOFTWARE ENGINEERING AND DESIGN LABORATORY	L 0	T 0	P 4	C 2
---------	---	--------	--------	--------	--------

COURSE OBJECTIVES:

Discuss and analyze how to develop software requirements specifications for a given problem.

- To understand Software development as a process.
- To implement various software designs, data flow models and UML diagrams.

- To apply various testing techniques like white box testing & black box testing techniques.
- To have hands on experience in developing a software project by using various software engineering principles and methods.

LIST OF EXERCISES:

Apply the following exercises for any four projects given in the list of sample projects:

1. Development of Problem Statements.
2. Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents.
3. Preparation of Software Configuration Management and Risk Management related documents.
4. Study and usage of any Design phase CASE tool
5. Performing the Design by using any Design phase CASE tools.
6. Develop test cases for unit testing and integration testing
7. Develop test cases for various white box and black box testing techniques.

Sample Projects:

1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.
10. Recruitment system

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- Ability to translate end-user requirements into system and software requirements
- Ability to generate a high-level design of the system from the software requirements
- Implement and solve testing problems and will be able to develop a simple testing report.
- Understand and develop various structural and behavioral UML diagrams.
- Explain the knowledge of project management tool

TEXT BOOKS:

1. Roger S. Pressman, Object-Oriented Software Engineering: An Agile Unified Methodology, First Edition, Mc Graw-Hill International Edition, 2014.
2. Bernd Bruegge and Allen H. Dutoit, “Object-Oriented Software Engineering: Using UML, Patterns and Java”, Third Edition, Pearson Education, 2009.

REFERENCES:

1. Len Bass, Ingo Weber and Liming Zhu, “DevOps: A Software Architect’s Perspective”, Pearson Education, 2016
2. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, Fundamentals of Software Engineering, 2nd edition, PHI Learning Pvt. Ltd., 2010.
3. Craig Larman, Applying UML and Patterns, 3rd ed, Pearson Education, 2005.
4. Rajib Mall, Fundamentals of Software Engineering, 3rd edition, PHI Learning Pvt. Ltd., 2009.
5. Stephen Schach, Object-Oriented and Classical Software Engineering, 8th ed, McGraw-Hill, 2010.

WEB REFERENCES:

- <https://www.javatpoint.com/software-engineering-object-oriented-design>
- <https://www.geeksforgeeks.org/software-engineering>

Mapping of CO with PO/PSO:

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	-	-	-	2	2	2	3	2	-
CO2	3	3	3	2	2	-	-	-	-	2	2	3	2	-

CO3	3	3	2	2	3	-	-	-	3	2	2	3	3	-
CO4	3	3	3	2	3	-	-	-	2	2	2	3	2	-
C05	2	2	2	2	3	-	-	-	3	3	2	2	3	2
AVG	2.8	2.8	2.4	2	2.6	—	—	—	2.5	2.2	2	2.8	2.4	2

JGE2542	MERN STACK DEVELOPMENT LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To understand the concepts of automata Full Stack Development.

- To learn and execute NoSQL Databases and MongoDB
- To learn and setup Express.js and Node.js.
- To learn React.js Development and to build Interactive User Interfaces.
- To learn about Integrating MERN Stack Applications

UNIT I Introduction To Full Stack Development 12

Understanding Web Development Architecture -Overview of Frontend, Backend, and Database Systems -Introduction to MERN Stack

UNIT II Mongodb Essentials 12

Introduction to NoSQL Databases -CRUD Operations with MongoDB -Designing Data Models and Schemas

UNIT III Express.js and Node.js Fundamentals 12

Setting up Node.js Environment -Building RESTful APIs with Express.js -Middleware and Routing Concepts

UNIT IV React.js Development 12

Introduction to React Framework - Components, Props, and State Management -Building Interactive User Interfaces

UNIT IV Integrating MERN Stack Applications 12

Connecting Frontend to Backend APIs - Managing Authentication and Authorisation (JWT) - Deployment and Hosting Best Practices

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- Complete understanding on Web Development Architecture.

- Implement CRUD Operations with MongoDB .
- Understand the steps in Setting up Node.js Environment and Building RESTful APIs with Express.js
- Understand and Building Interactive User Interfaces
- Integrating various MERN Stack Applications

Mapping of CO with PO/PSO:

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	-	-	-	-	-	2	3	2	2
CO2	3	3	2	2	3	-	-	-	-	-	2	3	3	2
CO3	3	3	3	2	3	-	-	-	2	-	2	3	3	2
CO4	3	2	3	2	3	-	-	-	3	-	2	3	3	3
C05	3	3	3	2	3	-	-	-	3	2	2	3	3	3
AVG	3	2.6	2.6	2	2.8	—	—	—	2.66	2	2	3	2.8	2.4

JPT2042	TECHNICAL SKILLS AND APTITUDE	L	T	P	C
		0	0	2	*

OBJECTIVE:

1. To make students analyze and solve problem in technical as well as aptitude. Enhance the Technical skills and basics of programming language
2. To make the students understand how to apply the practical knowledge with real time applications.
3. To make the students think and draw a conclusion from different scenarios.
4. To help the students understand OOPS and python programming concepts
5. To help the students understand concepts and problems in OOPS and python.

UNIT – 1: FUNDAMENTALS OF C++: 6

Introduction to C++ - Data Types and Operators - Control Structures - Functions in C++ - Arrays and Strings - Structures and Unions - File Handling

UNIT – 2: OBJECT-ORIENTED PROGRAMMING (OOP) & ADVANCED C++ 6

Object-Oriented Programming (OOP) - Inheritance & Polymorphism - Operator Overloading - Templates and Exception Handling - Standard Template Library (STL) - Multi-threading & Advanced Topics

UNIT- 3: PYTHON BASICS & FUNDAMENTALS 6

Introduction to Python - Data Types & Variables - Operators & Expressions - Control Flow Statements - Functions & Modules - File Handling - Exception Handling

UNIT- IV: QUANTITATIVE APTITUDE 6

Time and work – Pipes and Cistern – Time and Distance – Problems on Trains – Boats and streams – Arithmetic and Geometric progression

UNIT - V: LOGICAL REASONING 6

Syllogism: Statement and Conclusion – Clocks - Inequalities – Non Verbal Reasoning – Logical Sequence, Inferred Meaning

TOTAL 30 PERIODS

COURSE OUTCOMES

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

- CO1 To enhance their knowledge in OOPS concepts
- CO2 To enhance knowledge in PYTHON programming
- CO3 To gain knowledge in Coding the concepts of python programming.
- CO4 To solve the complex Arithmetic problems practically with real time application problems

CO5 To think logically in solving problems enhance their decision making for difficult situations.

TEXTBOOKS:

1. Dr.E. Balagurusamy ,”Programming in C++” 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 a nutshell by Alex Martelli Revised in March 2013.
5. Dr. R.S Agrawal, “Quantitative Aptitude” and Non Verbal Reasoning published in 2000

WEBSITES:

- <https://www.indiabix.com/aptitude/questions-and-answers/>
- <https://m4maths.com/placement-puzzles.php>
- [www.freshers world.com](http://www.freshersworld.com)
- www.careerride.com
- www.youtube.com/watch/python
- [www.youtube.com/watch/concepts of python](http://www.youtube.com/watch/concepts%20of%20python)
- <https://stackoverflow.com/>
- <https://www.w3schools.com/>
- <https://www.geeksforgeeks.org/>

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	-	-	2	2	2	3	2	2	3
CO2	3	3	3	3	3	-	-	2	2	2	3	2	2	3
CO3	3	3	3	3	3	-	-	2	2	2	3	2	2	3
CO4	3	3	3	3	3	-	-	2	2	2	3	2	3	3
C05	3	3	3	3	3	-	-	3	3	3	3	2	3	3
AVG	3	3	3	2.8	3	-	-	2.2	2.2	2.2	3	2	2.4	3

JCS2621	INTERNET AND WEB PROGRAMMING	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

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

Prerequisite :Object Oriented Programming

UNIT I WEBSITE BASICS - HTML 5, CSS 3, WEB 2.0 9

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 2.0 - User-Generated Content (UGC) - Social Media & Networking - Web Applications - Analytics & User Behavior - Identity & Access; SEO Basics.

UNIT II CLIENT-SIDE PROGRAMMING 9

Java Script: Introduction to JavaScript – JavaScript DOM Model - Date and Objects - Regular Expressions - Exception Handling –Validation - Built-in objects - Event Handling – Event Fetches & call back - Array Methods-Map Filter Reduce- String Manipulations

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 – MVC pattern. Introduction Spring Boot.

UNIT IV PHP , XML and REACT 9

An introduction to PHP: PHP- Using PHP- Variables- Program control- Built-in functions Form Validation- Regular Expressions - File handling – Cookies – PHP and connectivity. Basic XML- Document Type Definition- XML Schema DOM and Presenting XML, XML Parsers

and Validation, React-js Introduction, React features, App “Hello World” Application, Introduction to JSX, Simple Application using JSX

UNIT V INTRODUCTION TO AJAX and WEB SERVICES 9

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

TOTAL: 45 PERIODS

LIST OF EXCERSISES:

1. Build a Responsive Personal Portfolio Website
2. Dynamic Form with JavaScript Validation and DOM Manipulation
3. Student Registration System using JSP, Servlets & JDBC
4. Contact Form with PHP, Validation, and XML Handling
5. Create a Simple React App to Display User Information
6. AJAX-Based Weather Fetcher with Java Web Service Integration
7. Blog Website with Web 2.0 Features (UGC, Social Sharing) and SEO Optimization

TOTAL: 30 PERIODS

OUTCOMES:

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

- Construct a basic website using HTML5 and Cascading Style Sheets3.
- Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
- Develop server side programs using Servlets and JSP.
- Integrate APIs and manage data flow in React applications.
- 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 ProgramI, Prentice Hall, 5th Edition, 2011.

REFERENCES:

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

WEB REFERENCES:

- https://www.w3schools.com/REACT/react_intro.asp
- <https://www.tpointtech.com/spring-boot-tutorial>
- https://www.tutorialspoint.com/mvc_framework/mvc_framework_introduction.htm

Mapping of CO with PO/PSO

[illegible]

JCS2601	CRYPTOGRAPHY AND NETWORK SECURITY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To learn the basics of security and classical encryption algorithms
- 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 to secure computer networks

Prerequisite :Matrices and Calculus , Applied Linear Algebra

UNIT I	INTRODUCTION	9
Security trends - Legal, Ethical and Professional Aspects of Security, 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- cryptanalysis.		
UNIT II	SYMMETRIC KEY CRYPTOGRAPHY	9
Modular arithmetic-Euclid's algorithm- Congruence and matrices - Groups, Rings, Fields- Finite fields- SYMMETRIC KEY CIPHERS- SDES –DES–Differential and linear crypt analysis- Block cipher mode of operation–AES–Advanced Encryption Standard- RC4 Key distribution.		
UNIT III	PUBLIC KEY CRYPTOGRAPHY	9
Prime numbers –Primality Testing –Factorization – Euler's totient function, Fermat's and Euler's Theorem - Chinese Remainder Theorem–Exponentiation and logarithm- ASYMMETRIC KEY CIPHERS: RSA cryptosystem– Key distribution and management– Diffie Hellman key exchange-ElGamal cryptosystem–Elliptic curve cryptography–HoneyPot using KF Sensor		
UNIT IV	MESSAGE AUTHENTICATION AND INTEGRITY	9
Authentication requirement – Authentication function – MAC – Hash function – SHA –Digital signature and authentication protocols –DSS- Entity Authentication: Biometrics, Passwords, Challenge Response protocols-Authentication applications - Kerberos, X.509- Secure data storage and transmission and for creating digital signatures using GnuPG.		
UNIT V	SECURITY PRACTICE AND SYSTEM SECURITY	9
Electronic Mail security–PGP,S/MIME-IP Security-Web Application Security : Click jacking - DNS rebinding - Flash security - Single-sign- on solution and security - .System Security: Intruders–Malicious software – viruses – Firewalls - IoT attack, types of IoT attacks		

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
- Apply the different cryptographic operations of symmetric cryptographic algorithms
- Apply the different cryptographic operations of 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. Stutard, Dafydd, and Marcus P into. The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws. John WileySons, 2011

REFERENCES:

1. C K Shyamala, N Harini and Dr.TR Padmanabhan: Cryptography and Network Security, Wiley India Pvt.Ltd, 2011
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. 2019
4. Sullivan, Bryan, and Vincent Liu. Web Application Security, A Beginner's Guide. McGraw Hill Professional, 2011.

WEB REFERENCES:

1. <https://www.tutorialspoint.com/cryptography/index.html>
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

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	3	1	1	1	2	2	3	2	2
CO2	3	2	3	1	3	2	1	1	1	2	2	3	2	2
CO3	3	2	3	1	3	2	1	1	1	2	2	3	2	2
CO4	3	2	3	2	3	3	2	2	1	2	2	3	2	3
C05	3	2	2	1	2	3	1	1	1	2	2	3	2	3
AVG	3	2	2.6	1.4	2.6	2.6	1.2	1.2	1	2	2	3	2	2.4

JCS2602	CLOUD COMPUTING	L	T	P	C
		3	0	0	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.
- To analyze storage architectures, processes, components and how they relate to virtualization.
- To identify the key aspects of developing applications using a framework.

Prerequisite : Computer Networks

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 VIRTUALIZATION 9

Basics of Virtualization – Virtualization Platforms & Techniques – 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 - IaaS – 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 – Open Stack – Federation in the Cloud – Four Levels of Federation – Federated Services and Applications – Future of Federation

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the student should 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 SinghPatel , "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.

WEB REFERENCES:

- <https://nptel.ac.in/courses/101/104/106105167>
- <https://www.coursera.org/learn/introduction-to-cloud>
- <https://www.ibm.com/in-en/cloud/learn/soa>
- <https://www.geeksforgeeks.org/rest-api-architectural-constraints/>
- <https://aws.amazon.com/pub-sub-messaging/>

Mapping of CO with PO/PSO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	2	-	1	-	-	3	3	2	2
CO2	3	3	2	2	3	-	-	-	-	-	3	3	3	2
CO3	3	3	3	2	3	1	-	1	-	2	3	3	3	2
CO4	3	3	2	3	3	2	2	1	-	-	3	3	3	2
C05	3	2	2	2	3	2	2	1	1	1	3	3	3	2
AVG	3	2.8	2.2	2.2	2.8	1.75	2	1	1	1.5	3	3	2.8	2

JCS2611	CRYPTOGRAPHY AND NETWORK SECURITY LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To learn different classical encryption techniques
- To implement various symmetric key cryptosystems.
- To implement various public key cryptosystems.
- To create digital signatures for authentication
- To use network security tools and vulnerability assessment tools

LIST OF EXCERSISES:

1. Perform encryption, decryption using the following substitution techniques
 - i. Ceaser cipher,
 - ii. Playfair cipher
 - iii. Hill Cipher
 - iv. Vigenere cipher
2. Perform encryption and decryption using following transposition techniques
 - i. Rail fence
 - ii. Row & Column Transformation
3. Apply DES algorithm for practical applications.
4. Apply AES algorithm for practical applications.
5. Implementing Block Cipher using OpenSSL in C/C++
6. Implement RSA Algorithm using HTML and JavaScript
7. Calculate the message digest of a text using the SHA-1 algorithm.
8. Implement the SIGNATURE SCHEME - Digital Signature - Kleopatra
9. Demonstrate intrusion detection system (ids) using Kf Sensor

TOTAL: 60 PERIODS

COURSE OUTCOMES

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

- Develop code for classical Encryption Techniques to solve the problems.
- Build cryptosystems by applying symmetric and public key encryption algorithms.
- Construct code for authentication algorithms.
- Develop a signature scheme using Digital signature standard.
- Demonstrate the network security system using open source tools.

TEXTBOOKS:

1. [Bart Preneel](#) , [Christof Paar](#), [Jan Pelzl](#), Understanding Cryptography: A Textbook for Students and Practitioners, Springer, 2014.
2. [Wade Trappe](#), [Lawrence Washington](#) ,[Introduction to Cryptography with Coding Theory](#),Pearson publication May 2020

REFERENCES:

1. William Stallings, Cryptography and Network Security: Principles and Practice, PHI 8th Edition, 2019
2. Behrouz A. Forouzan, Debdeep Mukhopadhyay, Cryptography and Network Security, 3rd edition, Tata McGraw Hill 2015.

WEB SITE REFERENCE:

1. <https://opensource.com/article/19/6/cryptography-basics-openssl-part-1>
2. <https://kevinsguides.com/guides/security/software/pgp-encryption/>
3. <https://www.kfsensor.net/kfsensor/help/>

Mapping of CO with PO/PSO:

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	3	-	-	-	-	-	2	3	2	1
CO2	3	3	3	2	3	-	1	-	-	-	2	3	3	2
CO3	3	3	2	2	3	1	2	-	-	-	2	3	3	2
CO4	3	3	2	3	3	1	3	1	-	1	2	3	3	2
C05	3	2	3	3	3	2	2	2	2	2	3	3	3	3
AVG	3	2.8	2.4	2.4	3	1.33	2	1.5	2	1.5	2.2	3	2.8	2

JHS2541	PROFESSIONAL COMMUNICATION	L	T	P	C
		0	0	2	1

Course Objectives:

- To enhance reading comprehension and oral communication through self-reflection and peer feedback

- To improve listening and speaking skills through exposure to diverse accents and group discussions
- To develop professional writing and critical thinking through email composition and career-related tasks
- To refine presentation skills and job application writing for effective workplace communication
- To build interview confidence and problem-solving abilities through simulations and case analysis

List of Experiments and Activities:

1. Reading: 21st Century Skills

Activity: Read an article or infographic on 21st-century skills, summarize key skills and conduct a quiz.

2. Speaking: Self-introduction

Activity: Deliver a 2 to 3-minute self-introduction or elevator pitch and receive peer feedback on content and delivery.

3. Listening: Accents in English

Activity: Listen to English audio clips in British, American, and Indian accents and answer comprehension questions based on the content.

4. Speaking: Group Discussion Dynamics

Activity: Participate in a formal group discussion on a current or technical topic and observe turn-taking, assertiveness, and relevance.

5. Writing: Working in Virtual Teams

Activity: Conduct a virtual team-based design challenge, simulate and record a remote meeting, and complete a reflective report on communication effectiveness.

6. Reading: Career Planning and Research Proposals

Activity: Read and analyse a sample career plan or research proposal, extract key points and compare effectiveness.

7. Speaking: Presentation Skills

Activity: Prepare and deliver a 4 to 5-minute oral or PPT presentation on a technical or career-related topic and receive peer and instructor feedback.

8. Writing: Job Application and Resume Writing

Activity: Prepare a tailored cover letter and resume—both by mail and email—for a specific job description, emphasizing clarity, proper formatting, and relevance.

9. Speaking: Interview Skills

Activity: Participate in mock interviews in pairs or with instructors, practice behavioural questions and receive structured feedback.

10. Listening: Professional Challenges

Activity: Listen to workplace case studies based on real-life experiences shared by friends or relatives, identify challenges and discuss possible solutions and ethical considerations.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

At the end of the course, the students should be able:

- To demonstrate improved reading and speaking through summarization and structured self-introductions
- To apply listening and discussion strategies by interpreting diverse accents and engaging in collaborative dialogues
- To produce professional emails and analyse career-related documents with clarity
- To deliver concise presentations and craft effective job applications tailoring to contexts
- To show interview readiness and ethical awareness by engaging in mock interviews and analysing workplace challenges.

TEXT BOOKS:

1. Meenakshi Raman & Sangeeta Sharma, Technical Communication: Principles and Practice Oxford University Press, 2022.
2. Pushp Lata & Sanjay Kumar, Communication Skills, Oxford University Press, 2011

REFERENCES:

1. Alex, K, 2019, Soft Skills: Know Yourself and Know the World, New Delhi: S. Chand & Company Limited.
2. Butterfield, Jeff, 2015, Soft Skills for Everyone. New Delhi: Cengage Learning.
3. Dhawan, Erica. (2021). Digital Body Language: How to Build Trust and Connection, No Matter the Distance. New York: St. Martin's Press.
4. Gallo, Carmine. (2014). Talk Like TED: The 9 Public-Speaking Secrets of the World's Top Minds. New York: St. Martin's Press.
5. Interact English Lab Manual for Undergraduate Students, 2016, Hyderabad: Orient BlackSwan.

6. Mitra, Barun K, 2016, Personality Development and Soft Skills, New Delhi: Oxford University Press.
7. Raman, Meenakshi and Sangeeta Sharma, 2022, Professional Communication, Oxford: Oxford University Press.
8. Rizvi, Ashraf, M, 2018, Effective Technical Communication, Chennai: McGraw-Hill Education.

WEB LINKS:

1. <https://www.coursera.org/learn/english-for-career-development>
2. <https://owl.purdue.edu/>
3. <https://www.mindtools.com/>
4. <https://www.toastmasters.org/resources/public-speaking-tips>
5. <https://www.ted.com/topics/communication>
6. <https://learnenglish.britishcouncil.org/skills>
7. <https://www.indeed.com/career-advice/resumes-cover-letters>
8. <https://www.skillsyouneed.com/>

Mapping of CO with PO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	-	-	-	-	-	3	3	3	3	-	-	2
CO2	2	2	-	-	-	2	2	3	3	3	3	-	-	2
CO3	2	2	-	-	-	2	3	3	3	3	3	-	-	2
CO4	2	2	-	-	-	2	3	3	3	3	3	-	-	2
C05	2	2	-	-	-	2	3	3	3	3	3	-	-	2
AVG	2	2	-	-	-	2	2.6	3	3	3	3	-	-	2

JPT2042	TECHNICAL SKILLS AND APTITUDE	L	T	P	C
		0	0	2	*

OBJECTIVE:

1. To make students analyze and solve problem in technical as well as aptitude. Enhance the technical skills and basics of programming language
2. To make the students understand how to apply the practical knowledge with real time applications.
3. To make the students think and draw a conclusion from different scenarios.
4. To help the students understand JAVA programming concepts
5. To help the students understand concepts and develop new Applications in JAVA.

UNIT - 1: OBJECT-ORIENTED & ADVANCED PYTHON 6

Object-Oriented Programming (OOP) - Advanced Data Structures & Algorithms - Decorators & Closures - Regular Expressions & String Manipulation - Multi-threading & Multiprocessing

UNIT - 2: JAVA FUNDAMENTALS 6

Introduction to Java - Data Types & Variables - Operators & Control Statements - Functions & Methods - Arrays & Strings

UNIT-3: OBJECT-ORIENTED PROGRAMMING (OOP) & ADVANCED JAVA 6

Object-Oriented Programming (OOP) Basics - Exception Handling - Inheritance & Polymorphism - Collections Framework - File Handling & Serialization

UNIT- IV: QUANTITATIVE APTITUDE 6

Permutation and combination: Letter, Number and circular permutation – Probability – Logarithm – Mensuration – Data sufficiency

UNIT V: LOGICAL REASONING 6

Calendar – Visual Reasoning – Mirror Image and Water Image – Picture analogy – Pattern completion – Data Interpretation – Selection decision table

TOTAL 30 PERIODS

COURSE OUTCOMES

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

- CO1 To enhance their knowledge in JAVA concepts
- CO2 To enhance knowledge in JAVA programming
- CO3 To gain knowledge in Coding the concepts of JAVA programming
- CO4 To solve the complex Arithmetic problems practically with real time application problems
- CO5 To think logically in solving problems enhance their decision making for difficult situations.

CO6 To enhance their employability skills and well prepared to face the MNCs Campus interviews.

TEXTBOOK

1. Herbert Schildt, “Java The complete reference”, 8th Edition, McGraw Hill Education, 2011.
2. Cay S. Horstmann, Gary cornell, “Core Java Volume –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.

WEBSITES:

- <https://www.indiabix.com/aptitude/questions-and-answers/>
- <https://m4maths.com/placement-puzzles.php>
- [www.freshers world.com](http://www.freshersworld.com)
- www.careerride.com
- www.youtube.com/watch/python
- [www.youtube.com/watch/concepts of python](http://www.youtube.com/watch/concepts%20of%20python)
- <https://stackoverflow.com/>
- <https://www.w3schools.com/>
- <https://www.geeksforgeeks.org/>

Mapping of CO with PO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	-	-	2	2	2	3	2	2	3
CO2	3	3	3	3	3	-	-	2	2	2	3	2	2	3
CO3	3	3	3	3	3	-	-	2	2	2	3	2	2	3
CO4	3	3	3	3	3	-	-	2	2	2	3	2	3	3
C05	3	3	3	3	3	-	-	3	3	3	3	2	3	3
AVG	3	3	3	2.8	3	-	-	2.2	2.2	2.2	3	2	2.4	3

JGE2642	COMPUTATIONAL INTELLIGENCE LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- Introduce students to real-world tools and platforms used in the tech industry.
- Provide knowledge in information security
- Impart skills related to AR & VR
- Build hands-on skills in security testing, immersive technology development, and AI/ML workflows.
- Enable mini-projects or prototypes aligning with current trends.

UNIT I FUNDAMENTALS 12

Recap of basic programming knowledge (preferably Python and C/C++), Linux and CLI-Internet access and version control (Git/GitHub)M - Basics of networking, OS concepts - Basic 3D geometry, Unity or Unreal fundamentals -Linear algebra, probability, Python, NumPy, Pandas

UNIT II INFORMATION SECURITY 12

Introduction to Cybersecurity - Footprinting, reconnaissance, and VM setup (Kali Linux) - Vulnerability Assessment - Network scanning with Nmap, Nessus, and Wireshark -Web Application Security - OWASP Top 10, SQL Injection, XSS using DVWA

UNIT III AR & VR 12

Intro to AR/VR Platforms - Unity basics, setting up AR/VR environments -Augmented Reality - ARCore or Vuforia: AR object placement, interaction -Virtual Reality - Unity with Oculus or Google Cardboard: 3D world navigation

UNIT IV MACHINE LEARNING & DEEP LEARNING 12

ML Basics with Scikit-learn - Train/test models: classification (e.g., spam detection) -Deep Learning with TensorFlow/Keras - Build an image classifier using CNN -Transfer Learning - Use pre-trained models (e.g., MobileNet, ResNet)

UNIT V MINI PROJECT 12

Password & Access Controls - Hash cracking using John the Ripper, Rainbow Tables -Create an AR/VR prototype (e.g., virtual showroom, AR guide) -Deploy a model in a web app (e.g., using Flask/Streamlit)

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- Learned fundamentals of basic programming knowledge.
- Gained knowledge on ethical hacking fundamentals and tools
- Programming Knowledge and skills related to AR & VR
- Enhanced their vision on machine learning and deep learning
- use advanced scripting and programming to develop mini-projects and prototypes aligning with current trends.

Tools:

- Kali Linux, Metasploit, Burp Suite, Wireshark
- Unity3D, Vuforia/ARCore/ARKit, Oculus SDK or Cardboard SDK
- Jupyter, TensorFlow/Keras, Scikit-learn, Google Colab

LAB REQUIREMENTS

Hardware:

- PCs with minimum 8GB RAM, i5 processor, GPU recommended for DL module
- Android devices/AR-capable phones or VR headsets (Oculus Rift/Quest or Google Cardboard)

Software:

- VirtualBox/Vagrant (for cybersecurity labs)
- Unity3D (latest version)
- Python (3.10+), Anaconda
- TensorFlow, Scikit-learn, OpenCV
- GitHub Classroom or GitLab for submissions

JHS2741	UNIVERSAL HUMAN VALUES	L	T	P	C
		1	0	2	2

COURSE OBJECTIVES:

The objective of the course is four-fold:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

Module I: Introduction

(3L, 6P)

Purpose and motivation for the course, recapitulation from Universal Human Values-I, Self-Exploration– Its content and process; ‘Natural acceptance’ and Experiential Validation- as the process for self-exploration Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

Practical Session: Include sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking

Module II: Harmony in the Human Being

(3L, 6P)

Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’, Understanding the needs of Self (‘I’) and ‘Body’ - happiness and physical facility, Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer), Understanding the characteristics and activities of ‘I’ and harmony in ‘I’, Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Health.

Practical Session: Include sessions to discuss the role others have played in making material goods available to me. Identifying from one’s own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease.

Module III: Harmony in the Family and Society

(3L, 6P)

Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship, Understanding the meaning of Trust; Difference between intention and competence, Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Practical Session: Include sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives

Module IV: Harmony in the Nature and Existence (3L, 6P)

Understanding the harmony in the Nature, Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self regulation in nature, Understanding Existence as Co-existence of mutually interacting units in all- pervasive space, Holistic perception of harmony at all levels of existence.

Practical Session: Include sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

Module V: Implications of Harmony on Professional Ethics (3L, 6P)

Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems. Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations, Sum up.

Practical Session: Include Exercises and Case Studies will be taken up in Sessions E.g. To discuss the conduct as an engineer or scientist etc.

TOTAL: 45 (15 Lectures + 30 Practicals) PERIODS

COURSE OUTCOMES:

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

- Become more aware of themselves, and their surroundings (family, society, nature);
- Have more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
- Have better critical ability.
- Become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
- Apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

REFERENCES:

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 3rd revised edition, 2023.
2. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
3. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
4. The Story of Stuff (Book).
5. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
6. Small is Beautiful - E. F Schumacher.
7. Slow is Beautiful - Cecile Andrews.
8. Economy of Permanence - J C Kumarappa
9. Bharat Mein Angreji Raj – PanditSunderlal
10. Rediscovering India - by Dharampal
11. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
12. India Wins Freedom - Maulana Abdul Kalam Azad
13. Vivekananda - Romain Rolland (English)
14. Gandhi - Romain Rolland (English)

Web URLs:

1. Class preparations: <https://fdp-si.aicte-india.org/UHV-II%20Class%20Note.php>
2. Lecture presentations: https://fdp-si.aicte-india.org/UHV-II_Lectures_PPTs.php
3. Practice and Tutorial Sessions: <https://fdp-si.aicte-india.org/UHV-II%20Practice%20Sessions.php>

Mapping of CO with PO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	2	1	3	-	-	3	-	-	1
CO2	-	-	-	-	-	2	1	3	-	-	3	1	2	2
CO3	-	-	-	-	-	3	2	3	-	1	3	2	2	2
CO4	-	-	-	-	-	3	2	3	-	1	3	1	1	1
C05	-	-	-	-	-	3	3	3	-	2	3	1	1	1
AVG	-	-	-	-	-	2.6	1.8	3	-	1.33	3	1.25	1.5	1.4

JGE2751	ENTREPRENEURSHIP DEVELOPMENT	L	T	P	C
		2	0	2	3

COURSE OBJECTIVES:

- Learn basic concepts in entrepreneurship, develop mind-set and skills necessary to explore entrepreneurship
- Apply process of problem - opportunity identification and validation through human centred approach to design thinking in building solutions as part of engineering projects
- Analyse market types, conduct market estimation, identify customers, create customer persona, develop the skills to create a compelling value proposition and build a Minimum Viable Product
- Explore business models, create business plan, conduct financial analysis and feasibility analysis to assess the financial viability of a venture ideas & solutions built with domain expertise
- Prepare and present an investible pitch deck of their practice venture to attract stakeholders

MODULE – I: ENTREPRENEURIAL MINDSET 4L, 8P

Introduction to Entrepreneurship: Definition – Types of Entrepreneurs – Emerging Economics – Developing and Understanding an Entrepreneurial Mindset – Importance of Technology Entrepreneurship – Benefits to the Society.

Case Analysis: Study cases of successful & failed engineering entrepreneurs - Foster Creative Thinking: Engage in a series of Problem-Identification and Problem-Solving tasks

MODULE – II: OPPORTUNITIES 4L, 8P

Problems and Opportunities – Ideas and Opportunities – Identifying problems in society – Creation of opportunities – Exploring Market Types – Estimating the Market Size, - Knowing the Customer and Consumer - Customer Segmentation - Identifying niche markets – Customer discovery and validation; Market research techniques, tools for validation of ideas and opportunities

Activity Session: Identify emerging sectors / potential opportunities in existing markets - Customer Interviews: Conduct preliminary interviews with potential customers for Opportunity Validation - Analyse feedback to refine the opportunity.

MODULE – III: PROTOTYPING & ITERATION 4L, 8P

Prototyping – Importance in entrepreneurial process – Types of Prototypes - Different methods – Tools & Techniques.

Hands-on sessions on prototyping tools (3D printing, electronics, software), Develop a prototype

based on identified opportunities; Receive feedback and iterate on the prototypes.

MODULE – IV: BUSINESS MODELS & PITCHING

4L, 8P

Business Model and Types - Lean Approach - 9 block Lean Canvas Model - Riskiest assumptions to Business Models – Using Business Model Canvas as a Tool – Pitching Techniques: Importance of pitching - Types of pitches - crafting a compelling pitch – pitch presentation skills – using storytelling to gain investor/customer attention.

Activity Session: Develop a business model canvas for the prototype; present and receive feedback from peers and mentors - Prepare and practice pitching the business ideas- Participate in a Pitching Competition and present to a panel of judges - receive & reflect feedback

MODULE – V: ENTREPRENEURIAL ECOSYSTEM 4L, 8P

Understanding the Entrepreneurial Ecosystem – Components: Angels, Venture Capitalists, Maker Spaces, Incubators, Accelerators, Investors. Financing models – equity, debt, crowdfunding, etc, Support from the government and corporates. Navigating Ecosystem Support: Searching & Identifying the Right Ecosystem Partner – Leveraging the Ecosystem - Building the right stakeholder network
Activity Session: Arrangement of Guest Speaker Sessions by successful entrepreneurs and entrepreneurial ecosystem leaders (incubation managers; angels; etc), Visit one or two entrepreneurial ecosystem players (Travel and visit a research park or incubator or makerspace or interact with startup founders).

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1: Develop an Entrepreneurial Mind-set and Understand the Entrepreneurial Ecosystem Components and Funding types

CO2: Comprehend the process of opportunity identification through design thinking, identify market potential and customers

CO3: Generate and develop creative ideas through ideation techniques

CO4: Create prototypes to materialize design concepts and conduct testing to gather feedback and refine prototypes to build a validated MVP

CO5: Analyse and refine business models to ensure sustainability and profitability Prepare and deliver an investible pitch deck of their practice venture to attract stakeholders

REFERENCES:

1. Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, Sabyasachi Sinha (2020). Entrepreneurship, McGrawHill, 11th Edition
2. Ries, E. (2011). The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. Crown Business
3. Blank, S. G., & Dorf, B. (2012). The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company. K&S Ranch
4. Roy, R. (2017). Indian Entrepreneurship: Theory and Practice. New Delhi: Oxford University Press

5. Osterwalder, A., &Pigneur, Y. (2010). Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers. John Wiley & Sons

Mapping of CO with PO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	1	-	-	-	-	2	-	-	-
CO2	2	2	1	-	-	-	-	-	-	-	2	-	-	-
CO3	2	3	2	2	1	-	-	-	-	-	2	-	-	-
CO4	1	2	3	2	2	-	-	-	2	2	2	-	-	-
CO5	1	2	1	-	-	3	2	1	2	-	3	-	-	-
AVG	1.6	2	1.75	2	1.5	2	2	1	2	2	2.2	-	-	-

JCS2741	COMPREHENSION AND 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.

EVALUATION:

Technical Seminar (50)	Comprehension (50)	Total (100)	Internal Marks (50)	Internal Marks (100)
-------------------------------	---------------------------	--------------------	----------------------------	-----------------------------

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.

Mapping of CO with PO

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	2	1	2	2	2	3	3	2	3
CO2	3	3	2	2	3	1	1	2	2	1	3	3	3	3
CO3	2	2	3	2	2	1	1	2	3	2	2	2	2	2
CO4	1	1	1	1	2	1	1	2	3	1	2	2	1	2
C05	2	2	1	1	1	1	1	3	3	2	3	2	1	2
AVG	2.2	2.2	1.8	1.6	2	1.2	1	2.2	2.6	1.6	2.6	2.4	1.8	2.4

JCS2742	INTERNSHIP	L	T	P	C
		-	-	4	2

COURSE OBJECTIVES:

To enable the students to

- Get connected with reputed industry/ laboratory/academia / research institute
- Get practical knowledge on Product Development / Software Design and Development / Testing / Analytics/ research/ startups/ professionalism / business processes and insights / domain knowledge/ Industry Practices/ and other related aspects and develop skills to solve related problems
- Develop technical, soft, team skills to cater to the needs of the industry / academia / businesses / research / organizations in the core aspects of Automation, Digitalization

The students may undergo Industrial training for a period as specified in the Curriculum during summer/winter vacation. In this case the training has to be undergone continuously for the entire period.

In lieu of Industrial training, students may undergo Internship at Industry / Research organizations / University (after due approval from Head of the Department) during the IV,V or VI semester breaks for a continuous period of 30 days to an Industry / Organization / University and two credit is allotted in the Seventh semester based on a viva voce examination. The Industrial / Practical Training, Summer Project, Internship, shall carry 100 marks and shall be evaluated through internal assessment only.

At the end of Industrial/Practical Training/Internship/ Summer Project, the student shall submit an attendance certificate from the organization where he / she has undergone training and a brief report. The evaluation will be made based on this report and a viva-voce Examination, conducted internally by a three member Departmental Committee constituted by the Head of the Institution consisting of the course coordinator and two experts from the Department. The certificates (issued by the organization) submitted by the students shall be attached to the mark list sent by the Head of the

Institution to the Controller of Examinations.

EVALUATION :

Internship Report (40)	Presentation (30)	Viva Voce (30)	Total Marks (100)
-----------------------------------	--------------------------	-----------------------	--------------------------

Number of days :30

COURSE OUTCOMES:

On completion of the course, the student will know about

CO1: Industry Practices, Processes, Techniques, technology, automation and other core aspects of software industry

CO2: Analyze, Design solutions to complex business problems

CO3: Build and deploy solutions for target platform

CO4: Preparation of Technical reports and presentation.

CO5: Ability to acknowledge the value of continuing education for oneself and to stay up with technology advancements.

CO/PO MAPPING :

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	1	3	1	1	1	2	2	2	2	1	3
CO2	3	3	3	2	3	1	1	1	1	2	2	2	1	2
CO3	2	2	3	2	3	2	1	1	1	2	2	2	1	3
CO4	1	1	1	1	2	-	-	2	3	2	2	1	-	1
C05	1	1	1	1	2	1	1	1	2	1	3	1	1	2
AVG	1.8	1.8	2	1.4	2.6	1.25	1	1.2	1.8	1.8	2.2	1.6	1	2.2

JCS2831	PROJECT WORK	L	T	P	C
		0	0	20	10

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.

PROJECT EVALUATION

ZEROth REVIEW

Novelty/Problem Identification & Objectives (20)	Literature survey (30)	Methodology (10)	Guide (20)	PowerPoint Presentation (20)			Total (100)
				BL (5)	CS (5)	CP (10)	

FIRST REVIEW

Implementation of Methodology (20)	Design/ Analysis/ Testing/ Algorithm/Model(30)	Inferences (10)	Guide (20)	Power Point Presentation (20)			Total (100)
				BL (5)	CS (5)	CP (10)	

SECOND REVIEW

Progress (20)	Results (30)	Preparation of Conference Paper (10)	Guide (20)	Power Point Presentation (20)			Total (100)
				BL (5)	CS (5)	CP (10)	

THIRD REVIEW

Results & Discussions (30)	Conclusions (20)	Publications (10)	Guide (20)	Power Point Presentation (20)			Total (100)
				BL (5)	CS (5)	CPS (10)	

BL - Body Language, CS-Communication Skills, CP-Content of Presentation

TOTAL: 300 PERIODS

END SEMESTER EXAM

Project report (External Only) (30)	Result/Demonstration (30)		Power Point Presentation (20)		Viva (External Only) (20)	Total (100)
	Internal	External	Internal	External		

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 for implementing the project.
- 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.

CO/PO MAPPING :

PO,PSO /CO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2	2	2	2	2	2	3	3	3
CO2	2	3	3	2	3	-	2	2	2	3	3	3	3	2
CO3	2	3	3	2	3	-	-	2	2	2	3	3	2	3
CO4	2	2	3	-	2	-	2	3	2	3	2	3	2	2
C05	2	2	2	-	2	-	2	3	3	3	3	3	2	2
AVG	2.2	2.6	2.8	2	2.6	2	2	2.4	2.2	2.6	2.6	3	2.4	2.4

