K.L.N. COLLEGE OF ENGINEERING

Pottapalayam, Sivagangai District

(An Autonomous Institution, Affiliated to Anna University, Chennai)

Estd: 1994

FIRST AND SECOND YEAR

CURRICULA AND SYLLABI

REGULATIONS 2020

For Under Graduate Program

B.E. – COMPUTER SCIENCE AND ENGINEERING

(CYBER SECURITY)

CHOICE BASED CREDIT SYSTEM

(For the students admitted during the academic year 2023-2024)

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM

(An Autonomous Institution, Affiliated to Anna University, Chennai)

VISION OF THE INSTITUTION

To become a Centre of Excellence in Technical Education and Research in producing Competent and Ethical professionals to the society.

MISSION OF THE INSTITUTION

To impart Value and Need based curriculum to the students with enriched skill development in the field of Engineering, Technology, Management and Entrepreneurship and to nurture their character with social concern and to pursue their career in the areas of Research and Industry.

VISION OF THE DEPARTMENT

To develop competent professionals specialized in the field of cyber security through Quality education and research.

MISSION OF THE DEPARTMENT

To produce skilled cyber security professionals by leveraging technological advancements and research initiatives in collaboration with industry and society by inculcating innovative technical education and ethical principles.

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM

(An Autonomous Institution, Affiliated to Anna University, Chennai)

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO I To Contribute effectively to the society by applying principles of Cyber security for analyzing the real world problems to produce optimal and sustainable technical solutions

PEO II To adapt an ever changing technologies by applying Engineering Principles

PEO III To build professionalism, team work, effective communication, ethical values and leadership qualities

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1 To develop data, resource and asset protection strategies for organizations, processes and peoples through cyber security-centric skills

PSO2 To apply computer knowledge continuously in the areas of networking, cryptography and web development to meet the industry requirements

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM

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PROGRAM OUTCOMES

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

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

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

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

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

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

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

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

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

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

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

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

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM

(An Autonomous Institution, Affiliated to Anna University, Chennai)

REGULATIONS 2020

For Under Graduate Program

B.E. – COMPUTER SCIENCE AND ENGINEERING – CYBER SECURITY

CHOICE BASED CREDIT SYSTEM

CATEGORY OF COURSES

i. **Humanities and Social Sciences (HS) Courses** include Technical English, Environmental Science and Engineering, Engineering Ethics and human values, Communication Skills and Management courses.

ii. **Basic Sciences (BS) Courses** include Mathematics, Physics, and Chemistry.

iii. **Engineering Sciences (ES) Courses** include Engineering Practices, Engineering Graphics, Basics of Electrical / Electronics / Mechanical / Computer Engineering / Instrumentation etc.

iv. **Professional Core (PC)Courses** include the core courses relevant to the chosen programme of study.

v. **Professional Elective (PE)Courses** include the elective courses relevant to the chosen programme of study.

vi. **Open Elective (OE) Courses** include courses from other departments which a student can choose from the list specified in the curriculum of the students B.E. / B.Tech. Programmes.

vii. **Employability Enhancement Courses (EEC)** includes Project Work and/or Internship, Seminar, Professional Practices, Case Study and Industrial/Practical Training.

viii. **Mandatory (MC) Courses** include Personality and Character development and the courses recommended by the regulatory bodies such as AICTE, UGC, etc

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM – 630 612

(An Autonomous Institution, Affiliated to Anna University, Chennai)

B.E. COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)

REGULATIONS – 2020

CHOICE BASED CREDIT SYSTEM

I TO IV SEMESTERS

SEMESTER I

(Common to all B.E/ B.Tech Programmes)

S. NO	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
	THEORY							
1	20HS101	English for Technical Communication	HS	3	3	0	0	3
2	20BS101	Fundamentals of Engineering Mathematics	BS	4	3	1	0	4
3	20BS102	Engineering Physics	BS	3	3	0	0	3
4	20BS103	Engineering Chemistry	BS	3	3	0	0	3
5	20GE101	Problem Solving using Python Programming	ES	3	3	0	0	3
6	20HST01	தமிழர் மரபு /Heritage of Tamils	HS	1	1	0	0	1#
	PRACTICAL							
7	20BS1L1	Basic Science Laboratory	BS	3	0	0	3	1.5
8	20GE1L1	Python Programming Laboratory	ES	4	0	0	4	2
9	20GE1L2	Industrial Practices Workshop	ES	3	0	0	3	1.5
TOTAL				**27**	**16**	**1**	**10**	**21**

SEMESTER II

S. NO	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
	THEORY							
1	20HS201	Advanced Technical Communication **(Common to all B.E / B. Tech programmes)**	HS	3	3	0	0	3
2	20BS201	Laplace Transform and Advanced Calculus **(Common to all B.E / B. Tech programmes)**	BS	4	3	1	0	4
3	20BS204	Physics for Information Science **(Common to B.E CSE, B.Tech IT & B.E CSE (CS) programmes)**	BS	3	3	0	0	3
4	20GE205	Basic Electrical and Electronics Engineering	ES@	3	3	0	0	3
5	20CS201	Programming in C **(Common to B.E EEE, B.E. CSE, B.Tech IT , B.Tech. AIDS& B.E CSE (CS) programmes)**	PC	3	3	0	0	3
6	20GE206	Engineering Graphics **(Common to all B.E / B. Tech programmes)**	ES	3	3	0	0	3
7	20HST02	தமிழரும்தொழில்நுட்பமும் /Tamils and Technology **(Common to all B.E./B.Tech programmes)**	HS	1	1	0	0	1#
	PRACTICAL							
8	20HS2L2	Professional Communication Laboratory **(Common to B.E. CSE, B.Tech IT , AIDS & B.E CSE (CS) programmes)**	HS	4	0	0	4	2
9	20CS2L1	C Programming Laboratory **(Common to B.E EEE, B.E. CSE, B.Tech IT , B.Tech. AIDS& B.E CSE (CS) programmes)**	PC	4	0	0	4	2
TOTAL				**28**	**19**	**1**	**8**	**23**

 # Credit assigned will not be taken into account for GPA calculations

@ Common to B.E CSE, B.Tech IT , B.Tech AIDS & B.E CSE (CS) Programme

SEMESTER III

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	20BS305	Discrete Maths and Linear Algebra	BS	4	3	1	0	4
2	20CS301	Digital Principles and System Design	ES#	4	3	1	0	4
3	20CS302	Data Structures and Algorithms	PC@	3	3	0	0	3
4	20IT301	Object Oriented Programming	PC	3	3	0	0	3
5	20SC301	Introduction to Cyber Security	PC	3	3	0	0	3
6	20HS301	Universal Human Values **(Common to all B.E./B.Tech programmes)**	HS	3	2	1	0	3
PRACTICAL								
7	20CS3L1	Digital Systems Laboratory	ES@	4	0	0	4	2
8	20CS3L2	Data Structures and Algorithms Laboratory	PC@	4	0	0	4	2
9	20CS3L3	Object Oriented Programming Laboratory	PC#	4	0	0	4	2
TOTAL				**32**	**17**	**3**	**12**	**26**

SEMESTER IV

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	20BS405	Number Theory, Probability and Statistics	BS	4	3	1	0	4
2	20CS401	Computer Organization and Architecture	PC#	3	3	0	0	3
3	20CS501	Computer Networks	PC	3	3	0	0	3
4	20CS403	Design and Analysis of Parallel Algorithms **(Common to B.E CSE & B.E.CSE(CS) programmes)**	PC	3	3	0	0	3
5	20HS401	Environmental Science and Engineering **(Common to all B.E./B.Tech programmes)**	HS	2	2	0	0	2
THEORY CUM PRACTICAL								
6	20SC401	Linux Operating Systems	PC	5	3	0	2	4
PRACTICAL								
7	20CS5L1	Networks Laboratory **(Common to B.Tech IT programmes)**	PC	4	0	0	4	2
TOTAL				**24**	**17**	**1**	**6**	**21**

 # Common to B.E.CSE, B.Tech IT & B.E CSE (CS) programmes

@ Common to B.E CSE, B.Tech IT , B.Tech AIDS & B.E CSE (CS) Programme

20HS101 ENGLISH FOR TECHNICAL COMMUNICATION

L	T	P	C
3	0	0	3

OBJECTIVES:

- This course is designed for entry level Engineering and Technology curriculum enabling the students to learn, acquire and apply for their learning and career.
- The course is aimed at providing effective skills for promoting communication skills through English.
- Students will benefit in conversing with the peers, faculty and fellow professionals.
- The outcome of this course contains refined level of English proficiency by acquiring all four skills, listening, speaking, reading and writing to prepare them for global readiness.

PRE-REQUISITE: NIL

UNIT - I FOCUSING LANGUAGE DEVELOPMENT 9

Listening: Listening to TV News, Guest Lecturers, Note – taking. **Speaking**: Pronunciation Common Vocabulary – Technical Vocabulary – Answering Peer Questions – Conversation with Teacher. **Reading**: News magazines, Reading for unfamiliar words, Variety of News Items **Writing**: Word formation – Auxiliary verbs – Modal Verbs – Sentence Types – Affirmative, Negative, Interrogative, Concord – Dialogue Writing, Letter to Principal / Director – Instructions using Auxiliary

UNIT - II GRAMMAR AND TECHNICAL READING 9

Listening: Listening to Peer Conversations – Brief Speeches – Listening for Specific Information – Recap of Speeches. **Speaking**: Wh Questions, Day today conversations, Telephonic enquiries official/formal enquiries. **Reading**: Technical Essays – Identifying Sentence Types – Classifying the verb patterns. **Writing**: Tenses – Simple Present, Present Progressive, Present Perfect, Present Perfect Continuous – Voice – Active & Passive – Précis Writing – Essay Writing

UNIT - III GRAMMAR AND LANGUAGE DEVELOPMENT 9

Listening: TV interviews, Commentaries, Digital Videos for World Information. **Speaking**: Telephonic Conversation – Classroom Activities – Conversing Information. **Reading**: Coherence, Development of Thoughts. **Writing**: Tenses – Simple Past, Past Progressive, Past Perfect, Past perfect continuous – Impersonal Passive-Narrating the past events, Letter to friend/father about Industrial Visit/Functions held – Narrating the past experience using Impersonal Passive voice

UNIT - IV READING AND LANGUAGE DEVELOPMENT 9

Listening: Listening to Dialects of English – British & American Regional. **Speaking**: Role Plays, Extempore, Responding to specific questions. **Reading**: Comprehensive passages, Reading for specific points. **Writing**: Tenses – Simple Future, Future progressive, Future Perfect, Future Perfect continuous – Definition – Phrases of Reason – Cause & Effect, Recommendations, Argumentative Essays, Letter to the Editor on Social Issues – Analytical Essays on Social hazards using Cause and Effect.

UNIT - V EXTENDED WRITING 9

Listening: Listening to Technical Seminar speeches – Listening to achievers, eminent personalities – Dialects – Australian – African – Asian. **Speaking**: Welcome address, Compeering, Vote of Thanks, Peer debates. **Reading**: Texts on self-confidence, motivation, success path. **Writing**: Contracted forms, Conditionals, Articles, Preposition, Tense – 'going to' - Error Spotting, Sequence Words – Rearranging – Writing a Book Review – Summary writing – Rearranging Sentences using Sequence Words, Note Making

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Board of Editors. Using English "A Course book for Undergraduate Engineers and Technologists". Orient Black Swan Limited, Hyderabad, 2015
2. Richards, C. Jack. "Interchange Students' Book-2" New Delhi: CUP, 2015

REFERENCES:

1. Murphy, "Raymond English Grammar in Use with Answers: Reference and Practice for Intermediate Students", Cambridge: CUP, 2004
2. Thomson, A.J. and Martinet, A.V. A Practical English Grammar, OUP, New Delhi: 1986
   Anne Laws, "Writing Skills", Orient Black Swan, Hyderabad, 2011
3. Board of Editor, "English for Technical Communication", Great Mind Publication, Chennai, 2018

20BS101 FUNDAMENTALS OF ENGINEERING MATHEMATICS

L	T	P	C
3	1	0	4

OBJECTIVES:

- To relate various methods of Matrix Algebra to handle practical problems arising in the field of engineering.
- The main aim of this course is to achieve conceptual understanding and to retain the best traditions of Calculus.
- The syllabus is designed to provide the basic tools of Calculus of Single and Multivariable, mainly for the purpose of modeling the engineering problems mathematically and obtaining solutions.

PRE-REQUISITE: NIL

UNIT - I MATRICES **12**

Introduction to Matrices-Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley-Hamilton Theorem – Diagonalization of matrices – Reduction of a Quadratic form to Canonical form by Orthogonal transformation – Nature of Quadratic forms.

UNIT - II DIFFERENTIAL CALCULUS **12**

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Differentiation of Polynomials, Exponential, Trigonometric, Hyperbolic, Logarithmic and Implicit functions- Maxima and Minima of functions of single variable.

UNIT – III FUNCTIONS OF SEVERAL VARIABLES **12**

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Maxima and Minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT – IV INTEGRAL CALCULUS **12**

Definite and Indefinite integrals - Substitution rule - Techniques of integration - Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions, Improper integrals.

UNIT – V ORDINARY DIFFERENTIAL EQUATIONS **12**

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

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2017.
2. T. Veerarajan., "Engineering Mathematics I", The Tata Mc Graw Hill Publication-New Delhi, First Edition, 2018

REFERENCES:

1. James Stewart, "Calculus, Early Transcendental", Cengage Learning, 7th Edition, New Delhi, 2015. [For units II & III].
2. 2. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 9th Edition, New Delhi, 2006.
3. Wiley, "Calculus- International Student version", 10th Edition, Wiley India Pvt. Ltd, New Delhi 2017.
4. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition , 2016.
5. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics II", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 9th Edition, 2014.

20BS102	ENGINEERING PHYSICS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To inculcate the fundamental knowledge in properties of matter and crystal physics.
- To enrich the knowledge on Laser, fiber optics and ultrasonics and their applications relevant to various streams of Engineering and Technology.
- To introduce quantum physics and its applications

PRE-REQUISITE: NIL

UNIT - I PROPERTIES OF MATTER **9**

Elasticity – Hooke's Law – Stress-strain diagram and its uses – Three modulus of elasticity (qualitative) – Poisson's ratio – factors affecting elastic modulus and tensile strength – twisting couple – torsional pendulum: theory and experiment – bending of beams – bending moment – cantilever: theory and experiment – uniform and non-uniform bending: theory and experiment – **I** - shaped girders.

UNIT - II LASER AND FIBER OPTICS **9**

Lasers: Interaction of radiation with atomic energy states – Einstein's A and B coefficients derivation – Population inversion – resonant cavity, optical amplification (qualitative) – solid state lasers – Nd:YAG laser, Semiconductor lasers: homojunction and heterojunction – Fiber optics: principle, numerical aperture and acceptance angle – types of optical fibers (material, refractive index, mode) – losses associated with optical fibers – fiber optic sensors: pressure and displacement sensor.

UNIT - III ULTRASONICS **9**

Ultrasonics – classification (qualitative) – properties – generation – magnetostriction and piezoelectric methods – detection of ultrasound – cavitations – velocity measurement – acoustic grating – Industrial applications (Drilling, Welding, Soldering and Cleaning) – SONAR – NDT – Pulse Echo system through Transmission and Reflection modes – A, B and C scan displays - Medical application – sonogram.

UNIT - IV QUANTUM PHYSICS **9**

Black body radiation – Planck's theory (derivation) – Compton effect: theory and experimental verification – wave particle duality – wave function and its physical significance – Schrödinger's wave equation – time independent and time dependent equations – particle in a one-dimensional rigid box – tunneling (qualitative) – scanning tunneling microscope.

UNIT - V CRYSTAL PHYSICS **9**

Crystalline and amorphous materials – unit cell, crystal systems, Bravais lattices, lattice planes - Miller indices – Inter planar spacing in cubic lattice – coordination number and packing factor for SC, BCC, FCC, HCP structures – growth of single crystals: solution and melt growth techniques – Mechanisms of plastic deformation, slip and twinning.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. R. K. Gaur and S. L. Gupta, “Engineering Physics”, Dhanpat Rai Publications, 2012.
2. B. K. Pandey and S. Chaturvedi, “Engineering Physics”, Cengage Learning India, 2018.
3. V.Rajendran, “Engineering Physics”, Tata McGraw Hill Education Private Limited, 2011.

REFERENCES:

1. D.Halliday, R. Resnick and J. Walker, “Principles of Physics”, Wiley publisher, 10th Edition, 2015.
2. R.A.Serway and J.W. Jewett, “Physics for Scientists and Engineers”, Cengage Learning, 2014.
3. P.A.Tipler and G. Mosca, “Physics for Scientists and Engineers with Modern Physics”, W.H.Freeman, 2007.
4. D.K.Bhattacharya and T. Poonam, “Engineering Physics”, Oxford University Press, 2017.

20BS103	ENGINEERING CHEMISTRY	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To make the students, familiar with boiler feed water requirements, related problems and water treatment techniques.
- To learn the principle of electrochemical cell, types of corrosion and its control.
- To develop an understanding of the basic concepts of phase rule and its applications to one and two component systems and appreciate the purpose and significance of alloys.
- To be familiar with different types of fuel and their characteristics and also functioning of energy storage devices.
- To understand the techniques of spectra and chromatography for analytical purpose.

PRE-REQUISITE: NIL

UNIT - I WATER AND ITS TREATMENT 9

Characteristics of water; Hard water, Soft water, difference; Hardness – types of hardness, expression of hardness, units, removal of hardness (boiling, soda lime process), estimation of hardness of water by EDTA method (problems); Boiler feed water – requirements – disadvantages of using hard water in boilers (scale and sludge, priming and foaming, caustic embrittlement, boiler corrosion); Treatment of boiler feed water – internal treatment (carbonate, phosphate, and calgon conditioning) external treatment – ion exchange process, zeolite process**;** Purification of water - reverse osmosis, electro dialysis, Application of nanomaterials in water purification.

UNIT - II ELECTROCHEMISTRY AND CORROSION 9

Electrochemical cell - redox reaction, electrode potential- origin of electrode potential- oxidation potential- reduction potential, - electrochemical series and its significance - Nernst equation (derivation and problems).
Corrosion- causes- factors, electrochemical corrosion (galvanic, differential aeration), corrosion control - material selection and design aspects - electrochemical protection – sacrificial anode method and impressed current cathodic method **–** corrosion inhibitors. Metallic coating – Electroplating – Factors - Electroplating of Copper and Electroless plating of Nickel.

UNIT - III PHASE RULE AND ALLOYS 9

Phase rule - introduction, definition of terms with examples; One component system - water system; Reduced phase rule - two component system, classification, lead-silver system; Alloys – introduction, definition, properties of alloys, significance of alloying; Functions and effects of alloying elements; Heat treatment of steel - annealing, hardening, tempering, carburizing, nitriding; Ferrous alloys- nichrome and stainless steel (18/8); Non-ferrous alloys – brass and bronze.

UNIT - IV FUELS AND BATTERIES 9

Fuels – classification, characteristics; Petrol – characteristics, knocking, octane number; Diesel – characteristics, cetane number; Natural gas (CNG), LPG, Power alcohol, Biodiesel, Gasohol; Combustion of fuels – calorific value, GCV and NCV (Problems),calculation of theoretical air for combustion (Problems), Ignition temperature, explosive range, flue gas analysis (Orsat apparatus); Batteries – primary and secondary batteries, lead-acid battery, lithium ion battery, Fuel cell (hydrogen oxygen fuel cell).

UNIT - V ANALYTICAL TECHNIQUES 9

Spectroscopic techniques – UV-visible(Principle and Instrumentation – Block Diagram only and applications), IR(Principle and Instrumentation – Block Diagram only and applications), ^{1}H NMR ((Principle and Instrumentation – Block Diagram only) – Chromatography – HPLC - Flame photometry – Estimation of sodium by Flame photometry.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. P.C. Jain and Monika Jain, “Engineering Chemistry”, Dhanpat Rai Publishing Company (P) LTD, New Delhi, 2017
2. S.S Dara and S.S Umare, “A Text Book of Engineering Chemistry”, S.Chand & Company Limited, 20th Edition, 2018

REFERENCES:

1. Shashi Chawla, “A Textbook of Engineering Chemistry”, Dhanpat Rai & CO. (PVT) LTD, New Delhi, 2012.
2. B.R. Puri, L.R. Sharma, M.S. Pathania, Vishal, “Principles of Physical Chemistry”, Vishal Publishing Co., Punjab, 47th Edition, 2017.
3. G Palanna, “Engineering Chemistry”, McGraw Hill Education (India) PVT, LTD, Chennai, 2017.
4. Dr. Sunita Rattan, “A Textbook of Engineering Chemistry”, S.K.Kataria & Sons, New Delhi, 2012

20GE101 PROBLEM SOLVING USING PYTHON PROGRAMMING

L	T	P	C
3	0	0	3

OBJECTIVES:

- To know the basics of Computers and algorithmic problem solving
- To understand Python programs with conditional and looping constructs.
- To define Python functions and strings.
- To use Python data structures – lists, tuples, sets and dictionaries.
- To do input/output with files in Python.

PRE-REQUISITE: NIL

UNIT - I COMPUTER FUNDAMENTALS AND PROBLEM SOLVING 9

Introduction to Computer System – Block Diagram of Computer, Types of Memory, I/O Devices, Application Programs, System Programs – Loader, linker, assembler, compiler, interpreter, Programming process – source code to executable code, Problem Solving Strategies – Problem analysis, Algorithms, Flow Charts, Pseudo Code. Illustrative problems: odd or even number, Leap year, Biggest of three numbers, square root of a number, Sum of n numbers, Armstrong number, Palindrome, Fibonacci Series, Prime number, Bubble Sort and Linear Search.

UNIT - II DATA, EXPRESSIONS, CONTROL FLOW STATEMENTS 9

Python interpreter and interactive mode, values and types – int, float, boolean, string, and list, variables, expressions, statements, tuple assignment, operators and precedence of operators, comments, Control Flow Statements – Conditionals – conditional (if), alternative (if-else), chained conditional (if-elif-else), Iteration – state, while, for, break, continue, pass, Illustrative programs – exchange the values with and without using temporary variables, circulate the values of n variables, distance between two points.

UNIT - III FUNCTIONS, STRINGS 9

Functions – function definition and use, flow of execution, parameters and arguments, function composition, Fruitful functions – return values, parameters, local and global scope, recursion, Strings – string slices, immutability, string functions and methods, string module, Illustrative programs – square root, GCD, exponentiation, Factorial of a number, linear search, binary search.

UNIT - IV LISTS, TUPLES, SETS, DICTIONARIES 9

Lists – list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters, Lists as arrays, Tuples – tuple assignment, tuple as return value, Sets - Creating a set, Modifying a set, Removing elements from a set, Set operations- Set Union, Set intersection, Set difference, Set membership test, Iterating through a set, Set methods, Built-in functions with set, Frozenset - Dictionaries – operations and methods, Advanced list processing –List comprehension, Illustrative programs – selection sort, insertion sort, Matrix addition and subtraction, sum an array of numbers.

UNIT - V FILES, MODULES, PACKAGES 9

Files and exception – text files, reading and writing files, format operator, command line arguments, errors and exceptions, handling exceptions, modules, packages – Math and Rand, Illustrative programs – word count, copy file, merge two files.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. E. Balagurusamy, “Problem solving and Python Programming”, First edition, McGraw Hill Education (India) Private Limited, 2017.
2. 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/)

REFERENCES:

1. Yashavant Kanetkar, Aditya Kanetkar, “Let Us Python”, 2nd Edition, BPB Publications, 2020.
2. John V Guttag, “Introduction to Computation and Programming Using Python: With Application to Understanding Data”, 2nd Edition, PHI Publisher, 2017.
3. Robert Sedgewick, Kevin Wayne, Robert Dondero, “Introduction to Programming in Python: An Inter-disciplinary Approach”, Pearson India Education Services Pvt. Ltd., 2016.
4. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd., 2015.
5. Paul Gries, Jennifer Campbell and Jason Montojo, “Practical Programming: An Introduction to Computer Science using Python 3.6”, 3rd edition, Shroff/O’ Reilly Publishers, 2018.
6. Dr. A. Kannan, Dr. L. Sai Ramesh, “Problem Solving and Python Programming”, Updated Edition, United Global Publishers Pvt. Ltd., April 2018.

20HST01	HERITAGE OF TAMILS	L	T	P	C
		1	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

20HST01	தமிழர் மரபு	L	T	P	C
		1	0	0	1

அலகு -I மொழி மற்றும் இலக்கியம்: **3**

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

அலகு –II மரபு - பறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக்கலை: **3**

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

அலகு –III நாட்டுப்புற கலைகள் மற்றும் வீர விளையாட்டுகள்: **3**

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கனியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலி யாட்டம், தமிழர்களின் விளையாட்டுகள்

அலகு –IV தமிழர்களின் திணைக் கோட்பாடுகள்: **3**

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோ ட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்க காலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்க கால நகரங்களும் துறைமுகங்களும் - சங்க காலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு –V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்க்குத் தமிழர்களின் பங்களிப்பு: **3**

இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிற் ப்பகுதிகளில் தமிழ் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப் படிகள் - தமிழ் புத்தகங்களின் அச்சு வரலாறு.

TOTAL: 15 PERIODS

TEXT-CUM-REFERENCEBOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. கணினித்தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரீகம் (தொல்லியல் துறை வெளியீடு)
4. பொருனை - ஆற்றங்கரை நாகரீகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization 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.

20BS1L1	BASIC SCIENCE LABORATORY	L	T	P	C
		0	0	3	1.5

PHYSICS LABORATORY

OBJECTIVES:

- To introduce different experiments to test basic understanding of physics concepts applied in Optics, properties of matter and liquids.

PRE-REQUISITE: NIL

LIST OF EXPERIMENTS

(Any five to be carried out & one demonstration experiment)

1. Determination of Rigidity modulus – Torsional Pendulum.
2. Determination of Young's modulus – Non Uniform Bending.
3. a. Determination of wavelength and particle size using diode laser.
   b. Determination of acceptance angle in an optical fiber.
4. Determination of velocity of sound and compressibility of liquid using ultrasonic interferometer.
5. Determination of band gap of a semiconductor diode.
6. Determination of thickness of a thin wire – Air wedge method.
7. Determination of dispersive power of a prism – Spectrometer*
8. Determination of wavelength of mercury spectrum – Spectrometer grating

*Demonstration experiment

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Evaluate moment of inertia of a disc and rigidity modulus for thin wire using Torsional pendulum
- Appraise Young's modulus of material of the given beam by Non-Uniform bending method
- Measure the wavelength of laser light , Particle size and basic parameter of optical fiber using Semiconductor diode LASER
- Estimate velocity of ultrasound and compressibility of liquid
- Estimate the wavelength of the prominent spectral lines
- Utilize experiment kits for useful applications

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.No.	NAME OF THE EQUIPMENT	Qty.
1	Torsional pendulum set	6
2	Travelling microscope & accessories	6
3	Laser kit	6
4	Ultrasonic interferometer	6
5	Semiconductor band gap kit	6
6	Air wedge set up	6
7	Spectrometer & prism	6
8	Spectrometer & Grating	6

CHEMISTRY LABORATORY

OBJECTIVES:

- To make the students to acquire practical skill in the determination of water quality parameters through volumetric analysis.
- To have hands on experience in using instruments like pH meter, conductivity meter, potentiometer.
- To acquaint the students with the determination of molecular weight of polymer by viscometer.

PRE-REQUISITE: NIL

Any Five experiments to be given

1. Determination of total, temporary & permanent hardness of water by EDTA method.
2. Determination of alkalinity in water sample.
3. Determination of dissolved oxygen content of water sample by Winkler's method.
4. Determination of strength of given hydrochloric acid using pH meter.
5. Estimation of iron content of the given solution using potentiometer.
6. Conductometric titration of a strong acid Vs a strong base.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.
9. Corrosion Experiment – Weight Loss Method.
10. Estimation of sodium present in water using flame photometer.

TOTAL(Physics & Chemistry): 45 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Estimate the Chemical quality parameter of a water sample.
- Estimate the strength of acid by conductometric and pH metric titration.
- Estimate the strength of oxidisable material present in given sample by potentiometry.
- Determine the molecular weight of polymer by Ostwald viscometer.
- Demonstrate the rate of corrosion by weight loss method.

REFERENCE:

1. Vogel's "Text book of quantitative chemical analysis" (8^{th} edition, 2014)

LIST OF APPARATUS AND EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.No.	NAME OF THE EQUIPMENT	Quantity
1	Burette	30
2	Pipette	30
3	Beaker (100ml)	30
4	Conical Flask (250ml)	30
5	Conductivity meter	10
6	Potentiometer	10
7	pH meter	10
8	Viscometer	10
9	Flame Photometer	1
10	Electronic Balance	1

20GE1L1	PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

OBJECTIVES:

- To write, test, and debug simple Python programs using conditional statements.
- To implement Python programs using loops.
- To use functions for structuring Python programs.
- To implement Python programs using lists.
- To write Python programs for implementing file operations.

PRE-REQUISITE: NIL

LIST OF PROGRAMS

1. Biggest of three numbers, odd or even number, Leap year.
2. GCD, Armstrong Number, Palindrome, Fibonacci Series, Prime number
3. Find the square root and exponentiation of a number with and without built-in functions
4. Linear search and Binary search using Recursion.
5. Find the maximum of a list of numbers
6. Selection sort, Insertion sort
7. First n prime numbers
8. Transpose of a Matrix
9. Multiply matrices
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file
12. Merge two files

PLATFORM NEEDED: Python 3 interpreter for Windows/Linux

TOTAL: 60 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Develop simple Python programs using conditional and iterative constructs.
- Develop simple Python programs using built-in functions and user-defined functions.
- Develop a Python program using recursion to implement linear and binary search.
- Develop a Python program using list to implement selection and insertion sort.
- Develop Python programs to implement matrix operations.
- Develop a Python program to implement file handling.

Laboratory requirements for a batch of 30 students

- Systems with Linux or Windows 7 or later Operating System with Python versions: 2.7.X, 3.6.X.,3.8.X

20GE1L2 INDUSTRIAL PRACTICES WORKSHOP

L	T	P	C
0	0	3	1.5

OBJECTIVES:

- To provide exposure to the students with Hands on Experience on various Basic Industrial Practices in Civil, Mechanical, Electrical and Electronics Engineering.

PRE-REQUISITE: NIL

GROUP A (CIVIL & MECHANICAL)
LIST OF EXPERIMENTS

I CIVIL ENGINEERING PRACTICE

UNIT - I CARPENTRY PRACTICE

1. Study of carpentry tools.
2. Preparation of Cross lap joint
3. Preparation of Dovetail joint
4. Preparation of T joint

UNIT - II PLUMBING PRACTICE

1. Study of plumbing tools, pipeline joints, its location and functions: valves, taps, couplings, unions, reducers and elbows in household fittings.
2. Exercise on Preparation of plumbing line sketches for water supply and sewage works.
3. Exercise on providing of basic water line connection for a residential house using plumbing components.
4. Exercise on providing Water line pipe connections for household utilities like water heater, wash basin etc.,

II MECHANICAL ENGINEERING PRACTICE

UNIT - III SHEET METAL PRACTICE

1. Study of sheet metal forming tools.
2. Preparation of a Model of rectangular tray.
3. Preparation of a Model of Conical Funnel.

UNIT - IV MACHINING PRACTICE

1. Study of machining tools.
2. Exercise on Simple turning, Facing, Chamfering
3. Exercise on Taper turning.
4. Exercise on Drilling and Tapping.

UNIT – V METAL JOINING PROCESS

1. Study of welding tools.
2. Exercise to join two metal plates by single butt joint using arc welding.
3. Exercise to join two metal plates by T Fillet joint using arc welding.
4. Exercise to join two metal plates by lap joint using arc welding.

DEMONSTRATION

1. Gas welding process.
2. Refrigeration and Air conditioning process.

GROUP B (ELECTRICAL & ELECTRONICS)
LIST OF EXPERIMENTS

I ELECTRICAL ENGINEERING PRACTICE

1. Residential house wiring using switches, fuse, indicator, Fluorescent lamp and Energy Meter.
2. Measurement of Power consumption for CFL, Fluorescent Lamp, LED Lamp and Incandescent lamp.
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 an electrical equipment.

II ELECTRONICS ENGINEERING PRACTICE

1. Study of Electronic components – Resistor colour coding, Capacitor, Inductor- Measurement using LCR meter, Transistor & Diode – Terminal identification using Multimeter.
2. Study of logic gates AND, OR, EX-OR and NOT.
3. Measurement of AC signal parameter (peak-peak, rms value, period & frequency) using CRO and AFO.
4. Soldering practice – Components Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of HWR and FWR.

TOTAL: 45 PERIODS

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS		
CIVIL		
S. No	**Component Name**	**No. of Components**
1	Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, coupling, unions, elbows, plugs and other fittings	15 sets
2	Carpentry Vice (fitted to work bench)	15 nos
3	Standard wood working tools	15 sets
4	Models of industrial trusses, door joints, furniture joints	5 each
5	Power Tools a. Rotary Hammer b. Demolition Hammer c. Circular Saw d. Planer e. Hand Drilling Machine f. Jigsaw	 2 nos 2 nos 2 nos 2 nos 2 nos 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 brush, etc.	5 sets
4	Oxygen and acetylene gas cylinders, blow pipe and other welding outfit.	2 nos
5	Centre Lathe	2 nos
6	Power Tool: Angle Grinder	2 nos
7	Study purpose items: Refrigerator and Air Conditioner	One each
ELECTRICAL		
1	Assorted electrical components for house wiring	10 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 b. Digital Live-wire detector	 2 nos 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	Regulated of power supply, CRO	1 no. each

20HS201 ADVANCED TECHNICAL COMMUNICATION L T P C

3 0 0 3

OBJECTIVES:

- This course is designed for Engineering and Technology curriculum enabling the students to learn, acquire and apply updated elements of English communication.
- The course is aimed at providing effective skills for procuring communication skills for business and advanced technology.
- Students will benefit by learning the four skills – Listening, Speaking, Reading and Writing to meet the global requirements for their career and higher studies.

PRE-REQUISITE: NIL

UNIT - I TECHNICAL WRITING 9

Listening: Listening to audio-visuals on personal Interviews, Speeches from Company CEOs, TV Debates. **Speaking**: Wishing, Greeting, Enquiring Hobbies. **Reading**: Editorials, Letter to the Editor Columns, Technical Papers. **Writing**: Analytical writings, Emphasis Techniques, Letter Writing – Business Correspondence, Abstract Writing, Common Errors, Footnotes, Compound words, Preparation of Agenda

UNIT - II BUSINESS ENGLISH AND LANGUAGE DEVELOPMENT 9

Listening: Listening to Audio-Visual documentary, TV Programs of Celebrities Forum. **Speaking**: Self-Expression, Introducing the fellow students, Talking about celebrities, leaders

Reading: Company Correspondence, Business Correspondence, Technical Text for Vocabulary

Writing: Bibliography, Sentence Completion, Cloze exercises, Verbal Analogy, Letter – Business enquiry orders, payments, Minutes Preparation.

UNIT - III VISUAL BASED LANGUAGE DEVELOPMENT 9

Listening: Visuals on Group Discussion-Understanding the nuances of GD – Approach – Content – Methodology. **Speaking**: Discussing main points on burning issues, Social issues – Expressing ideas and suggestions. **Reading**: Etiquettes of Non-Verbal Communication. **Writing**: List of common expressions for specified situations – Sentence linkers – Formal Expressions – Suggestions – Reported Speech - Letter to the Editor on Common Issues – Writing the Points in Indirect Form – Check Lists – Numerical Expressions

UNIT - IV EMPLOYABILITY CORRESPONDENCE 9

Listening: Listening to Visuals of Technical Paper presentation – Technical and HR interviews

Speaking: Peer-to-Peer Interview – Mock Interview – Telephone Conversations. **Reading**: Comparative Analyses – Instructions on Public Spots – Time Management concepts – Email Correspondence. **Writing**: Compare and Contrast – Cause and Effect – Purpose and Function – Job Application Letter – Drafting Resume / CV,– Inferring the graphical / Pictorial representations – Bar chart – Pie chart, Instruction – common and technical instructions for a process or a component.

UNIT - V TECHNICAL REPORT WRITING 9

Listening: Key note speeches – Annual Reports of institutions / companies. **Speaking**: Answering to the Mock Panel Interview – Sharing of interview experiences – presenting a Technical Paper. **Reading**: Annual Reports – Company Reports – Newspaper reports – Comprehension passages. **Writing**: Homophones – Abbreviations and Acronyms – SI Units – Report Writing with recommendations – Inferring the Graph – Flow Chart – Tables – Technical Papers

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Board of editors. "**Fluency in English A Course book for Engineering and Technology".** Orient Blackswan, Hyderabad: 2016
2. Raman, Meenakshi and Sharma, Sangeetha "**Technical Communication Principles and Practice".** Oxford University Press: New Delhi, 2014.

REFERENCES:

1. Booth-L. Diana**, "Project Work",** Oxford University Press**,** Oxford: 2014
2. Grussendorf, Marion, "**English for Presentations",** Oxford University Press, Oxford: 2007
3. Means, L. Thomas and Elaine Langlois, "**English & Communication For Colleges".** Cengage Learning, USA: 2007
4. Board of Editor, "**Advanced Technical Communication"**, Great Mind Publication, Chennai : 2019

20BS201 LAPLACE TRANSFORM AND ADVANCED CALCULUS

L	T	P	C
3	1	0	4

OBJECTIVES:

- To make the student familiar with topics such as Multiple Integrals, Vector Calculus, Analytic Functions, Complex Integration and Laplace Transform.
- To learn the concept of basic Vector Calculus which can be widely used for Modeling the various laws of Physics.
- To understand the various methods of Complex Analysis and Laplace Transform can be used for efficiently solving the problems that occur in various branches of Engineering disciplines.

PRE-REQUISITE: NIL

UNIT - I LAPLACE TRANSFORM **12**

Existence Conditions – Transforms of Elementary Functions – Transform of Unit Step Function and Unit Impulse Function – Basic Properties – Shifting Theorems -Transforms of Derivatives and Integrals – Initial and Final Value Theorems – Inverse Transforms – Convolution Theorem – Transform of Periodic Functions – Application to Solution of Linear Second Order Ordinary Differential Equations with Constant Coefficients.

UNIT - II MULTIPLE INTEGRALS **12**

Double integrals – Change of order of integration – Double integrals in Polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of Solids – Change of Variables in Double and Triple integrals.

UNIT - III VECTOR CALCULUS **12**

Gradient and Directional Derivative – Divergence and Curl - Vector Identities – Irrotational and Solenoidal Vector fields – Line Integral over a Plane curve – Surface Integral - Area of a Curved Surface - Volume Integral – Green's, Gauss divergence and Stoke's theorems – Verification and Application in evaluating Line, Surface and Volume Integrals.

UNIT - IV ANALYTIC FUNCTIONS **12**

Analytic functions – Necessary and Sufficient Conditions for Analyticity in Cartesian and Polar Coordinates – Properties – Harmonic Conjugates – Construction of Analytic Function – Conformal Mapping – Mapping by Functions w = z+c, cz, 1/z , z2 -Bilinear transformation.

UNIT - V COMPLEX INTEGRATION **12**

Line integral – Cauchy's Integral Theorem – Cauchy's Integral Formula – Taylor's and Laurent's Series – Singularities – Residues – Residue Theorem – Application of Residue Theorem for Evaluation of Real Integrals – Use of Circular Contour.

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 44th Edition, 2017.
2. T. Veerarajan., “Engineering Mathematics I”, The Tata Mc Graw Hill Publication-New Delhi, First Edition 2018.

REFERENCES:

1. Kreyszig Erwin, “Advanced Engineering Mathematics”, John Wiley and Sons, 9th Edition, New Delhi, 2006.
2. James Stewart, “Calculus, Early Transcendental”, Cengage Learning, 7th Edition, New Delhi, 2015.
3. Bali N., Goyal M. and Watkins C., “Advanced Engineering Mathematics II”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 9th Edition, 2014.
4. Jain R.K. and Iyengar S.R.K., “Advanced Engineering Mathematics II”, Narosa Publications, New Delhi, 5th Edition, 2016.
5. Sastry, S.S. “Engineering Mathematics”, Vol.I & II, PHI Learning Pvt. Ltd, 4th Edition, New Delhi, 2014.

20BS204 PHYSICS FOR INFORMATION SCIENCE

L	T	P	C
3	0	0	3

OBJECTIVES:

- To introduce the essential principles of semiconductor device and Electron transport properties.
- To inculcate proficiency in magnetic & optical properties of materials and their fruitful applications.
- To develop knowledge on Nano devices.

PRE-REQUISITE: NIL

UNIT - I ELECTRICAL PROPERTIES OF MATERIALS 9

Classical free electron theory – Derivation of electrical conductivity – Thermal conductivity– Wiedemann-Franz law – Success and failures – electrons in metals – Fermi- Dirac statistics – Density of energy states – Electron in periodic potential – Energy bands in solids – tight binding approximation - Electron effective mass – concept of hole.

UNIT - II SEMICONDUCTOR PHYSICS 9

Properties of semiconductor – Energy band diagram – direct and indirect band gap semiconductors – Intrinsic Semiconductors – Carrier concentration derivation – electrical conductivity, Energy band gap determination – variation of Fermi level with temperature – extrinsic semiconductors – Carrier concentration in N-type & P-type semiconductors (qualitative) – Variation of carrier concentration with temperature – variation of Fermi level with temperature and impurity concentration – Carrier transport in Semiconductor: random motion, drift, mobility and diffusion – Hall effect and devices.

UNIT - III MAGNETIC PROPERTIES OF MATERIALS 9

Magnetic dipole moment – atomic magnetic moments - magnetic permeability and susceptibility – Magnetic material classification: diamagnetism – paramagnetism – ferromagnetism – antiferromagnetism – ferrimagnetism – Domain Theory of ferromagnetism - M versus H behaviour – Hard and soft magnetic materials – Ferrites and its applications – Magnetic principle in computer data storage – Magnetic hard disc (GMR sensor).

UNIT - IV OPTICAL PROPERTIES OF MATERIALS 9

Classification of optical materials – carrier generation and recombination processes – Absorption, emission and scattering of light in metals, insulators and semiconductors (concepts only) - photocurrent in a p-n diode – Photo voltaic effect – solar cell and its types – LCD – LED – Organic LED – Laser diodes – Optical data storage techniques.

UNIT - V NANO DEVICES 9

Quantum structures, Quantum confinement – Density of states in quantum well, quantum wire and quantum dot structure (qualitative) – Band gap of nanomaterials – Size dependence of fermi energy – Coulomb blockade effect – Quantum computation–Introduction – Single electron phenomena and Single Electron Transistor (SET) – Quantum dot laser – Carbon nanotubes: types, Properties and Applications.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. B.K.Pandey and S.Chaturvedi, “Engineering Physics”, Cengage learning, 2013.
2. V.Rajendran, “Engineering Physics”, Mc Graw-Hill Education, 2011
3. Charles Kittel, “Introduction to solid state Physics”, John Wiley & sons, 8th edition, 2015.

REFERENCES:

1. G.W. Hanson, “Fundamentals of nano electronics”, Pearson Education, 2009
2. B. Rogers, Adams and S. Pennathur, “Nanotechnology: Understanding Small Systems”, CRC Press, 2019.
3. N. Garcia and A. Damask, “Physics for Computer Science Students”, Springer Verlag

20GE205	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Qualitative Treatment only)	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To learn the fundamental laws, theorems of electrical circuits and also to analyze them.
- To study the basic principles of electrical machines and their performances.
- To study the different energy sources and their utilizations.
- To study the fundamentals of electronic circuits.
- To understand the principles and operations of operational amplifiers.

PRE-REQUISITE: NIL

UNIT - I ELECTRICAL CIRCUITS ANALYSIS 9

Ohms Law, Kirchhoff‘s Law-Instantaneous power- series and parallel circuit analysis with resistive, capacitive and inductive network - nodal analysis, mesh analysis- network theorems - Thevenins theorem, Norton theorem, maximum power transfer theorem and superposition theorem, -star delta conversion.

UNIT - II ELECTRICAL MACHINES 9

DC and AC Rotating Machines: Types, Construction, principle, Emf and torque equation, Basics of Stepper Motor- Transformers-Introduction- types and construction, working principle of Ideal transformer-Emf equation- All day efficiency calculation.

UNIT - III UTILIZATION OF ELECTRICAL POWER 9

Renewable energy sources-wind and solar panels. Illumination by lamps- Sodium Vapour, Mercury vapour, Fluorescent tube. Domestic refrigerator -Electric circuit, construction and working principle. Protection-need for earthing. Energy Tariff calculation for domestic loads.

UNIT - IV ELECTRONIC CIRCUITS 9

Semi conductors, Types -PN Junction-VI Characteristics of Diode, zener diode, BJT-operations of PNP and NPN transistors- Transistors configurations –Common Base, Common Emitter &Common Collector configurations- Amplifiers.

UNIT - V OPERATIONAL AMPLIFIERS AND DIGITAL ELECTRONICS 9

Op amps- Amplifiers, oscillator, rectifiers, differentiator, integrator, ADC, DAC, Number Systems, Complements-1’s and 2’s Complements- Basic Digital Logic gates, Universal gates- NAND and NOR Implementation.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. D.P. Kothari and I.J Nagarath, “Basic Electrical and Electronics Engineering”, Mc Graw Hill, 2019, Fourth Edition.
2. M.S. Sukhija and T.K. Nagsarkar, “Basic Electrical and Electronic Engineering”, Oxford, 2019.

REFERENCES:

1. S.B. Lal Seksena and Kaustuv Dasgupta, “Fundaments of Electrical Engineering”, Cambridge, 2017
2. B.L Theraja, “Fundamentals of Electrical Engineering and Electronics”. Chand & Co, 2018.
3. S.K.Sahdev, “Basic of Electrical Engineering”, Pearson, 2019.
4. John Bird, “Electrical and Electronic Principles and Technology”, Sixth Edition, Elsevier, 2017.
5. Mittle,Mittal, “Basic Electrical Engineering”, 2nd Edition, Tata McGraw-Hill Edition, 2017.
6. C.L.Wadhwa, “Generation, Distribution and Utilisation of Electrical Energy”, New Age international pvt.ltd, Revised 4th Edition 2018.

20CS201	PROGRAMMING IN C	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the basic C programming constructs
- To learn about usage of arrays and strings
- To understand the concepts of functions, pointes, structures and unions
- To expose to file handling operations in C

PRE-REQUISITE: NIL

UNIT - I BASICS OF C PROGRAMMING 9

Introduction to programming paradigms– Structure of C program– C programming– Data Types, Storage classes, Constants, Enumeration Constants – Keywords, Operators– Precedence and Associativity, Expressions – Input/output statements, Assignment statements –Decision making statements, Switch statement, Looping statements –Pre-processor directives – Compilation process.

UNIT - II ARRAYS AND STRINGS 9

Introduction to Arrays– Declaration, Initialization –One dimensional array –Example Program– Computing Mean, Median and Mode, Two dimensional arrays –Example Program– Matrix Operations (Addition, Scaling, Determinant and Transpose), String operations– length, compare, concatenate, copy –Selection sort, linear and binary search.

UNIT - III FUNCTIONS AND POINTERS 9

Introduction to functions – Function prototype, function definition, function call, Built- in functions (string functions, math functions), Recursion, Example Program – Computation of Sine series, Scientific calculator using built-in functions, Binary Search using recursive functions – Pointers, Pointer operators, Pointer arithmetic, Arrays and pointers – Array of pointers, Example Program – Sorting of names, Parameter passing – Pass by value, Pass by reference, Example Program – Swapping of two numbers and changing the value of a variable using pass by reference

UNIT - IV STRUCTURES AND UNIONS 9

Structure – Nested structures, Pointer and Structures, Array of structures, Example Program – using structures and pointers, typedef, Self referential structures, Union, Dynamic memory allocation, Illustrative programs – allocating block of memory, sum of n numbers using malloc, calloc.

UNIT - V FILE PROCESSING 9

Files – File operations, Types of file processing– Sequential access, Random access Sequential access file - Example Program– Finding average of numbers stored in sequential access file, Random access file -Example Program– Transaction processing using random access files, Command line arguments.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Balagurusamy, E, “Programming in ANSI C”, Eighth Edition, Tata Mcgraw-Hill, 2019.
2. Yashavant Kanetkar, “Let Us C”, BPB Publications, 17th Edition, 2020.
3. Kernighan, B.W and Ritchie, D.M, “The C Programming language”, Second Edition, Pearson Education, 2015

REFERENCES:

1. Paul Deitel and Harvey Deitel, “C How to Program”, Seventh edition, Pearson Education India, 2015.
2. Juneja, B. L and Anita Seth, “Programming in C”, CENGAGE Learning India pvt. Ltd., 2011
3. PradipDey, Manas Ghosh, “Computer Fundamentals and Programming in C”, Second Edition, Oxford University Press, 2013.
4. Byron Gottfried, "Schaum’s outlines- Programming with C", McGraw-Hill Education, Fourth edition, 2018.
5. Reema Thareja, “Programming in C”, Oxford University Press, Second Edition, 2016.

20GE206	ENGINEERING GRAPHICS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To develop graphic skills for communication of concepts, ideas and design of engineering products.
- To expose national standards related to technical drawings.

PRE-REQUISITE: NIL

CONCEPTS AND CONVENTIONS (Not for Examination)

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT – I PROJECTION OF POINTS AND LINES 9

Orthographic projection – Principles - Principal planes - Projection of points in all quadrants - Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method.

UNIT – II PROJECTION OF PLANE SURFACES 9

Projection of planes (Polygonal and Circular surfaces) inclined to both the principal planes by rotating object method.

UNIT – III PROJECTION OF SOLIDS 9

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.

UNIT – IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 9

Sectioning of simple solids in vertical position when the cutting plane is inclined to one of the principal planes and perpendicular to the other – obtaining true shape of section - Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids, cylinder and cone.

UNIT – V ISOMETRIC PROJECTION AND FREEHAND SKETCHING 9

Principles of Isometric Projection – Isometric scale – Isometric projections of simple solids - truncated Prisms and Pyramids.

Visualization concepts and Free Hand sketching : Principles – Representation of Three Dimensional objects – Layout of views - Freehand sketching of multiple views from pictorial views of objects

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Natarajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 30th Edition, 2017.
2. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 15th Edition, 2018.

REFERENCES:

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019.
2. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson Education, 3rd Edition, 2012.

PUBLICATION OF BUREAU OF INDIAN STANDARDS:

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001: Technical drawings - General principles of presentation.
4. IS 11669 – 1986 : General principles of dimensioning on technical drawings.
5. SP 46 *(*2003*)*: Engineering Drawing Practice for Colleges.
6. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

SPECIAL POINTS APPLICABLE TO EXAMINATIONS ON ENGINEERING GRAPHICS:

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day.

20HST02	TAMILS AND TECHNOLOGY	L	T	P	C
		1	0	0	1

UNIT - I WEAVING AND CERAMIC TECHNOLOGY **3**

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

UNIT - II DESIGN AND CONSTRUCTION TECHNOLOGY **3**

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

UNIT - III MANUFACTURING TECHNOLOGY **3**

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads - Glass beads - Terracotta beads - Shell beads/ bone 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 - Conchediving - 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

20HST02	தமிழரும் தொழில்நுட்பமும்	L	T	P	C
		1	0	0	1

அலகு -I நெசவு மற்றும் பானை தொழில் நுட்பம்: **3**

சங்க காலத்தில் நெசவுத் தொழில் - பனைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பண்டங்களில் கீறல் குறியீடுகள்.

அலகு -II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம் : **3**

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடு கல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிப்பாட்டு தலங்கள் - நாயக்கர் கால கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ - சாரோ செனிக் கட்டிடக்கலை.

அலகு -III உற்பத்தி தொழில் நுட்பம் : **3**

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்பு தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத் துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்

அலகு –IV வேளாண்மை மற்றும் நீர் பாசன தொழில்நுட்பம்: **3**

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குமிழித்தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன் வளம் - முத்து மற்றும் முத்துக் குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவு சார் சமூகம்.

அலகு -V அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்: **3**

அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின் பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்

TOTAL: 15 PERIODS

TEXT-CUM-REFERENCEBOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. கணினித்தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரீகம் (தொல்லியல் துறை வெளியீடு)
4. பொருனந - ஆற்றங்கரை நாகரீகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization 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.

20HS2L2 PROFESSIONAL COMMUNICATION LABORATORY

L	T	P	C
0	0	4	2

OBJECTIVES:

- This course is framed for imparting practical approach in learning and enhancing communication skill among engineering students.
- Students will be able to identify appropriate expressions in speaking and writing.
- They will also be able to understand the style and perfection of language in reading and listening various contexts of engineering and technology.
- The course will benefit to the students to gain confidence for every day communication, aptitude test and interviews.

UNIT-I Application of Professional Communication **12**

Listening to Self Introduction Videos, Developing effective listening skills - Courteous Expressions - making polite phrases.
Speaking - Role Play on Workplace Contexts – attainment of goals – experiences - events in life- past events. **Reading** - cloze exercises, Identifying redundant words, Jargon words, Foreign words, Technical terms. **Writing** - short paragraphs - informal letters.

UNIT-II Enhanced Verbal Skills **12**

Listening - Telephone Etiquettes; Listening to digital information; Introducing a peer group; **Speaking** – Travel schedule and constraints, making arrangements for visits, giving instructions. **Reading** - General awareness of current affairs. Comprehending the elements of a website. **Writing** - Drafting instruction manuals - writing a short article and emails

UNIT - III Employability Skills **12**

Listening - Listening to audio-visuals on personal Interviews, Speeches from Company CEOs, TV Debates Listening product demonstrations. Mock Interviews, Etiquettes of GD. **Speaking** - discussing purposes and reasons- Visuals on Group Discussion-Understanding the nuances of GD – Approach – Content – Methodology - understanding common technology, new terms, understanding technical instructions. **Reading** - FAQ's related to Job Interview, Job Application Letter, Resume, CV. **Writing** – Answers for Interview Questions – Email Correspondence

UNIT – IV Employment Nuances **12**

Listening - locating workplaces- framing instruction to handle the product- illustrating purposes **Speaking** – Predictions, assumptions, recommendations, likes & dislikes. Sharing interview experiences. **Reading** – Journal papers, Reports on Events, Analysis of placement recruitment. **Writing** - Process Description, Conversation building, Completing the Story, Predicting the end of a situation. Drafting charts on placement details.

UNIT - V Integration of Communication Skills **12**

Listening - Technical and HR interviews - Technical Presentation on power point **Speaking** – Burning issues, hot debates, Justifications, analogical arguments. Group Discussion on assigned topics. Panel Interview **Reading** – Comprehension, Identification of difficult words, Spotting the error, taking notes on irregular presentations. **Writing** – Corporate Communication, Business communication, Environmental conditions, Function of digital devices, Product utilities, SoP's.

TOTAL: 60 PERIODS

TEXT BOOKS:

1. E. Suresh Kumar et al. Communication for Professional Success. Orient Blackswan: Hyderabad, 2015

REFERENCES:

1. Butterfield, Jeff Soft Skills of Everyone. Cengage Learning: New Delhi, 2015
2. Interact English Lab Manual for Undergraduate Students,. Orient BlackSwan: Hyderabad, 2016.
3. Raman, Meenakshi and Sangeetha Sharma. Professional Communication. Oxford University Press: Oxford, 2014.
4. S. Hariharanetal. Soft Skills. MJP Publishers: Chennai, 2010.

20CS2L1	C PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

OBJECTIVES:

- To develop programs in C using basic constructs.
- To develop applications in C using strings, pointers, functions, structures.
- To develop applications in C using file processing.

PRE-REQUISITE: NIL

LIST OF PROGRAMS

1. Programs using I/O statements, expressions and decision-making constructs.
2. Program for finding given year is leap year or not and finding given number is Armstrong number or not.
3. Design a calculator to perform the operations namely, addition, subtraction, multiplication, division and square of a number.
4. Given a set of numbers like <10, 36, 54, 89, 12, 27>, find sum of weights based on the following conditions.
    - 5 if it is a perfect cube.
    - 4 if it is a multiple of 4 and divisible by 6.
    - 3 if it is a prime number.

   Sort the numbers based on the weight in the increasing order as shown below <10,its weight>,<36,its weight><89,its weight>
5. Matrix addition and subtraction
6. Matrix multiplication and transpose of a matrix
7. Program using string with and without using string functions: string copy and Reverse the String.
8. Convert the given decimal number into binary, octal and hexadecimal numbers using user defined functions.
9. From a given paragraph perform the following using built-in functions:
    a. Find the total number of words.
    b. Capitalize the first word of each sentence.
    c. Replace a given word with another word.
10. Program using recursion – factorial and Fibonacci series
11. Sort the list of numbers using pass by reference.
12. Generate salary slip of employees using structures and pointers.
13. Insert, update, delete and append telephone details of an individual or a company into a telephone directory using random access file.
14. Count the number of account holders whose balance is less than the minimum balance using sequential access file.
15. **Mini project (Any one project : Maximum 4 per Team)**
    - Railway reservation system
    - Library Management System
    - University Result Publication System
    - Hospital Management System
    - Student Automation System
    - Payroll System
    - Banking System
    - Inventory System

PLATFORM NEEDED: Turbo C++ Compiler

TOTAL: 60 PERIODS

Laboratory requirements for a batch of 30 students

- Systems with Linux Operating System with gnu compiler

20BS305 DISCRETE MATHS AND LINEAR ALGEBRA

L	T	P	C
3	1	0	4

OBJECTIVES

- To understand the basic concepts of Logic, Lattices and Boolean algebra.
- To make the student familiarize the applications of Algebraic Structures
- To introduce the basic concepts of vector space, linear transformations and apply the concept of inner product spaces in orthogonalization.

PRE-REQUISITE: NIL

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 ALGEBRAIC STRUCTURES **12**

Algebraic Systems – Semi Groups and Monoids - Groups – Subgroups – Homomorphism's – Normal Subgroup and Cosets – Lagrange's Theorem – Definitions and Examples of Rings and Fields

UNIT - III LATTICES AND BOOLEAN ALGEBRA **12**

Partial Ordering – Posets – Lattices as Posets – Properties of Lattices - Lattices as Algebraic Systems – Sub Lattices – Direct Product and Homomorphism – Some special Lattices – Boolean Algebra.

UNIT – IV VECTOR SPACES AND LINEAR TRANSFORMATION **12**

Vector spaces – Subspaces – Linear combinations and linear system of equations – Linear independence and linear dependence – Bases and dimensions- Linear transformation - Null spaces and ranges - Dimension theorem – Matrix representation of a linear transformations

UNIT - V INNER PRODUCT SPACES **12**

Inner product, norms - Gram Schmidt orthogonalization process - Adjoint of linear operations – Least square approximation.

TOTAL : 60 PERIODS

TEXT BOOKS:

1. Tremblay.J.P. and Manohar.R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Publishing company Limited, New Delhi, 30th Reprint, 2008.
2. Friedberg, A.H., Insel, A.J. and Spence, L., "Linear Algebra", Prentice Hall of India, New Delhi,2004.

REFERENCES:

1. Grimaldi. R.P., "Discrete and Combinatorial Mathematics: An Applied Introduction", Pearson Education Asia, Delhi, 5thEdition, 2007.
2. Rosen.K.H., "Discrete Mathematics and its Applications", Tata McGraw Hill Publishing company Limited,New Delhi, 7th Edition, 2011
3. Veerarajan .T, "Discrete Mathematics with graph theory and combinatorics",Tata Mc Graw –Hill companies, New Delhi, 4th Reprint, 2008
4. James. G. ,"Advanced Modern Engineering Mathematics", Pearson Education, 4th Edition, 2016.
5. Veerarajan.T., "Linear Algebra and Partial Differential Equations", TataMcGraw Hill, New Delhi, 2018.

20CS301	DIGITAL PRINCIPLES AND SYSTEM DESIGN	L	T	P	C
		3	1	0	4

OBJECTIVES:

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

PRE-REQUISITE: NIL

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 - Magnitude Comparator - Decoders – Encoders – Multiplexers - Introduction to HDL – HDL Models of Combinational circuits-Decoder-Comparator-Multiplexer.

UNIT–III SYNCHRONOUS SEQUENTIAL LOGIC 12

Sequential Circuits - Storage Elements: Latches, Flip-Flops-Characteristic table-Excitation table-Characteristic equation-Conversion of one flip-flop into another - Analysis of Clocked Sequential Circuits - State Reduction and Assignment - Design Procedure - Registers and Counters - HDL Models of Sequential Circuits- D flip flop-JK flip flop-JK flip flop from D flip flop.

UNIT–IV 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– Error Detection and Correction - ROM - Programmable Logic Array – Programmable Array Logic-An overview of sequential programmable devices.

TOTAL: 60 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Apply Arithmetic operations in any number system and various techniques to simplify the Boolean function.
- Build combinational circuits that perform arithmetic operations.
- Design and Analyze Synchronous sequential circuits such as counters and registers.
- Design and simulate various combinational and sequential circuits using HDL.
- Analyze Asynchronous sequential circuits to find out the impact of Hazards and Races.
- Model memory arrays for any Boolean function with the help of PLA, PAL and PROM.

TEXT BOOKS:

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, 2018.
2. Dr. P. Leach and A.P. Malvino, "Digital Principles and Applications", Tata McGraw Hill, 2011.

REFERENCES:

1. G. K. Kharate, Digital Electronics, Oxford University Press, 2012.
2. John F. Wakerly, Digital Design Principles and Practices, Fifth Edition, Pearson Education, 2018.
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, 2017.

20CS302	DATA STRUCTURES AND ALGORITHMS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the concepts of ADTs
- To understand the basics of algorithm analysis
- To Learn linear data structures – lists, stacks, and queues
- To apply Tree and Graph structures
- To understand sorting, searching and hashing algorithms and their analysis.

PRE-REQUISITE:

Course code : 20CS201
Course Name: Programming in C

UNIT - I INTRODUCTION TO DATA STRUCTURES AND ALGORITHM ANALYSIS **10**

Introduction: Data Structures, Notion of an algorithm, Algorithm Efficiency and Analysis Framework, Asymptotic Notations and their properties. Linear Data Structures: Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation —Singly Linked Lists- Circularly Linked Lists- Doubly-Linked Lists – Applications of Lists –Polynomial Manipulation – All operations (Insertion, Deletion, Merge, Traversal). Implementation of algorithmic problems.

UNIT - II LINEAR DATA STRUCTURES – STACKS, QUEUES **8**

Stack ADT – Operations – Applications– Evaluating arithmetic expressions- Conversion of Infix to postfix expression – Queue ADT – Operations – Circular Queue – Priority Queue – deQueue – Applications of Queues.

UNIT - III NON LINEAR DATA STRUCTURES – TREES **9**

Tree ADT – Tree Traversals – Binary Tree ADT – Expression Trees – Applications of Trees – Binary Search Tree ADT –Threaded Binary Trees- AVL Trees – B-Tree – B+ Tree – Heap – Applications of heap.

UNIT - IV NON LINEAR DATA STRUCTURES – GRAPHS **9**

Definition – Representation of Graph – Types of graph – Breadth-first traversal – Depth-first traversal – Topological Sort – Bi-connectivity – Cut vertex – Euler circuits – Applications of graphs.

UNIT - V SEARCHING, SORTING AND HASHING TECHNIQUES **9**

Divide and Conquer Methodology: Comparison of Searching Techniques: Linear Search – Binary Search, Mathematical analysis of Binary Search. Sorting – Merge Sort, Quick Sort, Bubble sort – Selection sort – Insertion sort – Shell sort – Radix sort. Hashing- Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.

TOTAL: 45 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Explain the concept of asymptotic notations and algorithmic efficiency with properties.
- Describe abstract data types and implement various algorithmic problems using arrays and linked list.
- Apply the different linear data structures like stack and queue to various computing problems.
- Implement different types of trees and apply various operations on graphs and its applications.
- Inspect and Analyze different sorting and searching techniques based on time and space complexity of the algorithms designed using divide and conquer methods.
- Implement suitable hashing algorithm for indexing data items into specific locations in a hash table considering collision resolution techniques.

TEXT BOOKS:

1. Mark Allen Weiss, — Data Structures and Algorithm Analysis in C, 2nd Edition Reprint, Pearson Education, 2002.
2. Reema Thareja, — Data Structures Using C, Second Edition, Oxford University Press, 2011.
3. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein – Introduction to Algorithms, MIT Press, Third Edition, 2009.

REFERENCES:

1. Stephen G. Kochan, —Programming in C, 3rd edition, Pearson Education, 2005.
2. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, — Fundamentals of Data Structures in C, Second Edition, University Press, 2008.

20IT301	OBJECT ORIENTED PROGRAMMING	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand basic principle of Object-Oriented Programming
- To understand the characteristics of java and basics of java programming tool.
- To know the principles of inheritance and interfaces
- To define exceptions and use I/O streams
- To develop a java application with threads and generics classes
- To design and build simple Graphical User Interfaces

PRE-REQUISITE:

Course code :20CS201
Course Name : Programming in C

UNIT I INTRODUCTION TO OOP AND JAVA FUNDAMENTALS 9

Introduction to Object Oriented Programming –Differences between Structure programming and OOPS-Characteristics of Java – The Java Environment -Java Source File -Structure – Compilation. Fundamental Programming Structures in Java – Defining classes in Java – constructors, methods -access specifiers - static members -Comments, Data Types, Variables, Operators, Control Flow, Arrays , Packages - JavaDoc comments, finalize method, Automatic Garbage Collection.

UNIT II INHERITANCE AND INTERFACES 9

Inheritance – the Object class – abstract classes and methods- final methods and classes – Interfaces –differences between classes and interfaces and extending interfaces - Object cloning, Reflection, Proxies -inner classes, Array Lists - Strings

UNIT III EXCEPTION HANDLING AND I/O 9

Exceptions - exception hierarchy - throwing and catching exceptions – built-in exceptions, creating own exceptions, Assertions, logging, Stack Trace Elements. Input / Output Basics – Streams – Byte streams and Character streams – Reading and Writing Console – Readingand Writing Files-Sequential Access file and Random Access file.

UNIT IV MULTITHREADING AND GENERIC PROGRAMMING 9

Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, Inter-thread communication, daemon threads, thread groups. Generic Programming – Generic classes – generic methods – Inheritance & Generics – Reflection & Generics-Bounded Types – Restrictions and Limitations.

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: Design an application for automating the file processing by using the java swing with mysql database.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Realize the Object-Oriented Programming concepts and Basics of java Programming tool
- Apply the concepts of inheritance and interfaces using java programs
- Construct java exceptions and I/O streams
- Illustrate multithread concepts and generics in java
- Develop interactive java application using AWT
- Build interactive java application using Swing

TEXT BOOKS

1. Herbert Schildt, “Java The complete reference”, 9th Edition, McGraw Hill Education, 2017.
2. Cay S. Horstmann, Gary cornell, “Core Java Volume –I Fundamentals”, 9th Edition,Prentice Hall, 2013.
3. E. Balagurusamy, “ Programming with Java”, 6th Edition, McGraw Hill Education, 2019.

REFERENCES:

1. Paul Deitel, Harvey Deitel, “Java SE 8 for programmers”, 3rd Edition, Pearson, 2015.
2. Steven Holzner, “Java 2 Black book”, Dreamtech press, 2011.
3. Timothy Budd, “Understanding Object-oriented programming with Java”, Updated Edition, Pearson Education, 2000.

20SC301 INTRODUCTION TO CYBER SECURITY

L	T	P	C
3	0	0	3

OBJECTIVES:

- To understand various types of cyber-attacks and cyber-crimes
- To learn threats and risks within context of the cyber security
- To have an overview of the cyber laws & concepts of cyber forensics
- To study the defensive techniques against these attacks

PRE-REQUISITE: NIL

UNIT - I INTRODUCTION **9**

Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

UNIT - II CYBERSPACE & CYBER FORENSICS **9**

Introduction, Cyber Security Regulations, Roles of International Law - The INDIAN Cyberspace, National Cyber Security Policy. Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics

UNIT - III CYBER CRIME: MOBILE AND WIRELESS DEVICES **9**

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Organizational security Policies and Measures in Mobile Computing Era, Laptops.

UNIT - IV CYBER SECURITY: ORGANIZATIONAL IMPLICATIONS **9**

Introduction: cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.

UNIT - V PRIVACY ISSUES AND CYBERCRIME **9**

Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Data linking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains - medical, financial, etc

Cybercrime: Examples and Mini-Cases Examples: Official Website of Maharashtra Government Hacked, Indian Banks Lose Millions of Rupees, Parliament Attack, Pune City Police Bust Nigerian Racket, e-mail spoofing instances. Mini-Cases: The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Frauds in Cyber Domain.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley, 2013
2. B.B.Gupta, D.P.Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives, CRC Press, 2018.

REFERENCES:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press, 2016
2. Chwan-Hwa (John) Wu, J. David Irwin, Introduction to Computer Networks and Cyber security, CRC Press T&F Group, 2013.

20HS301	UNIVERSAL HUMAN VALUES	L	T	P	C
		2	1	0	3

OBJECTIVES:

- To create an awareness on Engineering Ethics and Human Values.
- To understand social responsibility of an engineer.
- To appreciate ethical dilemma while discharging duties in professional life

PRE-REQUISITE: NIL

UNIT-I INTRODUCTION TO VALUE EDUCATION 9

Value Education — Definition - Concept and Need for Value Education - The Evolution of Value Education: Natural acceptance, Self exploration - Fundamentals of value education - Happiness and Prosperity as parts of Value Education- fulfilling human aspirations.

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

UNIT-II HARMONY IN THE HUMAN BEING 9

Human being vs Value education - I' and Body synchronization - Understanding Myself as Co-existence of the Self and the Body - Realization - Self, Body needs - Scanning of Karma -Self and Body- Understanding Sanyam and Health.

Practice sessions: To discuss the role others have played in making material goods available to self. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

UNIT - III HARMONY IN THE FAMILY, SOCIETY AND NATURE 9

Family as a basic unit of Human Interaction-Values in Relationships - The Basics for Trust and Respect in today's Crisis: Affection, e-Guidance, Reverence, Glory, Gratitude and Love — Harmony in society : Resolution, Prosperity, Fearlessness and Co-existence as Comprehensive Human Goal- Harmony in Nature: The Four Orders in Nature - The Holistic Perception of Harmony in Existence.

Practice sessions: To discuss on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education. Gratitude as a universal value in relationship. Discuss with scenarios. Elicit examples from students' lives

UNIT - IV SOCIAL ETHICS 9

The Basics for Ethical Human Conduct - Defects in Ethical Human Conduct - Holistic Alternative and Universal Order - Universal Human Order and Ethical Conduct - Human Rights violation and Social Disparities.

Practice sessions: To discuss human being as cause of imbalance in nature, pollution, depletion of resources and role of technology

UNIT - V PROFESSIONAL ETHICS 9

Value based Life and Profession - Professional Ethics and Right Understanding - Competence in Professional Ethics - Issues in Professional Ethics — The Current Scenario - Vision for Holistic Technologies, Production System and Management Models.

Practice sessions: To discuss the conduct as an engineer or scientist

TOTAL: 30 PERIODS + 15 TUTORIALS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Explain the significance of value inputs in a classroom and start applying them in their life and profession
- Distinguish between Values & Skills to ensure happiness and prosperity.
- Distinguish between Thyself & the Body to ensure competency of an individual.
- Explain the role of a human being in ensuring harmony in society and nature.
- Distinguish between ethical and unethical practices, and apply suitable strategy to actualize a harmonious working environment.
- Develop an awareness of human values to appreciate the rights of others.

TEXT BOOKS:

1. R.R. Gaur, R. Asthana, G.P. Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd revised edition, Excel Books, New Delhi, 2019.
2. A N Tripathy, Human Values, New Age International Publishers, New Delhi, 2003.

REFERENCES:

1. E G Seebauer & Robert L.Berry, Fundamentals of Ethics for Scientists & Engineers, OxfordUniversity Press, 2000.
2. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including HumanValues), Eastern Economy Edition, Prentice Hall of India Ltd, Reprint 2011.
3. Mike Martin and Roland Schinzinger “Ethics in Engineering” McGraw Hill, New York,4th Edition, Reprint 2017.
4. Charles E. Harries, Michael S. Protchard and Michael J. Rabins, ”Engineering Ethics-concepts and Cases”, Thomson Learning, 2000.
5. S.K. Chakraborty and Dabangshu Chakraborty, “Human Values and Ethics: Achieving
Holistic Excellence”, ICFAI University Press, 2006.

20CS3L1	DIGITAL SYSTEMS LABORATORY	L	T	P	C
		0	0	4	2

OBJECTIVES:

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

LIST OF EXPERIMENTS

1. Verification of Boolean Theorems using basic gates
2. Design and implementation of combinational circuits using basic gates for arbitrary functions.
3. Design and implementation of code converters.
4. Design and implement Half/Full Adder and Subtractor.
5. Design and implement combinational circuits using MSI devices:

a. Parity generator /checker
b. Magnitude Comparator
c. Multiplexers

6. Design and implement shift-registers.
7. Design and implement synchronous counters.
8. Design and implement asynchronous counters.
9. Coding combinational circuits using HDL.
10. Coding sequential circuits using HDL.
11. Design and implementation of a simple real time digital system (Mini Project).

TOTAL: 60 PERIODS

LABORATORY REQUIREMENT FOR BATCH OF 30 STUDENTS HARDWARE:

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

SOFTWARE: HDL simulator.

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Apply Boolean simplification techniques to construct combinational logic circuits.
- Build combinational logic circuits to perform arithmetic operations.
- Implement combinational circuits using MSI devices
- Construct Sequential circuits like registers and counters.
- Simulate combinational and sequential circuits using HDL.
- Design a simple real time application using Digital system.

20CS3L2	DATA STRUCTURES AND ALGORITHMS LABORATORY	L	T	P	C
		0	0	4	2

OBJECTIVES:

- Write functions to implement linear and non-linear data structure operations
- Suggest appropriate linear / non-linear data structure operations for solving a given problem
- Appropriately use the linear / non-linear data structure operations for a given problem
- Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval

LIST OF EXPERIMENTS

1. Implementation of List and Stack Using Array.
2. Implementation of List and Stack Using Linked list.
3. Implementation of Queue Using Linked List.
4. Perform polynomial addition using list.
5. Perform Infix to postfix conversion using stack.
6. Implementation of Binary tree.
7. Implementation of Binary Search tree.
8. Implementation of AVL Tree.
9. Implementation of Heaps using Priority Queues.
10. Implementation of Graph Traversals Using Breadth First Search.
11. Implementation of Graph Traversals Using Depth First Search.
12. Applications of Graph.
13. Case study problem for sorting and searching.
14. Case study problem using linked list.

TOTAL: 60 PERIODS

SOFTWARE: Sublime editor / Turbo C

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Compute Array implementation of stack, Queue and List ADTs using C program
- Demonstrate Linked list implementation of list, Stack and Queue ADTs
- Manipulate Binary trees, Binary search Trees and AVL tree and its operations
- Compute graph representation and Traversal algorithms
- Examine searching, sorting and hashing algorithms
- Implement various techniques of Data structures to Illustrate real world problems

20CS3L3 OBJECT ORIENTED PROGRAMMING LABORATORY

L	T	P	C
0	0	4	2

OBJECTIVES:

- To build software development skills using java programming for real-world applications.
- To understand and apply the concepts of classes, packages, interfaces, arraylist, exception handling and file processing.
- To develop applications using generic programming and event handling.

LIST OF EXPERIMENTS

1. Develop a Java application to generate Electricity bill. Create a class with the following members: Consumer no., consumer name, previous month reading, current month reading, type of EB connection (i.e domestic or commercial). Compute the bill amount using the following tariff.

If the type of the EB connection is domestic, calculate the amount to be paid as follows:

First 100 units	Rs. 1.00 per unit
101-200 units	Rs. 2.50 per unit
201 -500 units	Rs. 4.00 per unit
> 501 units	Rs. 6.00 per unit

If the type of the EB connection is commercial, calculate the amount to be paid as follows:

First 100 units	Rs. 2.00 per unit
101-200 units	Rs. 4.50 per unit
201 -500 units	Rs. 6.00 per unit
> 501 units	Rs. 7.00 per unit

2. Develop a java application to implement currency converter (Dollar to INR, EURO to INR, Yen to INR and vice versa), distance converter (meter to KM, miles to KM and vice versa) , time converter (hours to minutes, seconds and vice versa) using packages.

3. Develop a java 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 withtheir gross and net salary.
4. Design a Java interface for ADT Stack. Implement this interface using array. Provide necessary exception handling in both the implementations.

5. Write a program to perform string operations using Array List. Write functions for the following
   a. Append - add at end
   b. Insert – add at particular index
   c. Search
   d. List all string starts with given letter

6. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named print Area(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

7. Write a Java program to implement user defined exception handling.

8. Write a Java program that reads a file name from the user, displays information about whether the file exists, whether the file is readable, or writable, the type of file and the length of the file in bytes.

9. Write a java program that implements a multi-threaded application that has 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 the value of cube of the number.

10. Write a java program to find the maximum value from the given type of elements using a generic function.

11. Design a calculator using event-driven programming paradigm of Java with the following options.
    a) Decimal manipulations
    b) Scientific manipulations

12. Develop a mini project for any application using Java concepts.

TOTAL: 60 PERIODS

SOFTWARE: JDK8.0 / Net beans 11

OUTCOMES:
AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Develop and implement Java programs for simple applications that make use of classes, packages.
- Develop and implement Java programs with inheritance and interfaces.
- Develop simple java programs with use of files and exceptions.
- Develop simple java programs by implementing multithread concepts and generics.
- Design and Develop interactive java application using AWT and Swing.
- Design and develop of mini project.

20BS405 NUMBER THEORY, PROBABILITY AND STATISTICS

L	T	P	C
3	1	0	4

OBJECTIVES

- To Understand the basic concepts of Number Theory and coding theory.
- To introduce the basic concepts of probability and random variables of one and two dimensions.
- To acquaint the knowledge of testing of hypothesis for small and large sample.

UNIT - I INTRODUCTION TO NUMBER THEORY 12

Division algorithm –Prime and composite numbers – GCD – Euclidean algorithm – Fundamental Theorem of arithmetic(Statement & Proof)– LCM- Fermat's little theorem(Statement & Proof) – Euler's theorem(Statement & Proof) – Euler's Phi functions Congruences –Basic properties of congruences-Chinese remainder theorem(Statement & Proof) .

UNIT – II CODING THEORY 12

Introduction- Basic concepts-Encoder and Decoder-group codes- minimum distance-Hamming codes- generation of codes by using parity checks- Error recovery in group codes.

UNIT - III PROBABILITY AND RANDOM VARIABLES 12

Probability –Discrete and continuous random variables – Moments – Moment generatingfunctions – Binomial, Poisson, Uniform, Exponential and Normal distributions.

UNIT – IV TWO - DIMENSIONAL RANDOM VARIABLES 12

Joint distributions – Marginal and conditional distributions – Covariance – Correlation –Rank Correlation and linear regression – Transformation of random variables.

UNIT - V TESTING OF HYPOTHESIS 12

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

TOTAL : 60 PERIODS

TEXT BOOKS:

1. Veerarajan .T, "Discrete Mathematics with graph theory and
2. combinatorics",Tata Mc Graw –Hill companies, New Delhi, 4th Reprint, 2008.
3. Johnson. R.A., Miller, I and Freund J., "Miller and Freund's Probability andStatistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.

REFERENCES:

1. Koshy, T., Elementary Number Theory with Applications, Elsevier Publications, New Delhi, 2002 .
2. Niven, I., Zuckerman.H.S., and Montgomery, H.L., An Introduction to Theory of Numbers, 5th Edition, John Wiley and Sons , Singapore, 2004.
3. Tremblay.J.P. and Manohar.R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Publishing company limited, New Delhi, 30th Reprint, 2008.
4. Veerarajan.T., "Probability, "Statistics and Random Processes",Tata McGrawHill, New Delhi , 2006.
5. Gupta. S. C, V. K. Kapoor, "Fundamentals of Mathematical Statistics", S. Chand & Co., 10th Edition , 2000.

20CS401	COMPUTER ORGANIZATION AND ARCHITECTURE	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To learn the fundamentals of a computer system and operations.
- To learn the arithmetic and logic unit and implementation of fixed-point and floating point arithmetic unit.
- To learn the basics of pipelined execution.
- To understand parallelism and multi-core processors.
- To understand the memory hierarchies and different ways of communication with I/O devices.

PRE-REQUISITE:

Course code: 20CS301

Course Name: Digital Principles and System Design

UNIT- I FUNDAMENTALS OF A COMPUTER SYSTEM 9

Functional Units – Basic Operational Concepts- Bus structures – Performance Metrics – Instructions: Language of the Computer — Operations, Operands — Instruction Set Architecture- Instruction representation- RISC and CISC Architectures – Amdahl's Law – Logical operations – decision making – MIPS Addressing.

UNIT- II ARITHMETIC FOR COMPUTERS 9

ALU design - Addition and Subtraction — Multiplication — Division — Floating Point Representation – Floating Point Operations – Subword Parallelism.

UNIT - III PROCESSOR AND CONTROL UNIT 9

Components of the Processor - Hardwired control – Micro programmed control – Nano programming-A Basic MIPS implementation – Building a Datapath – Control Implementation Scheme — Pipelining — Pipelined datapath and control — Hazards — Structural, Data and

Control Hazards –Exception handling. Building blocks of Raspberry-pi.

UNIT - IV PARALLELISIM 9

Parallel processing challenges – Instruction Level Parallelism - Exploitation of more ILP – Hardware and Software Approaches – Dynamic Scheduling – Speculation – Compiler Approaches – Multiple Issue Processors - ILP and Thread Level Parallelism-Flynn's classification — SISD, MIMD, SIMD, SPMD, and Vector Architectures - Hardware multithreading – Multi-core processors and other Shared Memory Multiprocessors - Introduction to Graphics Processing Units, Clusters, Warehouse Scale Computers and other Message-Passing Multiprocessors.

UNIT - V MEMORY & I/O SYSTEMS 9

Memory Hierarchy - memory technologies – cache memory – measuring and improving cache performance – virtual memory- Memory management techniques – Associative memories -TLB's — Accessing I/O Devices — Interrupts — Direct Memory Access — Bus structure — Bus operation – Arbitration – Interface circuits - USB. Case Study: Design of Memory Systems using Raspberry Pi.

TOTAL: 45 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Explain the computer organization components, instructions and addressing modes.
- Compute the arithmetic operations such as Addition, Subtraction, Multiplication and Division.
- Discuss the basics of MIPS implementation and pipelining.
- Illustrate the basic concepts of parallelism, multi-core processor, GPU & Clusters.
- Describe the memory technologies & I/O systems.
- Generalize the memory systems using Raspberry-pi.

TEXT BOOKS:

1. David A. Patterson and John L. Hennessy, Computer Organization and Design: TheHardware/Software Interface, Fifth Edition, Morgan Kaufmann / Elsevier, 2014.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, Computer Organization and Embedded Systems, Sixth Edition, Tata McGraw Hill, 2012.

REFERENCES:

1. John L. Hennessey and David A. Patterson, Computer Architecture — A QuantitativeApproach, Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.
2. John P. Hayes, Computer Architecture and Organization, Third Edition, Tata McGraw Hill, 2012.
3. William Stallings, Computer Organization and Architecture – Designing for Performance,Eighth Edition, Pearson Education, 2010.
4. Learning Computer Architecture using Raspberry pi — Eben Upton, Jeffrey Duntemann 2016 (1st Edition).

20CS501	COMPUTER NETWORKS	L	T	P	C
		3	0	0	3

OBJECTIVES

- To understand the concept of layering and functions of each layers of the protocol suits
- To be familiar with the components required to build different types of networks
- To learn concepts related to network addressing and routing
- To familiarize the functions and protocols of the layer of Transport layer
- To understand the working of various application layer protocols

PRE-REQUISITE: NIL

UNIT – I INTRODUCTION TO NETWORKS 8

Network Introduction: Evolution of Computer Networks, Classification of computer Networks LAN, WAN, MAN, Software Defined Networks (SDN), Network Topology: BUS, STAR, RING, MESH, OSI Layered Architecture, TCP/IP Protocol Suite.

UNIT – II MEDIA ACCESS & INTER NETWORKING 12

Medium Access Control Techniques: Random, Round Robin, Reservation: ALOHA Pure and Slotted, CSMA/CD-CSMA/CA- Ethernet-Token Ring-Token Bus-ARQ 3 Types, Data Link Layer design issues: Error Detection Codes, Parity Check, Checksum Error Correction Codes, Hamming codes, IEEE Standards: Bluetooth (802.15), Basic Internetworking: IP - CIDR-ARP -DHCP -ICMP.

UNIT – III NETWORK DEVICES AND NETWORK LAYER 8

Network Devices: Router, Switch, HUB, Bridge, Routing: Static Routing, Introduction to dynamic Routing, Categories of Routing – RIP v1 and RIP v2-OSPF-DSDV,IPV6 Addressing-IPV6 Protocol.

UNIT – IV TRANSPORT LAYER 9

Overview of Transport layer: UDP - Reliable byte stream (TCP), Connection Management: Flow control – Retransmission – TCP Congestion control, Congestion avoidance: DECbit - RED.

UNIT – V APPLICATION LAYER 8

Traditional applications: SSH – HTTP – FTP –DNS – SNMP- Telnet

TOTAL: 45 PERIODS

TEXT BOOK:

1. Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition TMH, 2013.
2. William Stallings, Data and Computer Communications, Tenth Edition, Pearson Education, 2013.

REFERENCES

1. Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.
2. Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.
3. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An OpenSource Approach, McGraw Hill Publisher, 2011.
4. James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Sixth Edition, Pearson Education, 2013.

20CS403 DESIGN AND ANALYSIS OF PARALLEL ALGORITHMS

L	T	P	C
3	0	0	3

OBJECTIVES:

- To choose appropriate sequential algorithm design techniques for solving problems.
- To understand different parallel architectures and models of computation.
- To apply parallel algorithms for basic problems.
- To analyze the various classes of parallel algorithms.

PRE-REQUISITE:

Course Code: 20CS302
Course Name: Data Structures and Algorithms

UNIT - I GREEDY TECHNIQUES **9**

General Method – Knapsack Problem – Job Sequencing with Deadlines - Minimum Cost Spanning Trees – Prim's Algorithm, Kuruskal's Algorithm – Optimal Merge Pattern - Single Source Shortest Paths.

UNIT - II DYNAMIC PROGRAMMING TECHNIQUES **9**

General Method – Multistage Graph – All pair shortest path – Optimal Binary Search Tree- 0/1 Knapsack Problem -Travelling Salesman Problem - Flow Shop Scheduling.

UNIT - III BACKTRACKING AND BRANCH & BOUND TECHNIQUES **9**

Backtracking Techniques: General Method – The 8 Queen's problem – Sum of Subset – Hamiltonian Cycles – Knapsack Problems Branch & Bound Techniques: Least Cost Search — 0/1 Knapsack Problem -Travelling

Salesman Problem - Assignment problem.

UNIT - IV PARALLEL ALGORITHMS **9**

Introduction to parallel Algorithms – Computational Model – Fundamentals Techniques andModels:Prefix Computation — List Ranking — Selection — Merging — Sorting — Graph Problems.

UNIT - V SIMD AND MIMD ALGORITHMS **9**

2D Mesh SIMD Model – Parallel Algorithms for Reduction – Prefix Computation – Selection -Odd-Even Merge Sorting — UMA Multiprocessor Model- Matrix Multiplication on Multiprocessors and multicomputer.

TOTAL: 45 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Apply and solve various problems under Greedy techniques, Dynamic programming, Backtracking and Branch & Bound techniques.
- Analyze the various classes of sequential algorithms.
- Compare and analyze the performance of similar problems under different sequential algorithmic design techniques.
- Explain the basic concepts of parallel algorithms.
- Develop parallel algorithms for standard problems and applications.
- Analyze the efficiency of different parallel algorithms.

TEXT BOOKS:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, “Fundamentals of Computer Algorithms”, University press, Second edition , 2011.
2. Michael J. Quinn, “Parallel Computing : Theory & Practice”, Tata McGraw Hill Edition, Second edition, 2017.

REFERENCES:

1. Anany Levitin, —Introduction to the Design and Analysis of Algorithms, Third Edition,Pearson Education, 2012.
2. Ananth Grame, George Karpis, Vipin Kumar and Anshul Gupta, “Introduction to Parallel Computing”, 2nd Edition, Addison Wesley, 2003.
3. S.G.Akl, “The Design and Analysis of Parallel Algorithms”, PHI, 1989.

20HS401	ENVIRONMENTAL SCIENCE AND ENGINEERING	L	T	P	C
		2	0	0	2

OBJECTIVES:

- To study the scope and significance of environment
- To understand the interrelationship between living organism and environment
- To get a conceptual knowledge on various types of pollution and its effects
- To gain knowledge on various natural resources and its significances
- To provide knowledge on solid wastes ,disposal methods and natural disasters and its management
- To learn social issues such as human welfare, sustainability related to population

PRE-REQUISITE: NIL

UNIT - I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 6

Environment – definition, importance, public awareness

Ecosystem — concept, structure and function– producers, consumers and decomposers - characteristic features, structure and function of the forest ecosystem and grassland ecosystem

Biodiversity– definition, types - genetic, species and ecosystem diversity — values - consumptive use, productive use, social, ethical, aesthetic and option values — hot-spots ofbiodiversity –threats to biodiversity: habitat loss, poaching of wildlife — endangered and endemic species of India. Assignment on Conservation of biodiversity.

UNIT - II ENVIRONMENTAL POLLUTION 6

Definition, causes, effects and control measures of (i) Air pollution (ii) Water pollution (iii) Soil pollution (iv) Marine pollution – role of an individual in prevention of pollution – pollution casestudies - Climate change - global warming, acid rain, ozone layer depletion.

UNIT - III NATURAL RESOURCES 6

Forest resources: Uses, over-exploitation, deforestation, case studies

Water resources: Surface water and ground water - uses, over-utilization, conflicts over water, Conservation of water - rain water harvesting, dams-benefits and problems

Mineral resources: uses, over exploitation, environmental effects of extracting mineral resources, case studies.

UNIT - IV SOLID WASTE AND DISASTER MANAGEMENT 6

Solid waste management: Introduction, types, effects on human beings and disposal management.

Disaster management: Introduction, causes, effects and management of flood, cyclone, earthquake, landslide disasters, case studies– roles and responsibilities of Government andcommunity

UNIT - V HUMAN POPULATION AND SOCIAL ISSUES 6

Population growth, population explosion – family welfare programme – women and child welfare – human rights – value education – sustainable development – resettlement and rehabilitation – waste land reclamation – role of information technology in environment and human health.

Debate on women and child welfare.

TOTAL: 30 PERIODS

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

- Describe the environment, ecosystem and their significances.
- Identify the threats to biodiversity.
- Identify the sources and implement technological solution to environmental pollution.
- Develop the knowledge on various natural resources and effect on environment due to over utilization.
- Describe the disposal techniques of solid wastes and Record the consequences of natural disasters.
- Outline the social issues such as welfare, sustainability etc., and to relate with population growth.

TEXT BOOKS:

1. Anubha Kaushik and Kaushik C.P., Environmental Science and Engineering, New Age International (P) Ltd, Sixth Edition, 2018.
2. Benny Joseph, Environmental Science and Engineering, Tata McGraw-Hill Publishing Company Ltd, New Delhi, ISBN: 0070601690, 2006.

REFERENCES:

1. Erach Bharucha, “Text book of Environmental Studies”, Universities Press (I) PVT LTD, Hyderabad, 2015.
2. G. Tyler Miller and Scott E.Spoolman, “Environmental Science”, Cengage Learning India PVT, LTD, Delhi, 2014.
3. Gilbert M.Masters, “Introduction to Environmental Engineering and Science”, 2nd edition, Pearson Education, 2004.

20SC401	LINUX OPERATING SYSTEMS	L	T	P	C
		3	0	2	4

OBJECTIVES:

- To understand the basic concepts and functions of Operating Systems
- To learn Linux process control and shell programming
- To understand Processes, Threads and analyze scheduling algorithms
- To understand File Systems
- To analyze various memory management schemes
- To study various security aspects related to Local User Management and iptables firewall

PRE-REQUISITE:

Course Code : 20CS302 Course Name : Data Structures and Algorithms
Course Code : 20CS201 Course Name : Programming in C

UNIT - I INTRODUCTION 10

Operating system overview-objectives and functions, Evolution of Operating System.- Operating System Structure and Operations, Process Concept, Process Scheduling, Operations on Processes, Inter Process Communication - Linux System- Design Principles and Kernel Modules;

PRACTICAL 6

1. Installation of Linux operating system
2. Study of Linux general purpose utility command list obtained from (man, who,cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod,chown, finger, pwd, cal, logout, shutdown) commands
3. Write Shell Script to experiment with system calls like fork, grep, pipe, open, createread, write, etc.

UNIT - II PROCESSES MANAGEMENT AND COORDINATION **9**

CPU Scheduling –Concept - Scheduling criteria, Scheduling algorithms; Threads- Overview, Multithreading models, Threading issues; Process Synchronization - The critical-section problem, Semaphores, Classic problems of synchronization, Monitors; Deadlock - System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock- Linux Scheduling policy and algorithm

PRACTICAL **6**

1. Implementation of FCFS, SJF, Round Robin, Priority Scheduling Algorithms and analysing their performance
2. Implement semaphore for solving producer-consumer problem using threads.
3. Simulate situations for testing Deadlock avoidance algorithm.

UNIT - III Memory Management **8**

Main Memory – Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation; Virtual Memory – Background, Demand Paging, Page Replacement, Allocation of Frames, Thrashing; Allocating Kernel Memory – Paging and Segmentation in Linux

PRACTICAL **6**

1. Implementation of Directory organizations like – single, two-level, hierarchy
2. Implementation of Allocation methods used for files like – sequential, indexed, linked

UNIT - IV STORAGE MANAGEMENT **9**

File-System- File concept, Access methods, File Sharing and Protection – File System Structure – File System Implementation - Allocation Methods, Free Space Management- Mass Storage system – Disk Structure, Disk Scheduling and Management; - Linux Virtual File System

PRACTICAL **6**

1. Implementation Of FIFO, LRU, Optimal Page Replacement Algorithms

UNIT - V SECURITY **9**

The Security Problem - Program Threats - System and Network Threats - Cryptography as a Security Tool - User Authentication - Implementing Security Defences. Linux Security - Local User Management: Introduction to users, User Management, User Passwords, User Profiles, Groups - iptables firewall: Introduction to routers, iptables firewall

PRACTICAL **6**

1. Practicing user management (User and Group) in Linux environment
2. Practicing Permission and Access control for files in Linux.
3. Practicing packet forwarding and packet filtering in Linux.

TOTAL: 75 PERIODS

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, — Operating SystemConcepts, 10th Edition, John Wiley and Sons Inc., 2018.
2. Daniel P. Bovet and Marco Cesati - Understanding the Linux Kernel, 3rd Edition , y O'Reilly Media, Inc.
3. Paul Cobbaut - Linux Security, 2015

REFERENCES:

1. RamazElmasri, A. Gil Carrick, David Levine, — Operating Systems – A SpiralApproach, Tata McGraw Hill Edition, 2010.
2. AchyutS.Godbole, AtulKahate, — Operating Systems, McGraw Hill Education, 2016.
3. Andrew S. Tanenbaum, "Modern Operating Systems", Fourth Edition, PearsonPublications, 2014.

20CS5L1	NETWORKS LABORATORY	L	T	P	C
		0	0	4	2

OBJECTIVES:

- To learn and use network commands.
- To learn socket programming.
- To implement and analyze various network protocols.
- To learn and use simulation tools.
- To use simulation tools to analyze the performance of various network protocols.

LIST OF EXPERIMENTS

1. Learn to use commands like TCP dump, netstat, ifconfig, nslookup and traceroute. Capture ping and trace route PDUs using a network protocol analyzer and examine.
2. Write a HTTP web client program to download a web page using TCP sockets.
3. Applications using TCP sockets like:
   a) Echo client and echo server
   b) Chat
   c) File Transfer
4. Simulation of DNS using UDP sockets.
5. Write a code simulating ARP /RARP protocols.
6. Write a program to implement RPC (Remote Procedure Call)
7. Study of Network simulator (NS) and Simulation of Congestion Control Algorithms using NS.
8. Study of TCP/UDP performance using Simulation tool.
9. Simulation of error correction code (like CRC).
10. Performance evaluation of Routing protocols using Simulation tool.
11. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer**.**
    a) Link State routing
    b) Flooding
    c) Distance vector

TOTAL: 60 PERIODS

LABORATORY REQUIREMENT FOR BATCH OF 30 STUDENTS:

1. Windows 7 or higher
2. C / C++ / Java / Python / Equivalent Compiler
3. Network simulator like NS2/Glomosim/OPNET/ Packet Tracer / Equivalent