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 CYBER SECURITY

B.E.CSE (CS)

CURRICULUM

REGULATION 2021

CHOICE BASED CREDIT SYSTEM

JERUSALEM COLLEGE OF ENGINEERING

(An Autonomous Institution Affiliated to Anna University, Chennai)

B.E.CSE (CS)

REGULATION– 2021

CHOICE BASED CREDIT SYSTEM

I - VIII SEMESTERS CURRICULUM

SEMESTER- I

S. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACTPERIODS	L	T	P	C
THEORY								
1.	**JHS1121**	Communicative English and Soft Skills I	HS	4	2	0	2	3
2.	**JMA1102**	Matrices and Multivariate Calculus	BS	4	2	2	0	3
3.	**JPH1101**	Engineering Physics	BS	3	3	0	0	3
4.	**JCY1101**	Engineering Chemistry	BS	3	3	0	0	3
5.	**JGE1101**	Engineering Basics	ES	3	3	0	0	3
6.	**JGE1102**	Programming in C	ES	3	3	0	0	3
PRACTICALS								
7.	**JPC1111**	Physics and Chemistry Laboratory	BS	2	0	0	2	1
8.	**JGE1112**	Programming in C Laboratory	ES	4	0	0	4	2
9.	**JGE1111**	Design Appreciation Laboratory	ES	4	0	0	4	2
TOTAL				**30**	**16**	**2**	**12**	**23**

SEMESTER- II

S. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	**JHS1221**	Technical English and Soft Skills II	HS	4	2	0	2	3
2.	**JGE1209**	Heritage of Tamils	HS	1	1	0	0	1
3.	**JMA1202**	Linear Algebra	BS	4	2	2	0	3
4.	**JBE1223**	Applied Science for Electronics and Information Engineering	BS	4	2	0	2	3
5.	**JGE1201**	Python Programming	ES	3	3	0	0	3
6.	**JGE1204**	Digital Logic Fundamentals	ES	3	3	0	0	3
7.	**JGE1212**	Engineering Graphics and Design	ES	5	1	0	4	3
8.	**JNC1261**	Environmental Science	NCM	3	3	0	0	0
PRACTICALS								
9.	**JGE1211**	Python Programming Laboratory	ES	4	0	0	4	2
10.	**JGE1214**	Digital Logic Fundamentals Laboratory	ES	4	0	0	4	2
TOTAL				**35**	**17**	**2**	**16**	**23**

SEMESTER-III

S. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	**JGE1309**	Tamils and Technology	HS	1	1	0	0	1
2.	**JMA1304**	Discrete Mathematics for Computer Science	BS	4	2	2	0	3
3.	**JCB1301**	Data Structures and Algorithms	PC	3	3	0	0	3
4.	**JCS1321**	Object Oriented Programming	PC	4	2	0	2	3
5.	**JCS1302**	Database Management Systems	PC	3	3	0	0	3
6.	**JCS1404**	Software Engineering	PC	3	3	0	0	3
PRACTICALS								
7.	**JPT1001**	Soft Skills and Aptitude I	HS	2	0	0	2	*
8.	**JCS1312**	Database Management Systems Laboratory	PC	4	0	0	4	2
9.	**JCB1311**	Data Structures and Algorithms Laboratory	PC	4	0	0	4	2
TOTAL				**28**	**14**	**2**	**12**	**20**

SEMESTER-IV

S. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	**JMA1405**	Applied Probability and Statistics	BS	4	2	2	0	3
2.	**JCB1401**	Data Communication and Networks	PC	3	3	0	0	3
3.	**JCS1402**	Operating Systems	PC	3	3	0	0	3
4.	**JCB1402**	Foundation of Cyber Security	PC	3	3	0	0	3
5.	**JCB1403**	Cryptography and Cryptanalysis	PC	3	3	0	0	3
6.		Open Elective I	OE	3	3	0	0	3
PRACTICALS								
7.	**JPT1001**	Soft Skills and Aptitude II	HS	2	0	0	2	1
8.	**JCS1412**	Operating Systems Laboratory	PC	4	0	0	4	2
9.	**JCB1413**	Cryptography and Cryptanalysis Laboratory	PC	4	0	0	4	2
TOTAL				**29**	**17**	**2**	**10**	**23**

SEMESTER-V

S. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	**JMA1501**	Mathematical Modelling and Optimization Techniques	BS	4	2	2	0	3
2.	**JCB1501**	Cyber Forensics	PC	3	3	0	0	3
3.	**JCB1502**	Intrusion Detection Systems	PC	3	3	0	0	3
4.	**JCB1503**	Hardware Security	PC	3	3	0	0	3
5.		Professional Elective I	PE	3	3	0	0	3
6.		Open Elective II	OE	3	3	0	0	3
PRACTICALS								
7.	**JHS1511**	Professional Communication	HS	2	0	0	2	1
8.	**JPT1002**	Technical Skills and Aptitude 1	HS	2	0	0	2	*
9.	**JCB1511**	Cyber Forensics Laboratory	PC	4	0	0	4	2
TOTAL				**27**	**17**	**2**	**8**	**21**

SEMESTER-VI

S. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	**JCB1601**	Cloud Security	PC	3	3	0	0	3
2.	**JCB1602**	Digital Watermarking and Steganography	PC	3	3	0	0	3
3.	**JCB1603**	Ethical Hacking	PC	3	3	0	0	3
4.		Professional Elective II	PE	3	3	0	0	3
5.		Professional Elective III	PE	3	3	0	0	3
6.		Open Elective III	OE	3	3	0	0	3
PRACTICALS								
7.	**JPT1002**	Technical Skills and Aptitude II	HS	2	0	0	2	1
8.	**JCB1613**	Ethical Hacking Laboratory	PC	4	0	0	4	2
9.	**JCB1621**	Mini Project	EEC	2	0	0	2	1
10.	**JCB1641**	Internship	EEC	-	-	-	-	1
TOTAL				**26**	**18**	**0**	**8**	**23**

SEMESTER-VII

S. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	**JCB1701**	Blockchain and Cryptocurrencies	PC	3	3	0	0	3
2.	**JCB1702**	Web Application Security	PC	3	3	0	0	3
3.		Professional Elective – IV	PE	3	3	0	0	3
4.		Professional Elective – V	PE	3	3	0	0	3
5.		Open Elective –IV	OE	3	3	0	0	3
6.	**JNC1361**	Essence of Indian Traditional Knowledge	NCM	3	3	0	0	-
PRACTICALS								
7.	**JBA1711**	Entrepreneurship for Engineers	HS	2	0	0	2	1
8.	**JCB1712**	Web Application Security Laboratory	PC	4	0	0	4	2
9.	**JCB1731**	Project Work Phase I	EEC	6	0	0	6	3
TOTAL				**30**	**18**	**0**	**12**	**21**

SEMESTER-VIII

S. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	**JNC1861**	Indian Constitution	NCM	3	3	0	0	-
PRACTICALS								
2.	**JCB1832**	Project Work Phase II	EEC	18	0	0	18	9
3.	**JCB1851**	Comprehension and Technical Seminar	EEC	2	0	0	2	1
TOTAL				**23**	**3**	**0**	**20**	**10**

B.E.CSE(CS)
R-2021- CURRICULUM 2019
CHOICE BASED CREDIT SYSTEM
I - VIII SEMESTERS CURRICULUM
COURSE SUMMARY SHEET

Sl.No	Category	Credits as per Semester								Total Credits
		1	2	3	4	5	6	7	8	
1	HS	3	4	1	1	1	1	1	-	12
2	BS	10	6	3	3	3	-	-	-	25
3	ES	10	13	-	-	-	-	-	-	23
4	PC	-	-	16	16	11	11	8	-	62
5	PE	-	-	-	-	3	6	6	-	15
6	OE	-	-	-	3	3	3	3	-	12
7	EEC	-	-	-	-	-	2	3	10	15
TOTAL		23	23	20	23	21	23	21	10	164
Non Credit Mandatory			1Sub					1Sub	1Sub	

PROFESSIONAL ELECTIVES -VERTICALS

Vertical –I Full Stack Development	Vertical- II Creative Media	Vertical –III Internet of Things (IoT)	Vertical-IV Artificial Intelligence and Machine Learning	Vertical-V Gaming Technology
JIT1020: App Development	JCS1025: Principles of Multimedia	JIT1036: Internet of things: Architecture Protocols and Applications	JAL1401:Principles of Artificial Intelligence	JAD1026: AI For Games
JIT1021: Cloud Services Management	JCS1026: 3D Modeling and Rendering	JIT1037: Programming for IoT Boards	JAL1501:Machine Learning	JAD1027: Game Theory
JIT1022 :UI and UX design	JCS1007: Augmented Reality and Virtual Reality	JIT1038: Industrial IoT 4.0	JAL1503:Cognitive Science	JAD1028: Reinforcement Learning for Games
JIT1023: DevOps	JCS1027 :Digital Marketing and Commerce	JIT1039: IoT in Healthcare	JAL1601:Neural Networks and Deep Learning	JAD1029: Game Design
JIT1024: Web Application Security	JCS1028: Computer Graphics and Animation	JIT1040: Robotics in IoT	JAL1602:Knowledge Representation and Reasoning	JAD1030: Game Development
JIT1025 :MERN Stack Development	JCS1029 :Video Processing and Analytics	JIT1041: Mobile Application Development for IoT	JAL1603:Time Series Analysis and Forecasting	JAD1031: User Interface Design for Gaming
JIT1026 :Software Testing and Automation	JAD1030: Game Development	JIT1042: Cognitive IoT	JAL1701: Essence of Natural Language Processing	JCS1007: Augmented Reality and Virtual Reality
JIT1027: No SQL database	JCS1030: Media Security	JIT1043: Privacy security for IoT	JAL1702: Robotic process automation	JAD1032: Cognitive Science and Analyst

OPEN ELECTIVES

OPEN ELECTIVE –I SEMESTER IV

S. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	**JCB9001**	Malware Analysis	OE	3	3	0	0	3
2.	**JCB9002**	Firewall and Internet Security	OE	3	3	0	0	3
3.	**JCB9003**	Penetration Testing	OE	3	3	0	0	3

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SEMESTER I

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

COURSE OBJECTIVES:

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

UNIT I BASIC GRAMMAR I AND READING FOR INFORMATION 9

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

SOFT SKILLS LAB 3

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

UNIT II BASIC GRAMMAR I AND SHARING INFORMATION 9

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

SOFT SKILLS LAB 3

Self-introduction, peer introduction, picture description, JAM

UNIT III BASIC GRAMMAR III AND FREE WRITING I 9

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

SOFT SKILLS LAB 3

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

suggestions.

UNIT IV BASIC GRAMMAR IV AND LANGUAGE DEVELOPMENT 9

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

SOFT SKILLS LAB 3

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

UNIT V BASIC GRAMMAR V AND FREE WRITING II 9

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

SOFT SKILLS LAB 3

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

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

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

TEXTBOOKS:

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

REFERENCE BOOKS:

1. Regional Institute of English. English for Engineers. Cambridge University Press, New Delhi. 2006
2. Rizvi M, Ashraf. Effective Technical Communication. Tata McGraw-Hill Publishing Company Limited, New Delhi, 2007.
3. Rutherford, Andrea J. Basic Communication Skills for Technology. Pearson Edition (II Edition), New Delhi, 2001.
4. Mandel, Steve. Effective Presentation Skills. New Delhi: Viva Books Pvt. Ltd., 2004.
5. Writing Cover Letters-Kilmet, Stephen. "Cover Letter," and "Enclosures and Attachments." In Writing for Design Professionals. New York.

WEB REFERENCES:

1. https://www.perfect-english-grammar.com

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

EXTENSIVE READING:

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

CO-PO Mapping

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

JMA1101	MATRICES AND MULTIVARIATE 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 familiarize students in the applications of numerical methods to eigenvalue problems and to introduce matrix decomposition.
- To enable students to understand the concepts of multivariable functions and its 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.

UNIT I MATRICES 12

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

UNIT II EIGENVALUE PROBLEMS AND MATRIX DECOMPOSITION 12

Eigenvalue problems: Power method, Jacobi rotation method – Cholesky decomposition – QR decomposition – LU decomposition – Singular value decomposition.

UNIT III FUNCTIONS OF SEVERAL VARIABLES 12

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

UNIT IV APPLICATIONS OF INTEGRAL CALCULUS 12

Improper integrals: Beta and Gamma Integrals – Definitions and properties – Simple problems.Multiple integrals: Double integrals over general regions – Cartesian coordinates – Polar coordinates – Change of order of integration – Change of variables – Area enclosed between plane curves – Triple integrals – Volume of solids.

UNIT V VECTOR CALCULUS 12

Vector Differentiation: Gradient and directional derivative – Divergence and curl - Vector identities – Irrotational and Solenoidal vector fields Vector Integration: Line and surface integrals – Green's theorem – Gauss and Stoke's theorems – Verification and evaluation in simple problems.

TOTAL: 60 PERIOD

COURSE OUTCOMES:

At the end of the course, students will be able

CO1: To understand applications of matrix theory in quadratic forms.

CO2: To use numerical methods for solving eigenvalue problems and to perform various matrix decompositions.

CO3: To use calculus for problems and applications dealing with functions of several

variables.

CO4: To gain insight on the applications of multiple integrals in area and volume problems.

CO5: To understand concepts of vector calculus and evaluate line and surface integrals.

TEXT BOOKS:

1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 43rd Edition, 2014.
2. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
3. Weir, M.D and Joel Hass, "Thomas Calculus", 12th Edition, Pearson India, 2016.
4. P.Anuradha and V.Sudhakar, "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, 3rd Edition, 2007.
3. Srimantha Pal and Bhunia, S.C, "Engineering Mathematics" Oxford University Press, 2015.

WEB REFERENCES:

1. **https://nptel.ac.in/courses/111108157/**
2. **https://nptel.ac.in/courses/111107108/**
3. **https://nptel.ac.in/courses/111104144/**
4. **https://nptel.ac.in/courses/111105122/**

CO-PO MAPPINGS:

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

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

COURSE OBJECTIVES:

- To enable the students to understand the basics in crystals structure

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

UNIT I CRYSTAL PHYSICS 9

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

UNIT II PROPERTIES OF MATTER 9

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

UNIT III ULTRASONICS 9

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

UNIT IV PHOTONICS AND FIBRE OPTICS 9

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

UNIT V QUANTUM PHYSICS 9

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

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Students will be able

- To enhance knowledge on properties of matter
- To assess the properties of ultrasonics and imaging devices
- To understand and to compute problems in Quantum Physics.
- To learn the use of modern optical fiber communication systems and tools in real life

applications.

- To gain more insight on the functioning of optical materials for optoelectronics.

TEXT BOOKS:

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

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’.W.H.Freeman, 2007
4. Rajendran V, "Engineering Physics", Tata McGraw Hill, 2009.
5. John D.Cutnell, “Cutnell and Johnson Physics”, Willey Publications, 2018.

WEBSITE REFERENCES:

1. https://nptel.ac.in/courses/115/104/115104109/
2. https://nptel.ac.in/noc/courses/noc18/SEM2/noc18-ce18/
3. https://onlinecourses.nptel.ac.in/noc21_bt50/preview
4. https://nptel.ac.in/courses/115/104/115104096/
5. https://nptel.ac.in/courses/108/104/108104113/

CO-PO Mapping

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

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

COURSE OBJECTIVES

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

UNIT I: PHOTOCHEMISTRY AND ANALYTICAL TECHNIQUES 9

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

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

UNIT II WATER TECHNOLOGY 9

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

UNIT III ELECTROCHEMISTRY AND CORROSION 9

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

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

UNIT IV POLYMER, COMPOSITES AND ENERGY STORAGE DEVICES 9

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

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

UNIT V ENGINEERING MATERIALS AND NANOCHEMISTRY 9

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

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

TOTAL: 45 PERIODS

COURSE OUTCOMES

Students will be able to

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

TEXT BOOKS:

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

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

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1. https://nptel.ac.in/content/storage2/courses/103108100/module2/module2.pdf
2. https://www.samcotech.com/what-is-a-boiler-feed-water-treatment-system-how-does-it-work/
3. https://nptel.ac.in/courses/113/101/113101098/
4. https://nptel.ac.in/courses/112/107/112107221/
5. https://nptel.ac.in/courses/113/106/113106093/

CO-PO MAPPING

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

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

COURSE OBJECTIVES

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

UNIT 1 BASICS OF CIVIL ENGINEERING 11

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

Surveying and Levelling - Linear and Angular Measurements - Introduction to transport system, role of transportation in society - Green Highway.

Sources of water, Hydrological cycle, Irrigation Engineering, Rain water harvesting, Environmental pollution, Greenhouse gas emission, Ozone depletion, Global warming - Green building concepts.

UNIT 2 BASICS OF MECHANICAL ENGINEERING 11

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

UNIT 3 ELECTRIC CIRCUITS AND ELECTRICAL MACHINES 7

Basic circuit components - Ohms Law - Kirchhoff's Law-Introduction to AC circuits-waveforms and RMS value - Power and power factor-Principles of operation and characteristics of DC machines-Transformers-Three phase and single-Phase induction motors.

UNIT 4 ELECTRONIC DEVICES & CIRCUITS 7

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

UNIT 5 MEASUREMENTS & INSTRUMENTATION 9

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

TOTAL: 45 PERIODS

COURSE OUTCOMES

The students will be able to

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

TEXT BOOKS

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

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

WEBSITE REFERENCES:

1. https://www.eit.edu.au/
2. https://nptel.ac.in/courses/105/102/105102088/
3. https://nptel.ac.in/courses/108/105/108105155/
4. https://nptel.ac.in/courses/117/103/117103063/
5. https://nptel.ac.in/courses/108/105/108105153/

CO-PO MAPPING

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

JGE1102	PROGRAMMING IN C (Common to all B.E / B.Tech Programmes)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

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

UNIT I INTRODUCTION TO PROBLEM SOLVING 9

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

UNIT II C PROGRAMMING 9

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

UNIT III ARRAYS AND STRINGS 9

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

UNIT IV FUNCTIONS AND USER DEFINED DATA TYPES 9

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

UNIT V POINTERS AND FILES 9

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

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

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

TEXT BOOKS:

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

REFERENCES:

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

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1. https://www.javatpoint.com/computer-fundamentals-tutorial
2. https://www.geeksforgeeks.org/basics-file-handling-c/
3. https://www.studytonight.com/c/string-and-character-array.php
4. https://www.tutorialspoint.com/cprogramming/c_functions.htm
5. https://www.guru99.com/c-pointers.html

CO-PO MAPPING

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

JPC1111	PHYSICS AND CHEMISTRY LABORATORY (Common to all B.E / B.Tech Programmes)	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

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

LIST OF EXPERIMENTS:

PHYSICS

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

TOTAL: 15 PERIODS

LIST OF EXPERIMENTS

CHEMISTRY

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

TOTAL: 15 PERIODS

COURSE OUTCOMES:

Students will be able to

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

REFERENCES:

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

WEBSITE REFERENCES

1. http://www.digimat.in/nptel/courses/video/105107176/L31.html
2. https://www.canterbury.ac.nz/media/documents/science-outreach/chloride_mohr.pdf
3. http://www.mgcub.ac.in/pdf/material/20200428101433e562a8b8e8.pd
4. http://depthome.brooklyn.cuny.edu/physics/lab/phy2/newlabs/Diffraction-grating-ver-2.pdf
5. http://web.physics.ucsb.edu/~phys128/experiments/interferometry/measuring_wavelength.pdf

CO-PO MAPPING

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

JGE1112	PROGRAMMING IN C LABORATORY (Common to all B.E / B.Tech Programmes)	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

The students should be made to:

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

LIST OF PROGRAMS

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

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- Write simple C Programs
- Able to solve scientific problems using C
- Gain knowledge on the use of functions and arrays
- Use structures, pointers and files in C Programs
- Develop modularized applications in C

TEXT BOOKS:

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

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1. https://www.javatpoint.com/first-c-program

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

CO-PO MAPPING

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

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

COURSE OBJECTIVES

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

GROUP A (CIVIL & MECHANICAL)

I CIVIL ENGINEERING PRACTICE

13

Buildings:

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

Plumbing Works:

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

Carpentry using Power Tools only:

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

MECHANICAL ENGINEERING PRACTICE

18

Welding:

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

Basic Machining:

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

Sheet Metal Work:

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

Machine Assembly Practice:

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

Demonstration on:

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

GROUP B (ELECTRICAL & ELECTRONICS)

I ELECTRICAL ENGINEERING PRACTICE 13

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

II ELECTRONICS ENGINEERING PRACTICE 16

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

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

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

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

CIVIL

1. Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings. 15 Sets
2. Carpentry vice (fitted to work bench) 15 Nos
3. Standard woodworking tools 15 Sets
4. Models of industrial trusses, door joints, furniture joints 5 each

5. Power Tools:
    (a) Rotary Hammer 2 Nos
    (b) Demolition Hammer 2 Nos
    (c) Circular Saw 2 Nos
    (d) Planer 2 Nos
    (e) Hand Drilling Machine 2 Nos
    (f) Jigsaw 2 Nos

MECHANICAL

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

ELECTRICAL

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

ELECTRONICS

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

WEBSITE REFERENCES:

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

CO-PO MAPPING

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

SEMESTER II

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

COURSE OBJECTIVES:

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

UNIT I TECHNICAL WRITING AND VISUAL CONVERSION 6

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

SOFT SKILLS LAB 3

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

UNIT II TECHNICAL WRITING AND GUIDELINES PREPARATION 6

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

SOFT SKILLS LAB 3

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

UNIT III 9

SOFT SKILLS LAB

Listening and speaking practice based on BEC, IELTS and TOEFL

UNIT IVTECHNICAL WRITING AND BUSINESS LETTERS 6

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

SOFT SKILLS LAB 3

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

UNIT VTECHNICAL WRITING AND REPORT WRITING **6**

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

SOFT SKILLS LAB **3**

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

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

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

TEXTBOOKS:

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

REFERENCE BOOKS:

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

WEB LINKS:

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

EXTENSIVE READING:

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

CO-PO MAPPING:

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

JMA1202	LINEAR ALGEBRA	L	T	P	C
		2	0	2	3

COURSE OBJECTIVES:

- To impart knowledge of consistency of system of equations through Rouche-Capelli theorem and numerical techniques.
- To familiarize students in the concepts of vector spaces, bases and dimension.
- To help students understand concepts of linear transformation, Eigen values, Eigen vectors and Diagonalizability.
- To introduce inner product spaces, orthogonalization and least square approximations.

UNIT I MATRICES AND SYSTEM OF LINEAR EQUATIONS 12

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

UNIT II VECTOR SPACES 12

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

UNIT III LINEAR TRANSFORMATION 12

Linear transformation – Properties - Kernel and Image – One-to-One and Onto transformations – Rank and Nullity – Dimension theorem.

UNIT IV DIAGONALIZATION 12

Matrix representations of linear transformations - Eigenvalues and eigenvectors - Diagonalizability.

UNIT V INNER PRODUCT SPACES 12

Inner products and norms – Gram Schmidt orthogonalization process – Adjoint of a linear operator – Least square approximation.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able

CO1: To understand applications of Rouche-Capelli theorem and numerical methods in system of equations.

CO2: To apply fundamentals concepts of advanced algebra in modern mathematics.

CO3: To understand concepts and methods in Linear transformations.

CO4: To demonstrate efficient use of matrix representations and diagonalization.

CO5: To solve problems using orthogonalization process and use least square approximations in engineering applications.

TEXT BOOKS:

1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 43rd Edition, 2014.
2. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.

3. Friedberg, A.H., Insel, A.J. and Spence, L., ―Linear Algebra, Prentice Hall of India, New Delhi, 2004.

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1. Burden, R.L. and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2. James, G. ―Advanced Modern Engineering Mathematics, Pearson Education, 2007.
3. Kolman, B. Hill, D.R., ―Introductory Linear Algebra, Pearson Education, New Delhi, First Reprint, 2009.
4. Kumaresan, S., ―Linear Algebra – A Geometric Approach, Prentice – Hall of India, New Delhi, Reprint, 2010.
5. Lay, D.C., ―Linear Algebra and its Applications, 5th Edition, Pearson Education, 2015.
6. O'Neil, P.V., ―Advanced Engineering Mathematics, Cengage Learning, 2007.
7. Strang, G., ―Linear Algebra and its applications, Thomson (Brooks/Cole), New Delhi, 2005.
8. Sundarapandian, V. ―Numerical Linear Algebra, Prentice Hall of India, New Delhi, 2008.

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2. https://nptel.ac.in/courses/108104174/
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4. https://nptel.ac.in/courses/111106135/
5. https://nptel.ac.in/courses/111108157/

CO-PO MAPPING

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

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

COURSE OBJECTIVES

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

UNIT I SEMICONDUCTING MATERIAL 7

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

UNIT II MAGNETIC AND SUPERCONDUCTING MATERIALS 7

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

UNIT III OPTICAL PROPERTIES OF MATERIALS 7

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

UNIT IV CHEMICAL BONDING AND CONDUCTIVITY IN SOLIDS 10

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

UNIT V INSTRUMENTAL METHODS OF ANALYSIS 9

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

PHYSICS LABORATORY

LIST OF EXPERIMENTS: (ANY 5) **10**

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

CHEMISTRY LABORATORY

LIST OF EXPERIMENTS (ANY 5) **10**

1. Determination of strength of hydrochloric acid using pH meter.
2. Determination of strength of acids in a mixture of acids using conductivity meters.
3. Conductometric titration of strong acid vs strong base.
4. Estimation of iron content using potentiometer.
5. Estimation of iron content of the water sample using spectrophotometer (thiocyanate method).
6. Estimation of sodium and potassium present in water using a flame photometer.
7. Determination of SAP and FAV values of an oil.
8. Estimation of acetic acid adsorbed on charcoal

TOTAL: 60 PERIODS

COURSE OUTCOMES

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

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

TEXT BOOKS

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

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

WEBSITE LINKS

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

CO-PO MAPPING

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

JGE1201	PYTHON PROGRAMMING (Common to all B.E / B.Tech Programmes)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

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

UNIT I INTRODUCTION TO PYTHON 9

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

UNIT II DECISION MAKING AND LOOPING 9

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

UNITIII FUNCTIONS, STRING, LIST 9

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

UNIT IV TUPLES, DICTIONARY, FILES 9

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

UNIT V EXCEPTION HANDLING AND GRAPHICS 9

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

TOTAL : 45 PERIODS

COURSE OUTCOMES:

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

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

TEXTBOOKS:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/think-python/)

2. Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

REFERENCES:

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

CO-PO MAPPING

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

JGE1212	ENGINEERING GRAPHICS AND DESIGN (Common to all B.E / B.Tech. Programmes)	L	T	P	C
		1	0	4	3

COURSE OBJECTIVES

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

UNIT I PLANE CURVES AND ORTHOGRAPHIC PROJECTION 15

Conics - Construction of ellipse, Parabola and hyperbola by eccentricity method - Construction of cycloid - construction of involutes of squad and circle - Drawing of tangents and normal to the above curves. Representation of Three Dimensional objects - General principles of orthographic projection - Need for importance of multiple views and their placement - First angle projection - layout views - Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES 15

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

UNIT III PROJECTION OF SOLIDS 15

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

UNIT IV SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES 15

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

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

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 15

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

TOTAL: 75 PERIODS

COURSE OUTCOMES:

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

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

TEXT BOOKS:

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

REFERENCES:

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

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

WEB SITE REFERENCES:

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2. https://freevideolectures.com
3. https://nptel.ac.in/courses
4. https://nptel.ac.in/courses/105/104/105104148/
5. https://nptel.ac.in/courses/112/103/112103019/

CO-PO MAPPING

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

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

COURSE OBJECTIVES:

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

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES **12**

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

UNIT II COMBINATIONAL LOGIC **12**

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

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC **12**

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

UNITIV ASYNCHRONOUS SEQUENTIAL LOGIC **12**

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

UNIT V MEMORY AND PROGRAMMABLE LOGIC **12**

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

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

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

TEXT BOOK:

1. M. Morris R. Mano, Michael D. Ciletti, ―Digital Design: With an Introduction to the Verilog HDL, VHDL, and System Verilog, 6th Edition, Pearson Education, 2017.

REFERENCES:

1. G. K. Kharate, Digital Electronics, Oxford University Press, 2010
2. John F. Wakerly, Digital Design Principles and Practices, Fifth Edition, Pearson Education, 2017.
3. Charles H. Roth Jr, Larry L. Kinney, Fundamentals of Logic Design, Sixth Edition, CENGAGE Learning, 2013
4. Donald D. Givone, Digital Principles and Design‖, Tata McGraw Hill, 2003.

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3. https://nptel.ac.in/courses/117/106/117106086/
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5. http://www.nptelvideos.com/lecture.php?id=9616

CO-PO MAPPING

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

JNC1261	ENVIRONMENTAL SCIENCE (Common to all B.E / B.Tech Programmes)	L	T	P	C
		3	0	0	0

COURSE OBJECTIVES

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

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 9

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids - Nitrogen Cycle, Oxygen Cycle, Carbon Cycle, Phosphorous Cycle. Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – value of biodiversity- threats to biodiversity– conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

UNIT II ENVIRONMENTAL POLLUTION 9

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – climate change, global warming, acid rain, ozone layer depletion.

UNIT III NATURAL RESOURCES 9

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over- utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources- effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. Energy resources: renewable and non renewable energy sources, Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources.

UNIT V SOCIAL ISSUES AND THE ENVIRONMENT 9

Urban problems related to energy – water conservation- rain water harvesting, watershed management – resettlement and rehabilitation of policy. – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT **9**

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

TOTAL: 45 PERIODS

COURSE OUTCOMES

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

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

TEXT BOOKS:

1. Benny Joseph, Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.
2. Gilbert M. Masters, Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.

REFERENCES:

1. Dharmendra S. Sengar, ‗Environmental law', Prentice hall of India PVT LTD, New Delhi, 2007.
2. Erach Bharucha, ―Textbook of Environmental Studies‖, Universities Press (I) PVT. LTD, Hyderabad, 2015.
3. Rajagopalan, R, Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.
4. G. Tyler Miller and Scott E. Spoolman, ―Environmental Science, CENGAGE Learning India PVT, LTD., Delhi, 2014.

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3. https://nptel.ac.in/courses/120108004
4. https://nptel.ac.in/courses/107/103/107103081/
5. https://nptel.ac.in/courses/109/104/109104045/

CO-PO MAPPING

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

JEC1209	HERITAGE OF TAMILS	L	T	P	C
		2	0	0	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, Leather puppetry, 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 பண் பாடும் – கே.கே. பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம் . (விகடன் பிரசுரம்).
3. கீழடி – எளே நதிக்களரயில் சங்கோல நகர நாகரிகம் (ததொல்லியல் ிளை வெளியீடு)
4. தபொருளந – ஆறற்றங்களர நாகரிகம். (ததொல்லியலல் ிளை 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.Subaramanian, 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.

JGE1211	PYTHON PROGRAMMING LABORATORY (Common to all B.E / B.Tech Programmes)	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES

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

LIST OF PROGRAMS

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

TOTAL: 60 PERIODS

PLATFORM NEEDED

Python 3 interpreter for Windows/Linux

COURSE OUTCOMES:

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

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

WEBSITE REFERENCES:

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

CO-PO MAPPING

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

JEC1214	DIGITAL LOGIC FUNDAMENTALS LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

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

LIST OF EXPERIMENTS

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

TOTAL: 60 PERIODS

COURSE OUTCOMES:

- Upon Completion of the course, the students will be able to:
- Implement simplified combinational circuits using basic logic gates
- Implement combinational circuits using MSI devices
- Implement sequential circuits like registers and counters

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

1. Digital trainer kits - 30
2. Digital ICs required for the experiments in sufficient numbers

WEBSITE REFERENCES:

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

CO-PO MAPPING

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

SEMESTER III

JMA1304	DISCRETE MATHEMATICS FOR COMPUTER SCIENCE	L	T	P	C
		2	2	0	3

COURSE OBJECTIVES

- To equip students with the ability to deal with abstraction by way of propositional logic.
- To familiarize students in combinatorial problems and its applications.
- To develop the ability to apply the concepts of Fuzzy logic.
- To introduce fundamental concepts in number theory and its applications.
- To conceptualize congruence, its applications and standard theorems.

UNIT- I LOGIC AND PROOFS **12**

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

UNIT-II COMBINATORICS **12**

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

UNIT-III FUZZY LOGIC **12**

Fuzzy sets – Properties and Operations – Fuzzy relations – Operations on Fuzzy relations - Classical logic – Multivalued logic – Fuzzy propositions –Fuzzy quantifiers

UNIT-IV DIVISIBILITY THEORY AND CANONICAL DECOMPOSITIONS **12**

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

UNIT V CONGRUENCES AND CLASSICAL THEOREMS **12**

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

TOTAL: 60PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able

- To understand propositional logic and various proof methods and strategy.
- To use counting principles and mathematical induction in solving combinatorial problems.
- To understand applications of multivalued logic and fuzzy logic in problems.
- To understand divisibility theory and canonical decompositions of number theory.
- To solve simple problems using classical theorems of number theory.

TEXT BOOKS:

1. Rosen, K.H., "Discrete Mathematics and its Applications", 7th Edition, Tata McGraw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition, 2011.
2. Tremblay, J.P. and Manohar.R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.
3. George J. Klir and Yuan, B., Fuzzy sets and fuzzy logic, Theory and applications, Prentice Hall of India Pvt. Ltd., 1997.
4. Koshy, T., ―Elementary Number Theory with Applications, Elsevier Publications, New Delhi, 2002.

REFERENCES:

1. Grimaldi, R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition, Pearson Education Asia, Delhi, 2007.
2. Lipschutz, S. and Mark Lipson., "Discrete Mathematics", Schaum'sOutlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.
3. Koshy, T. "Discrete Mathematics with Applications", Elsevier Publications, 2006.
4. Lidl, R. and Pitz, G, "Applied Abstract Algebra", Springer Verlag, New Delhi, 2nd Edition, 2006.
5. Niven, I., Zuckerman.H.S., and Montgomery, H.L., ―An Introduction to Theory of Numbers‖, John Wiley and Sons , Singapore, 2004.
6. San Ling and Chaoping Xing, ― Coding Theory – A first Course, Cambridge Publications, Cambridge, 2004.

WEB REFERENCES:

1. https://nptel.ac.in/courses/111106086/
2. https://nptel.ac.in/courses/111106155/
3. https://nptel.ac.in/courses/127105006/
4. https://nptel.ac.in/courses/111101137/
5. https://nptel.ac.in/courses/111103020/

CO-PO MAPPINGS:

CO's	PO's											
CO-1	3	3	2	2	-	-	-	-	2	-	-	2
CO-2	3	3	2	2	-	-	-	-	2	-	-	2
CO-3	3	3	2	2	-	-	-	-	2	-	-	2
CO-4	3	3	2	2	-	-	-	-	2	-	-	2
CO-5	3	3	2	2	-	-	-	-	2	-	-	2
AVG.	3	3	2	2	-	-	-	-	2	-	-	2

JCB1301	DATA STRUCTURES AND ALGORITHMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To understand the concepts of ADTs
- To design linear data structures – lists, stacks, and queues
- To learn the non–linear data structure trees and its types.
- To understand the concepts of graphs and its applications.
- To understand sorting, searching, and hashing algorithms

UNIT-I ABSTRACT DATATYPE 9

Abstract Data Types (ADTs) – ADTs and classes - Introduction to analysis of algorithms- Asymptotic notations – Divide and Conquer – Recursion – Analyzing Recursive Algorithms

UNIT-II LINEAR STRUCTURE 9

List ADT – Array Based implementations – Linked List Implementations – Singly Linked Lists - Circularly Linked Lists– Doubly Linked Lists – Stack ADT – Queue ADT– Double ended queues applications

UNIT-III TREE STRUCTURE 9

Tree ADT – Binary Tree ADT – Tree Traversals – Binary Search Trees – AVL Trees – Heaps - Multi- way search trees

UNIT-IV GRAPH STRUCTURES 9

Graph ADT – Representations of graph – Graph Traversals – DAG – Topological ordering – Greedy algorithms – Dynamic Programming – Shortest paths – Minimum Spanning Trees.

UNIT-V SORTING AND SEARCHING 9

Bubble sort – Selection sort – Insertion sort – Merge sort – Quick sort – Analysis of sorting algorithms– Linear search – Binary search – Hashing – Hash functions – Collision Handling – Load factors, rehashing, and efficiency

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- Explain abstract data types
- Design, implement, and analyze linear data structures, such as lists, queues,and stacks, according to the needs of different applications.
- Design, implement, and analyze efficient tree structures to meet requirements such as searching, indexing, and sorting.

- Model problems as graph problems and implement efficient graph algorithms to solve them.

TEXT BOOKS:

1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, second Edition, Pearson Education,2014.
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 Edition2015
2. Rance D. Necaise, “Data Structures and Algorithms Using Python”, John Wiley & Sons, 2011
3. Aho, Hop croft, 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:

CO’s	PO’s											
	1	2	3	4	5	6	7	8	9	10	11	12
CO-1	1	1	1	1	1	-	-	-	2	-	2	1
CO-2	2	3	2	2	2	-	-	-	2	-	2	2
CO-3	2	2	3	2	3	-	-	-	3	-	2	2
CO-4	3	3	3	1	1	-	-	-	3	-	2	2
CO-5	2	2	2	1	1	-	-	-	-	-	2	2

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

COURSE OBJECTIVES

- To understand Object Oriented Programming concepts using Java.
- To know the principles of packages, inheritance and interfaces.
- To define exceptions and use I/O streams.
- To learn the concepts of threads and generic classes.
- To design and build simple Graphical User Interfaces using wing components.

UNIT-I INTRODUCTION TO OOP AND JAVA FUNDAMENTALS 9

Object Oriented Programming – Objects and classes – Features of OOP - OOP in Java Characteristics of Java – The Java Environment - Java Source File – Compilation. Fundamental Programming Structures in Java – Constructors, methods – Method overloading, access specifies - Static members - Comments, Data Types, Variables, Operators, Control Flow, Arrays, Packages, and Naming Conventions, Case study-simple program using objects, classes and constructors.

UNIT-II INHERITANCE AND INTERFACES 9

Inheritance – Super classes-sub classes – Protected members – Constructors in sub classes-the Object class – Abstract classes and methods - Final methods and classes – Interfaces –defining an interface, implementing interface, differences between classes and interfaces and extending interfaces - Object cloning - Inner classes, Reflection, Array Lists –Strings, Case study-Program using inheritance strings and array List.

UNIT-III EXCEPTION HANDLING AND I/O 9

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

UNIT-IV MULTI THREADING, GENERIC PROGRAMMING AND ADVANCED JAVA 9

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

UNIT-V EVENT DRIVEN PROGRAMMING 9

Graphics programming -Frame –Components -working with 2D shapes -Using color, fonts, and images -Basics of event handling -event handlers -adapter classes -actions -mouse

events – AWT event hierarchy -Introduction to Swing –layout management -Swing Components –Text Fields, Text Areas –Buttons-Check Boxes –Radio Buttons –Lists-choices-Scrollbars –Windows –Menus–Dialog Boxes, Case study-Program using AWT components and Swing Components.

TOTAL: 60 PERIODS

LIST OF EXPERIMENTS

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

COURSE OUTCOMES

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

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

TEXTBOOKS

1. Herbert Schildt,"Java The complete reference",11th Edition, McGraw Hill Education, , New Delhi 2017.
2. Cay S. Horstmann, Garycornell,"CoreJavaVolume–I Fundamentals", 9th Edition, Prentice Hall, 2013.

REFERENCES

1. Paul Deitel, HarveyDeitel,"Java SE 8 for programmers", 3rd Edition, Pearson, 2015
2. Steven Holzner,"Java2 Black book", Dream tech press, 2011.

WEB REFERENCES

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

Mapping of CO with PO

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

JCS1302	**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 a databases 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 Database System – Views of data – Data Models – Database 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 Save Points – Isolation Levels – SQL Facilities for Concurrency and Recovery.

UNIT-IV IMPLEMENTATION TECHNIQUES 9

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

UNIT-V ADVANCED DATABASE SYSTEMS 9

Distributed Databases Architecture – Data Storage– Transaction Processing – Object-based Databases Object Database Concepts – Object-Relational Features – ODMG Object Model – ODL – OQL XML Databases – XML Hierarchical Model – DTD – XML Schema – XQuery –Database Connectivity –Fundamentals of Database security.

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 designs of normalized databases
- Analyze the various transactions and provide smooth access of data
- Create organized databases and write optimized queries
- Learn the various advanced database concepts and security

TEXT BOOK:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, ―Database System Concepts, Seventh Edition, Tata McGraw Hill, 2020.
2. Ramez Elmasri, Shamkant B. Navathe, ―Fundamentals of Database Systems, Sixth Edition, Pearson Education, 2015.

REFERENCES:

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

WEB REFERENCES:

1. https://www.tutorialspoint.com/dbms/index.htm
2. https://www.studytonight.com/dbms/
3. http://www.ddegjust.ac.in/studymaterial/mca-3/ms-11.pdf
4. https://www.w3schools.in/dbms/https://sqlzoo.net/

CO-PO MAPPINGS:

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

JCS1404	**SOFTWARE ENGINEERING**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

COURSE OBJECTIVES

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

UNIT-I SOFTWARE PROCESS AND AGILE DEVELOPMENT 9

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

UNIT-II REQUIREMENTS ANALYSIS AND SPECIFICATION 9

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

UNIT-III SOFTWARE DESIGN 9

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

UNIT-IV TESTING AND MAINTENANCE 9

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

UNIT-V PROJECT MANAGEMENT 9

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

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

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

TEXT BOOKS:

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

REFERENCES:

1. Pankaj Jalote, Software Engineering, A Precise Approach, Wiley India, 2010.
2. Rajib Mall, Fundamentals of Software Engineering, Third Edition, HI Learning Private Limited, 2009.
3. Kelkar S.A., "Software Engineering", Prentice Hall of India Pvt Ltd, 2007.
4. Stephen R.Schach, "Software Engineering", Tata McGraw-Hill Publishing Company Limited,2007.
5.

WEB REFERENCES:

1. www.nptel.ac.in
2. www.brainkart.com

CO-PO MAPPINGS:

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

JGE1309	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) - ThirumalaiNayakar 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 beats - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT-IV AGRICULTURE AND IRRIGATION TECHNOLOGY 3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu 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 : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தம◌ிழகவரலொறு – மக◌்களும◌் பண◌் லபொடும◌் – கக.கக. ப◌ிள◌்ளள
(தவளியீட◌ு: தம◌ிழ◌்ல)ொடு லபொடநூ◌ூ6◌் மற◌்றும◌்
2. க6◌் வியிய6◌் பணிகள்கழகம◌்).
3. கணினித்தமிழ் – முளனவரஇ6. சு)◌்தரம◌். (விகடன் பிரசுரம◌்).
4. கீழடி – ளவளக)திக◌்களரயி6◌் சங◌் கலகா6) கரல)ொகரிகம◌் (தலதொ6◌் லிய6◌் Fளறதவளியீட◌ு)
5.தலபொர◌ூள)–ஆற◌் றங◌் களரல)ொகரிகம◌். (தலதொ6◌் லிய6◌் Fளறதவளியீட◌ு)
6. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
7. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
8. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
9. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
10. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly published by: 53 Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
11. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
12. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
13. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL)

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

COURSE OBJECTIVES

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

UNIT-I SOFTSKILLS AND APTITUDE-I **9**

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

UNIT-II SOFTSKILLS AND APTITUDE–II **9**

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

UNIT-III QUANTITATIVE APTITUDE **9**

Number system–Divisibility Rule–Simplification– Surds and Indices–Square root and Cube root–Averages– Percentage

UNIT-IV LOGICAL REASONING **9**

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

UNIT-V TECHNICAL APTITUDE IN C-I **9**

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

TOTAL: 30 PERIODS

COURSE OUTCOMES

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

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

TEXTBOOKS

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

WEB REFERENCES

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

6. https://www.youtube.com›watch/selfconfidence
7. https://www.youtube.com› watch/motivation

Mapping of CO with PO/PSO

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

JCB1311	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 appropriated at a structures for various applications
- To execute different operations of search trees
- To implement various sorting and searching algorithms
- To implement hashing techniques

LIST OF PROGRAMS

Implement the following programs

1. List ADT using Python with insert, delete, search and modify operations
2. Implement recursive algorithm in python.
3. Implementation of Singly linked list.
4. a. Stack ADT using arrays
   b. Stack ADT using linked list
5. a. Queue ADT using arrays
   b. Queue ADT using linked list
6. Infix to Post fix conversion
7. Binary Search Trees and Tree traversals
8. AVL Trees
9. Implement graph traversal techniques BFS and DFS.

10. Implementation of Minimum spanning tree using Prims algorithm
11. Bubble sort, Selection sort, Insertion sort using Python
12. Linear search and Binary search using Python
13. Hashing-Linear Probing and Quadratic Probing

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the lab 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 sin C&C++", 5th Revised & Updated Edition, BPB Publications,2018.
2. Rance D.Necaise, "Data Structures and Algorithms Using Python", Wiley Publications, 2010.

WEB REFERENCES:

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

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

SOFTWARE: Ubuntu C / Python 3

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

CO-PO MAPPINGS:

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

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

COURSE OBJECTIVES

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

LIST OF PROGRAMS

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, Save point 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 or two of the following systems
    a) Student database system
    b) Inventory Control System
    c) Online Library Management
    d) Hospital Management System
    e) Railway Reservation System
    f) Personal Information System
    g) Online Course registration and maintenance System
    h) Attendance Management System
    i) Hotel Management System
    j) E-commerce portal
    k) Online auction system

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

HARDWARE:

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

SOFTWARE:

Front end: Python / Visual Studio or Equivalent
Back end: Oracle / MS SQL Server / MySQL / DB2 or Equivalent

TEXTBOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Seventh Edition, Tata McGraw Hill, 2020.
2. RamezElmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Sixth Edition, Pearson Education, 2015.

WEB SITE REFERENCE:

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

CO-PO MAPPINGS:

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

SEMESTER IV

JMA1405	APPLIED PROBABILITY AND STATISTICS	L	T	P	C
		2	2	0	3

COURSE OBJECTIVES

- To provide basic concepts of discrete, continuous random variables and standard distributions.
- To introduce two dimensional random variables, correlation and regression.
- To acquaint students with statistical testing of hypothesis and its applications.
- To develop the ability to apply the concepts of Estimation Theory and Correlation & Regression in problems.

UNIT-I ONE DIMENSIONAL RANDOM VARIABLES 12

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

UNIT-II TWO DIMENSIONAL RANDOM VARIABLES 12

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

UNIT-III TESTING OF HYPOTHESIS 12

Statistical hypothesis – Large sample tests based on Normal distribution for single mean, difference of means and proportions – Small sample tests based on t, Chi-square and F distributions for mean and variance – Goodness of fit – Independence of attributes.

UNIT-IV ESTIMATION THEORY 12

Estimators: Un-biasedness, Consistency, Efficiency and Sufficiency – Maximum Likelihood Estimation – Method of moments – Curve fitting by principle of least squares.

UNIT V CORRELATION AND REGRESSION 12

Multiple and Partial Correlation – Method of Least Squares – Plane of Regression – Properties of Residuals – Coefficient of multiple correlation – Coefficient of partial correlation – Multiple correlation with total and partial correlations – Regression and Partial correlations in terms of lower order coefficient

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able

- To understand random variables and use standard distributions in solving real Time problems.
- To use joint density functions to perform correlation and regression analysis.
- To apply hypothesis testing for making statistical inferences in large and small sample real life problems.
- To use theory of estimation in practical applications and problem solving.
- To understand methods of finding correlation values between variables and use regression analysis for predicting values of variables

TEXT BOOKS:

1. Ibe, O.C.,"Fundamentals of Applied Probability and Random Processes", 1st Indian Reprint, Elsevier, 2007.
2. Gupta.S.C., and Kapoor, V.K., "Fundamentals of Mathematical Statistics", Sultan Chand and Sons, Eleventh Edition,2002
3. R.A.Johnson and C.B.Gupta, "Miller & Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 7th Edition,2007

REFERENCES:

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

WEB REFERENCES:

1. https://nptel.ac.in/courses/111104032/
2. https://nptel.ac.in/courses/103106120/
3. https://nptel.ac.in/courses/117103067/
4. https://nptel.ac.in/courses/108106179/
5. https://nptel.ac.in/courses/111104098/

CO-PO MAPPINGS:

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

JCB1401	DATA COMMUNICATION AND NETWORKS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To study the fundamentals of networking.
- To acquire basic knowledge on data transmission procedures and media.
- To understand error detection and flow control mechanisms.
- To learn about routing and addressing algorithms and protocols.
- To explore transmission control and application layer protocols.

UNIT I INTRODUCTION TO DATA COMMUNICATION 9

Data Communication - Networks - Network Types - The OSI Model - Layers in the OSI Model - TCP/IP Protocol Suite - Data Transmission - Analog Transmission – Digital Transmission - Transmission impairment - Wired LANs: Ethernet.

UNIT II PHYSICAL LAYER 9

Introduction - Physical Layer - Digital data - digital signals - Analog data - Analog signals - Synchronous and Asynchronous transfer - Multiplexing - Frequency division multiplexing- Time division multiplexing - Transmission media - Twisted Pair - Coaxial cable - Optical Fibers - Wireless transmission – Microwaves - Radio waves - Infrared.

UNIT III DATA LINK LAYER 9

Introduction - Link Layer Addressing – Framing - Flow Control - Error Control - Error Detection and Correction - Stop and Wait Protocols - Sliding Window Protocols – HDLC - Media Access Control (MAC) - Random Access - Controlled Access.

UNIT IV NETWORK LAYER 9

Network Layer Services - Packet switching - Performance - IPV4 Addresses - Network Layer Protocols: IP, ICMP v4 - Unicast Routing Algorithms - Protocols - Multicasting Basics - Congestion Control Algorithms.

UNIT V TRANSPORT LAYER AND APPLICATION LAYER 9

Transport Layer Protocols - Services - Port Numbers - User Datagram Protocol - Transmission Control Protocol - DNS - Email -WWW and HTTP.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- Understand the concept of computer networks and data transmission.
- Understand different schemes used for data transmission.
- Apply error detection and flow control techniques.
- Implement different addressing and routing algorithms.
- Understand about transport layer and application layer protocols.

TEXT BOOKS:

1. Behrouz Forouzan, “Data Communications and Networking”, Edition 5, Tata McGraw-Hill., 2017.
2. Andrews S. Tanenbaum, David J Wetherall, “Computer Networks”, Edition 5, Pearson Education, 2012.

REFERENCES:

1. William Stallings, “Data & Computer Communications”, PHI, Edition 6, 2012.
2. Achyut S Godbole- and AtulKahate, “Data Communications and Networks”, 2nd edition - Tata McGraw-Hill, 2017.
3. James F. Kurose & Keith W. Ross , “Computer Networking”, PEARSON, 6th edition, 2017.
4. Michael A. Gallo & William M. Hancock, “Computer Communications and Networking Technologies”, BROOKS & COLE, 2001.

WEB REFERENCES:

- https://www.tutorialspoint.com/data_communication_computer_network/data_communication_computer_network_tutorial.pdf
- https://www.sciencedirect.com/topics/computer-science/data-communication-network
- https://www.citethisforme.com/topicideas/technology/data%20communication%20and%20networking%20references-39792182
- https://link.springer.com/book/10.1007/978-1-4020-7870-5
- https://www.iitg.ac.in/eee/syllabusdetails.php?slno=WEo0emtEZHM2U0VmTkR5MXgwNU5oUT09

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	1	2	3	-	-	-	2	1	2	3	-	1
CO2	2	2	1	1	1	1	-	-	-	2	2	2	3	-	2
CO3	2	1	2	1	1	2	-	-	-	2	1	2	3	-	3
CO4	2	3	2	2	2	1	-	-	-	2	2	2	2	2	3
CO5	2	2	3	2	2	3	-	-	-	1	2	2	2	2	3
AVG	2	2	2	1	2	2	-	-	-	2	2	2	2.6	2	2.4

JCS1402	OPERATING SYSTEMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

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

UNIT-I OPERATING SYSTEM OVERVIEW 9

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

UNIT-II PROCESS MANAGEMENT 9

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

UNIT-III MEMORY MANAGEMENT AND FILE SYSTEMS 9

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

UNIT-IV FILE SYSTEM AND I/O SYSTEMS 9

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

UNIT-V CASE STUDY 9

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

OS Layer-File System.

TOTAL: 45 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.
- Understand memory management and storage management techniques.
- Analyze the File System Interface, Directory Structure and I/O systems.
- Understand and illustrate different aspects of various operating systems.

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", John Wiley & Sons, Inc., 10th Edition, 2021.
2. William Stallings, "Operating Systems–Internals and Design Principles", 7th Edition, Prentice Hall, 2018.

REFERENCES:

1. GerardusBlokdyk, Security Focused Operating System a Complete Guide - 2020 Edition, 5STARCooks, ISBN: 9781867373353, 2020.
2. William Stallings, "Operating Systems – Internals and Design Principles", 9th Edition, Pearson, 2017.
3. AndrewS.Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2014.

WEB REFERENCES:

- http://ebooks.lpude.in/computer_application/bca/term_1/DCAP103_PRINCIPLES_OF_OPERATING_SYSTEMS.pdf
- https://ppdb.jombangkab.go.id/pdf/record/Principles%20Of%20Modern%20Operating%20Systems.pdf?sitesec=reviews&isAllowed=y
- https://ppdb.jombangkab.go.id/pdf/record/Principles%20Of%20Modern%20Operating%20Systems.pdf?sitesec=reviews&isAllowed=y
- https://repository.dinus.ac.id/docs/ajar/Operating_System.pdf
- https://books.google.com/books/about/Operating_Systems_Principles_And_Design.html?id=DZxNHyVcqIC

CO-PO MAPPINGS:

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

JCB1403	CRYPTOGRAPHY AND CRYPTANALYSIS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To study about the fundamentals of Cryptography
- To analyze Key Management techniques and importance of number Theory
- To understand the concept of Message Authentication Codes and Hash Functions
- To design a security solution for a given application
- To understand about cyber crimes and the different security practice.

UNIT-I INTRODUCTION TO CRYPTOGRAPHY 9

Number theory – Algebraic Structures – Modular Arithmetic - Euclid's algorithm – Congruence and matrices – Group, Rings, Fields, Finite Fields-Symmetric Key Ciphers- SDES – Block Ciphers – DES – Strength of DES – Differential and linear cryptanalysis – Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – Pseudorandom Number Generators – RC4 – Key distribution.

UNIT-II ASYMMETRIC CRYPTOGRAPHY 9

Primes – 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 – Key management – Diffie Hellman key exchange – Elliptic curve arithmetic – Elliptic curve cryptography.

UNIT-III MESSAGE AUTHENTICATION AND HASH FUNCTION 9

Authentication Requirements - Authentication Function- Message Authentication Codes - Hash Functions - Security of Hash Functions and MACs- Secure Hash Algorithm - Whirlpool, HMAC, CMAC -Digital Signatures - Authentication Protocol - Digital Signature Standard- Authentication Applications- Kerberos -X.509 Authentication Service - Public-key infrastructure

UNIT-IV FIREWALLS AND CRYPTANALYSIS 9

Intruder – Intrusion detection system -Password Management-Virus and related threats- Countermeasures- Firewall design principles- Trusted systems -Practical implementation of cryptography and security

UNIT-V CYBER CRIMES AND SECURITY 9

Cyber Crime and Information Security – classifications of Cyber Crimes – Tools and Methods – Password Cracking, Keyloggers, Spywares, SQL Injection – Network Access Control – Cloud Security – Web Security – Wireless Security

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- Understand the fundamentals of networks security
- Demonstrate the different cryptographic operations of symmetric cryptographic algorithms
- Develop the different cryptographic operations of public key cryptography.
- Explain the various Authentication schemes to simulate different applications.
- Understand various cyber-crimes and cyber security.

TEXT BOOKS:

1. Forouzan Mukhopadhyay "Cryptography and Network Security" McGraw Hill, 2nd Edition
2. William Stallings, "Cryptography and Network Security - Principles and Practice", Seventh Edition, Pearson Education, 2017.
3. Nina Godbole, Sunit Belapure, "Cyber Security: Understanding Cyber-crimes, Computer Forensics and Legal Perspectives", First Edition, Wiley India, 2011.

REFERENCES:

1. Behrouz A. Forouzan, DebdeepMukhopadhyay, "Cryptography and Network Security", 3rd Edition, Tata McGraw Hill, 2015.
2. Charles Pfleeger, Shari Pfleeger, Jonathan Margulies, "Security in Computing", Fifth Edition, Prentice Hall, New Delhi, 2015.

WEB REFERENCES:

- https://www.w3.org/TR/WebCryptoAPI/
- https://ukdiss.com/examples/web-based-crypto-analysis-learning-application.php
- https://developer.mozilla.org/en-US/docs/Web/API/Web_Crypto_API
- https://www.garykessler.net/library/crypto.html
- https://www.cryptomathic.com/news-events/blog/summary-of-cryptographic-algorithms-according-to-nist

CO-PO MAPPINGS:

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

JCB1402	FOUNDATION OF CYBER SECURITY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To understand the difference between threat, risk, attack, and vulnerability.
- To learn about security in operating system and networks.
- To analyze the different security available in databases.
- To understand the concept of privacy and security in emerging technologies.
- To learn about management and risks in different technologies.

UNIT-I INTRODUCTION TO CYBER SECURITY 9

Introduction -Computer Security - Threats -Harm - Vulnerabilities - Controls - Authentication -Access Control and Cryptography –Web-User Side - Browser Attacks - Web Attacks Targeting Users - Obtaining User or Website Data - Email Attacks

UNIT-II SECURITY IN OPERATING SYSTEM & NETWORKS 9

Security in Operating Systems - Security in the Design of Operating Systems – Root kit - Network security attack- Threats to Network Communications - Wireless Network Security - Denial of Service - Distributed Denial-of-Service.

UNIT-III DEFENCES SECURITY COUNTER MEASURES 9

Cryptography in Network Security - Firewalls - Intrusion Detection and Prevention Systems - Network Management - Databases - Security Requirements of Databases - Reliability and Integrity - Database Disclosure - Data Mining and Big Data.

UNIT-IV PRIVACY IN CYBERSPACE 9

Privacy concepts –privacy principles and policies -authentication and privacy-Data mining – privacy on the Web - email Security - privacy Impacts of Emerging Technologies - where the Field Is Headed.

UNIT-V MANAGEMENT AND INCIDENTS 9

Security Planning - Business Continuity Planning - Handling Incidents - Risk Analysis - Dealing with Disaster - Emerging Technologies - The Internet of Things - Economics - Electronic Voting - Cyber Warfare- Cyberspace and the Law - International Laws - Cyber crime - Cyber Warfare and Home Land Security.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- Classify various types of attacks and learn the tools to launch the attacks
- Apply various tools to perform information gathering
- Analyze intrusion techniques to detect intrusion
- Apply intrusion prevention techniques to prevent intrusion
- Explain the basics of cyber security, cyber crime and cyber law

TEXT BOOKS:

1. Charles P. Pfleeger Shari Lawrence Pfleeger Jonathan Margulies, Security in Computing, 5th Edition, Pearson Education, 2015.
2. David Kim & Michael G. Solomon, "FOUNDATIONS" and Custom Edition 1 Jan 1, 2014.

REFERENCES:

1. George K.Kostopoulous, Cyber Space and Cyber Security, CRC Press, 2013.
2. MarttiLehto, PekkaNeittaanmäki, Cyber Security: Analytics, Technology and Automation edited, Springer International Publishing Switzerland 2015
3. Nelson Phillips and EnfingerSteuart, ―Computer Forensics and Investigations‖, Cengage Learning, New Delhi, 2009.

WEB REFERENCES:

- https://onlinecourses.nptel.ac.in/noc23_cs62/preview
- https://onlinecourses.nptel.ac.in/noc23_cs44/preview
- https://www.javatpoint.com/cyber-security-tutorial
- https://www.edureka.co/blog/cybersecurity-fundamentals-introduction-to-cybersecurity/
- https://cnitarot.github.io/courses/fc_Fall_2022/2550_intro_history_pub_cnr.pdf

CO-PO MAPPINGS:

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

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

COURSE OBJECTIVES

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

UNIT-I SOFT SKILLS AND APTITUDE-III **5**

Communication – on Specific topics – 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 – Concept of Goal setting –Importance of Goals– Dream vs Goal – Reasons for failure of Goals– SMART

UNIT-III QUANTITATIVE APTITUDE **6**

Ratio and Proportions – Allegations and Mixtures – Problem on Ages – Profit and Loss and Discount

UNIT-IV LOGICALREASONING **6**

Odd man out series–Blood Relation–Seating Arrangement–Number Ranking

UNIT-V TECHNICAL APTITUDE IN C-II **8**

Strings - Storage Classes – Pointers – Preprocessor directives - Structures – Union, Type def Input/Output FileI/O-HeaderFiles–Typecasting–Errorhandling–CommandLineArguments Variable Arguments– Memory Management - Bitwise operators

TOTAL: 30 PERIODS

COURSE OUTCOMES

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

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

TEXT BOOKS:

1. Dr.R.S.Aggarwal, “Quantitative Aptitude”, S.Chand Publishing, 2020.
2. Dr.R.S.Aggarwal, “A Modern 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. PradipDey, Manas Ghosh, “Fundamentals of Computing and Programming in C”, First Edition, Oxford University Press, 2009.
5. Yashavant P. Kanetkar. “LetUsC”,BPBPublications,2011

WEBSITE LINKS

- https://www.indiabix.com/aptitude/questions-and-answers/
- https://m4maths.com/placement-puzzles.php
- www.freshersworld.com/
- https://www.youtube.com›watch>problem son ages

- https://www.youtube.com›watch>blood relation
- https://www.youtube.com›watch>content
- https://www.youtube.com›watch>SMART
- https://www.youtube.com›watch>strings in C

CO-PO MAPPINGS:

CO's	PO's											
	1	2	3	4	5	6	7	8	9	10	11	12
1	-	2	3	2	-	-	1	3	2	1	-	-
2	-	2	3	2	-	-	1	3	2	1	-	-
3	-	2	3	2	-	-	1	3	2	1	-	-
4	-	2	3	2	-	-	1	3	2	1	-	-
5	-	2	3	2	-	-	1	3	2	1	-	-

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

COURSE OBJECTIVES

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

PRACTICAL EXERCISES

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

15. Implementation of the following File Allocation Strategies
    a) Sequential b)Indexed c)Linked

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

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

TEXT BOOKS

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

WEB REFERENCES:

- https://www.tutorialspoint.com/operating_system/os_overview.htm
- https://dextutor.com/courses/operating-system-programs/
- https://profile.iiita.ac.in/bibhas.ghoshal/teaching_os_lab.html
- https://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems/13_IOSystems.html
- https://inst.eecs.berkeley.edu/~eecsba1/sp97/reports/eecsba1a/index-os.html

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

SOFTWARE: C / C++ / Java or equivalent compiler

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

CO-PO MAPPINGS:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12
CO-1	3	-	1	-	-	-	-	-	-	-	-	2
CO-2	2	3	3	2	-	-	-	-	-	-	-	2
CO-3	3	1	1	3	-	-	-	-	-	-	-	-
CO-4	2	3	2	3	-	-	-	-	-	-	-	2
CO-5	-	3	3	2	-	-	-	-	-	-	-	2
Avg	2	2	2	2	-	-	-	-	-	-	-	-

JCB1413	CRYPTOGRAPHY AND CRYPTANALYSIS LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES

- To learn different cipher techniques.
- To implement the algorithms DES, AES, RSA and Diffie-Hellman.
- To implement hashing techniques such as SHA-1, MD-5.
- To develop a digital signature scheme.

PRACTICAL EXERCISES

1. Write a program to implement the following cipher techniques to perform encryptionand decryption
    i. Caesar Cipher
    ii. Play fair Cipher
    iii. Hill Cipher
2. Write a program to implement the Rail fence transposition techniques
3. Write a program to implement DES algorithm
4. Write a program to implement AES algorithm
5. Write a program to implement RSA Encryption algorithm
6. Write a program to implement the Diffie-Hellman Key Exchange mechanism.Consider one of the parties as Alice and the other party as bob.
7. Write a program to calculate the message digest of a text using the SHA-1 algorithm.
8. Write a program to calculate the message digest of a text using the MD-5 algorithm.
9. Write a program to implement digital signature standard.
10. Demonstrate Intrusion Detection System(IDS) using any Software tool

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- Understand and develop a code for classical encryption techniques.
- Develop symmetric and asymmetric algorithms.
- Design code for various Authentication schemes.
- Implement the principles of digital signature.
- Demonstrate the network security system using open source tools.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

SOFTWARE: C / C++ / Java or equivalent compiler

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

WEB REFERENCES:

- https://www.nist.gov/nvlap/cryptographic-and-security-testing-lap
- https://ppdb.jombangkab.go.id/pdf/record/Cryptography-and-network-security-lab-programs-in-java.pdf?sid=googleScholar&editionsView=true
- https://www.investopedia.com/news/cryptographic-hash-functions/
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8594793/

CO-PO MAPPINGS:

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