S.A. ENGINEERING COLLEGE, CHENNAI -77.
(An Autonomous Institution-Affiliated to Anna University)
B.E. COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)
REGULATION 2020A
CHOICE BASED CREDIT SYSTEM
SEMESTER I CURRICULUM

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT HOURS	L	T	P	C
THEORY								
1	HS1101A	Technical English	HS	3	3	0	0	3
2	MA1101A	Calculus and its Applications	BS	4	3	1	0	4
3	PH1101A	Applied Physics	BS	3	3	0	0	3
4	CY1101A	Engineering Chemistry	BS	3	3	0	0	3
5	CS1101A	Problem Solving and Python Programming	ES	3	3	0	0	3
PRACTICALS								
6	BS1101A	Physics and Chemistry Laboratory	BS	4	0	0	4	2
7	CS1102A	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
8	GE1201A	Engineering Practices Laboratory	ES	4	0	0	4	2
MANDATORY COURSE								
9	CI1101A	Indian Constitution	MC	2	2	0	0	0
10	TA1101A	Tamils & Technology/ தமிழரும் தொழில்நுட்பமும்	HS	1	1	0	0	1
TOTAL				31	18	1	12	23

SEMESTER II CURRICULUM

Sl.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	**HS1201A**	English for Communication	**HS**	3	3	0	0	3
2	**MA1201A**	Complex Variables and Transforms	**BS**	4	3	1	0	4
3	**PH1201A**	Materials Science	**BS**	3	3	0	0	3
4	**EE1202A**	Basic Electrical, Electronics and Measurement Engineering	**ES**	3	3	0	0	3
5	**CS1201A**	Programming in C	**PC**	3	3	0	0	3
6	**ME1101A**	Engineering Graphics	**ES**	4	2	0	2	3
PRACTICALS								
7	**CS1203 A**	Programming in C Laboratory	**PC**	4	0	0	4	2
MANDATORY COURSE								
8	**CY1201A**	Environmental Science and Engineering	**MC**	2	2	0	0	0
9	**TA1201A**	Heritage of Tamils / தமிழர் மரபு	**HS**	1	1	0	0	1
TOTAL				27	20	01	6	22

SEMESTER III

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	MA1303A	Discrete Mathematics	BS	3	1	0	4	4
2.	CW1301A	Digital Principles and Computer Organization	ES	3	0	0	3	3
3.	CS1301A	Data Structures	PC	3	0	0	3	3
4.	CS1302A	Software Engineering	PC	3	0	0	3	3
5.	IT1301A	Object Oriented Programming	PC	3	0	0	3	3
PRACTICALS								
6.	CS1303A	Data Structures Laboratory	PC	0	0	4	4	2
7.	IT1302A	Object Oriented Programming Laboratory	PC	0	0	4	4	2
8.	HS1301A	Interpersonal Skills Laboratory	PC	0	0	2	2	1
			TOTAL	15	1	10	28	21

HS1101A   **TECHNICAL ENGLISH**   **L-T-P-C**
                                                                          3-0-0-3

Prerequisites: Basic Language Proficiency.

 Objective:

- ☐ Develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- ☐ Nurture their ability in technical writing like to prepare professional job applications and effective reports.
- ☐ Develop their speaking skills by participating in various speaking activities.
- ☐ Strengthen their listening skill to comprehend lectures and talks in their areas of specialization.
- ☐ Improve their ability to explicit their excellence in all modes of technical communication.

Course Outcomes:

 The Students will be able to
> **CO1**: Read technical texts and write area- specific texts effortlessly.
> **CO2**: Listen and comprehend lectures and talks in their area of specialization successfully.
> **CO3**: Speak appropriately and effectively in varied formal and informal contexts.
> **CO4**: Write correctly, clearly and concisely with coherence and cohesion.
> **CO5**: Prepare job applications and resume in an inspiring manner.

UNIT – 1   **9 Periods**
Reading- Reading short texts **Listening**- Listening to different formal / informal conversations **Writing-** Instructions, Jumbled sentences **Speaking**- Self introduction **Language development**- Parts of speech, Prepositions **Vocabulary development-** Word formation- root words from foreign language and their use in English.

UNIT – 2   **9 Periods**
Reading-Skimming and Scanning to find specific information **Listening**- Listening to INK talks **Writing**- Job Application – cover letter, resume writing **Speaking**- Asking and Giving directions **Language development**- Conjunctions, Types of Nouns **Vocabulary development-** Prefixes and Suffixes.

UNIT – 3   **9 Periods**
Reading- Reading for predicting the content **Listening**- Listening to situational short talks **Writing**- Types of paragraphs- Descriptive/Analytical/ compare and contrast **Speaking**- Mini presentations, Expressing greeting and thanks **Language development**- Adjectives, Numerical Adjectives, Conditional Clauses **Vocabulary development-** Homophones, Homonyms.

UNIT – 4   **9 Periods**
Reading- Practice in speed reading **Listening**- Listening to short texts and fill the data **Writing**- Interpretation of Graphics / Information, Note making **Speaking**-Contributing for Group Discussion **Language development**- Active, Passive, Impersonal passive voice **Vocabulary development-** Definitions, Nominal Compounds.

UNIT – 5   **9 Periods**
Reading- Reading short stories **Listening**- Listening for note taking **Writing**- Report writing, E-mail Writing **Speaking**- Picture descriptions, Speaking in familiar situations **Language development**- Tenses **Vocabulary development-** British and American Vocabulary.

Text Books

- Richards, C. Jack. Interchange Students' Book-2 New Delhi: CUP, 2015.
- Board of editors. Fluency in English A Course book for Engineering and Technology.Orient Blackswan, Hyderabad: 2016.

Extensive Reading
- Khera, Shiv. You can Win, Macmillan, 2000.

Reference

- Bailey, Stephen. Academic Writing: A practical guide for students. New York:Rutledge,2011.
- Comfort, Jeremy, et al. Speaking Effectively : Developing Speaking Skills for Business English. Cambridge University Press, Cambridge: Reprint 2011
- Darlene Smith-Worthington, Sue Jefferson, Technical writing for Success, South-Western Cengage Learning,USA-2011
- Means, L. Thomas and Elaine Langlois, English & Communication For Colleges. Cengage Learning, USA: 2007
- Raman, Meenakshi and Sharma, Sangeetha- Technical Communication Principles and Practice.Oxford University Press: New Delhi, 2014
- Swan Michael, Practical English Usage. Oxford University Press, Eighth impression 2002.

Recommended Websites

bbc.co.uk/1learning english
oxfordonlineenglish.com/
cambridgeenglish.org
inktalks.com/talks/
manageyourwriting.com

MA1101A	CALCULUS AND ITS APPLICATIONS	L T P C
		3 1 0 4

OBJECTIVES:

1. To understand the concepts of limits, continuity, differentiation and use it to find maxima and minima of functions of one variable.
2. To make the student acquire sound knowledge of techniques in solving ordinary differential equations of first and second order that model in various engineering problems.
3. To familiarize the student with functions of several variables that is needed in many branches of engineering.
4. To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

UNIT I- DIFFERENTIAL CALCULUS   **9+3**

Representation of functions – Limit of a function – Continuity – Derivatives – Differentiation rules – Maxima and Minima of functions of one variable.

UNIT II -ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER WITH APPLICATIONS: **9+3**

Basic concepts- Separable differential equations - Exact differential equations - Integrating factors - Linear differential equations - Bernoulli's equation - Geometric Applications- Orthogonal trajectories - Physical Applications - Simple electronic circuits-Newton law of cooling-Heat flow-Rate of decay of radioactive materials-Chemical reaction and solutions.

UNIT III - DIFFERENTIAL EQUATIONS   **9+3**

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 - Method of undetermined coefficients.

UNIT IV- FUNCTIONS OF SEVERAL VARIABLES   **9+3**

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 V- MULTIPLE INTEGRALS   **9+3**

Double integrals – Change of order of integration – Double integrals in polar co-ordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.

TOTAL PERIODS:60

COURSE OUTCOMES:

After completing this course, students should demonstrate competency in the following skills:

- Use both the limit definition and rules of differentiation to differentiate functions. apply differentiation to solve maxima and minima problems.

- The subject helps the students to develop the fundamentals and basic concepts in ODE

- Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.

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TEXTBOOKS:

1. Grewal, B.S., Higher Engineering Mathematics, 43rd Edition, Khanna Publishers, 2016.

2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, Inc., 2016.

REFERENCE BOOKS:

1. Bali,N.P.,Goyal,M.,Watkins,C.,Advanced Engineering Mathematics,Laxmi
   Publications Pvt. Limited, 2007.

2. Boyce,W.E.,and DiPrima,R.C.,Elementary Differential Equationsand Boundary Value
   Problems, Wiley India, 2012.

3. O'Neil. P. V., "Advanced Engineering Mathematics", 7th Edition, Cengage Learning
   India Pvt., Ltd, New Delhi, 2011.

4. T.Veerarajan , Engineering Mathematics , Mc Grawhill Publications , New Delhi 2017.

PH1101A   **APPLIED PHYSICS**   **L   T   P   C**
                                                                     3   0   0   3
OBJECTIVES:
To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

UNIT-1 PROPERTIES OF MATTER   9

Elasticity- plasticity – Different Types of Stress and Strain- concept of stress-strain diagram and its application - three types of modulus of elasticity- Poisson's Ratio – Bending of beams- Expression for bending moment –- young's modulus uniform and Non uniform bending : Theory and Experiment – I Shape girders – **Torsional oscillation Theory and Experiment-** Application of Elastic Materials.

UNIT-2 APPLIED OPTICS   9

Laser : characteristics of laser - Principle of spontaneous emission and stimulated emission – Laser action – Einstein A & B coefficients - Population inversion - Pumping – Basic requirement of laser – Types of laser : Nd-YAG and CO_2 – Applications : Welding , Drilling & Cutting – Medical field
Fiber optics: **Introduction**- Principle and propagation of light – Numerical aperture and acceptance angle – classification of optical fibers – **Losses in optical fibers(Qualitative) –** Fiber optics

communication system (Block Diagram) – Advantages with fiber optic communication system.

UNIT-3 THERMAL PHYSICS   9

Modes of heat transfer- thermal conduction, convection and radiation – Specific heat capacity- thermal conductivity- Newton's law of cooling - **Searle's** and Lee's disc methods: theory and experiment - conduction through compound media (series and parallel) – **thermal expansion of solids, liquids and gases** - Applications: heat exchangers, refrigerators and solar water heaters.

UNIT-4 WAVE AND PARTICLE PHYSICS   9

Inadequacy of Classical Mechanics - Development of quantum theory- **Planck's Black body radiation and Distribution Laws(Qualitative) – Compton Effect (Derivation)** - De Broglie wavelength – properties of matter waves – Experimental Verification (G.P Thomson experiment) – Heisenberg's uncertainty principle - Schrodinger's wave equation – time dependent – time independent wave equations – physical significance of Wave function – applications: particle in a one dimensional potential box.

UNIT-5 CRYSTALOGRAPHY   9

Single crystalline, polycrystalline and amorphous materials Lattice - unit cell- Crystal systems-Bravais lattices- Lattice planes- Miller indices- Interplanar- d- Spacing in cubic Lattice- calculation of number of atoms per unit cell – atomic radius – packing factor for SC, BCC, FCC and HCP structures- **Crystal Defects – types.**

Total Periods : 45

OUTCOMES:
At the end of this course,
1. The students will gain knowledge on the basics of properties of matter and its applications
2. Use the concepts of waves and optical devices and their applications in Laser and fiber optics
3. The students will understand the properties of thermal materials and its applications
4. The students will get knowledge on advanced physics concepts of quantum theory and its application in one dimensional box.
5. The students will understand the different types of crystals structures and different crystal growth techniques.

TEXT BOOKS :
1. Gupta S.L. and Sanjeev Gupta, Modern Engineering Physics , Dhanpat Rai Publishers, 2015.
2. R. K. Gaur and S.C. Gupta, Engineering Physics, Dhanpat Rai Publication (P) Ltd, New Delhi, 2014.
3. Bhattacharya, D.K. and Poonam, T. Engineering Physics, Oxford University Press, 2015.

REFERENCES :
1. C. Kittel ,Introduction to Solid State Physics 8th Edition , Wiley Eastern Ltd,2004.
2. Halliday, D., Resnick, R. and Walker, J. Principles of Physics. Wiley, 2015.

3. Tipler, P.A. and Mosca, G. Physics for Scientists and Engineers with Modern Physics, W.H.Freeman, 2007.

4. Einstein coefficient calculation,https://youtu.be/TvfiZHXUtXg (Video lecture)

5. Lattice structures, https://youtu.be/Rm-i1c7zr6Q (Video lecture)

CY1101A   ENGINEERING CHEMISTRY   L T P C

3 0 0 3

COURSE OBJECTIVES:

- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
- It enables the students to gain information about Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells
- It deals with the information about the types of fuels, calorific value calculations and manufacture of solid, liquid and gaseous fuels.
- To impart knowledge about the nanomaterials synthesis, properties and applications

UNIT I WATER TREATMENT AND TECHNOLOGY   (9)

Introduction – characteristics, Water quality parameters -hardness– types, Determination-EDTA method, Alkalinity ,boiler feed water requirements-boiler troubles – scale & sludge - Caustic Embrittlement , boiler explosion -softening of hard water - external treatment process - demineralization and zeolite, internal treatment - boiler compounds (phosphate, calgon, carbonate and colloidal conditioning methods) – desalination of brackish water –reverse osmosis.

UNIT II PHASE RULE AND ALLOYS   (9)

Phase rule: Introduction, definition of terms with examples, One Component System- water system,Sulphur,CO_2 system, Thermal Analysis and cooling curves, Reduced phase rule - Two Component Systems- classification – lead-silver system-problems. Alloys: Introduction- Definition- Properties of alloys- Significance of alloying,Functions and effect of alloying elements- Ferrous alloys- Nichrome and Stainless steel – heat treatment of steel.

UNIT III   ENERGY SOURCES AND STORAGE DEVICES   (9)

Energy – Types – Non-renewable energy - Nuclear energy -renewable energy - solar energy conversion - solar cells. Introduction to Electrochemistry, Nernst Equation-Electrochemical cells – reversible and irreversible cells –Cell construction and representation - Batteries -types of batteries – characteristics – construction and working of primary battery (dry cell) - secondary battery (lithium-ion-battery) - fuel cells (H_2-O_2).

UNIT IV FUELS AND COMBUSTION   (9)

Fuel: Introduction- classification of fuels- calorific value- higher and lower calorific values- coal- analysis of coal (proximate and ultimate)- carbonization- manufacture of metallurgical coke (Otto Hoffmann method) – petroleum- manufacture of synthetic petrol (Bergius process)- knocking- octane number – diesel oil- cetane number – natural gas- compressed natural gas(CNG)- liquefied petroleum gases(LPG)- producer gas- water gas. Power alcohol and bio diesel. Combustion of fuels: introduction- theoretical calculation of calorific value- ignition temperature- explosive range – flue gas analysis (ORSAT Method).

UNIT V NANOCHEMISTRY   (9)
Basics - distinction between nanoparticles and bulk materials; size-dependent properties.,

 nano cluster, nano rod, nanotube(CNT)-Types of CNT and nanowire. Synthesis: precipitation, thermolysis, chemical vapour deposition, Properties, Characterisation and applications.

TOTAL PERIODS:45

COURSE OUTCOMES:

- The knowledge gained on water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
- With the help of phase rule, they could understand the various phase diagrams and able to predict the low melting alloys.
- Students can get knowledge about various fuels and its applications based on its calorific value.
- It provides the students to understand about conventional and non-conventional energy sources and its applications
- Students gain an insight about the recent trends in nano materials.

TEXT BOOKS

Jain P.C. and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2010

REFERENCES

1. Dara S.S, Umare S.S, "Engineering Chemistry", S. Chand & Company Ltd., New Delhi 2010

2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company, Ltd., New Delhi, 2008.

3. Ozin G. A. and Arsenault A. C., "Nanochemistry: A Chemical Approach to Nanomaterials", RSC Publishing, 2005.

CS1101A	PROBLEM SOLVING AND PYTHON PROGRAMMING	L T P C
		3 0 0 3

OBJECTIVES:

- To know the basics of algorithmic problem solving
- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures –- lists, tuples, dictionaries.
- To do input/output with files in Python.

UNIT I ALGORITHMICPROBLEMSOLVING   **9**

Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

UNIT II DATA, EXPRESSIONS, STATEMENTS   **9**

Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables,distance between two points.

UNIT III CONTROLFLOW, FUNCTIONS   **9**

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

UNIT IV LISTS, TUPLES, DICTIONARIES   **9**

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, mergesort, histogram.

UNIT V FILES, MODULES, PACKAGES & TURTLE   **9**

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file- **Case study: Simple Graphics using Turtle**: Draw a Random Pattern of Circle, Square and Rectangle; Draw a Pattern of Straight Lines, **Plotting Graphs in Python**: Menu Driven Program to Create Mathematical 3D Objects.

                                 TOTAL PERIODS: 45

OUTCOMES:

Upon completion of the course, students will be able to

- Develop algorithmic solutions to simple computational problems.
- Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python Programs.

TEXT BOOKS:
1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016(http://greenteapress.com/wp/thinkpython/)
2. Reema Thareja, Problem Solving and Programming with python, 2nd edition, Oxford University press,2019.
3. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd.,2011.

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

BS1101A   **PHYSICS AND CHEMISTRY LABORATORY**   **L   T   P   C**
                                                             0   0   4   2

PHYSICS LABORATORY

OBJECTIVES:

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

LIST OF EXPERIMENTS: PHYSICS LABORATORY (Any 5 Experiments)

1. Determination of rigidity modulus – Torsion pendulum
2. Determination of Young's modulus by non-uniform bending method
3. (a) Determination of wavelength, and particle size using Laser
   (b) Determination of acceptance angle in an optical fiber.
4. Determination of thermal conductivity of a bad conductor – Lee's Disc method.
5. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer
6. Determination of wavelength of mercury spectrum – spectrometer grating
7. Determination of band gap of a semiconductor
8. Determination of thickness of a thin wire – Air wedge method

TOTAL: 30 PERIODS

OUTCOMES:

- Upon completion of the course, the students will be able to apply principles of elasticity, optics and thermal properties for engineering applications.

CHEMISTRY LABORATORY

OBJECTIVES:

To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.

LIST OF EXPERIMENTS (Any seven experiments to be conducted)

1. Estimation of HCl using Na_2CO_3 as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of TDS of water sample.
5. Determination of strength of acids in a mixture of acids using conductivity meter.
6. Estimation of iron content of the given solution using potentiometer.
7. Estimation of iron content of the water sample using spectrophotometer (1, 10-Phenanthroline / thiocyanate method).
8. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.
9. Conductometric titration of strong acid vs strong base.
   □   **TOTAL PERIODS: 30**

OUTCOMES:

The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

CS1102A   PROBLEM SOLVING AND PYTHON PROGRAMMING

LABORATORY   **L T P C**

                                                                           0 0 4 2

Objectives:
- To study python programs with conditionals andloops
- To use functions for python structuredprograms.
- Use strings for structuring Pythonprograms.
- Represent compound data using Python lists, tuples,dictionaries.
- To read and write data from and to files inpython.

LIST OF EXPERIMENTS:
1. Write a program to display the largest number among threenumbers.
2. Write a program to display the Fibonacci series by using looping constructs.
3. Write a function to compute the GCD of two numbers.
4. Explore String Functions
5. With the help of strings, array or list, display a simple calendar in python program without using the calendar module.
6. With the help of list perform Linear search and Binary search.
7. Write a program to perform Selection sort, Insertion sort, Merge sort
8. Create a text file using python file I/O. Read the content of the file and change them from lower to upper case characters.
9. Programs that take command line arguments (word count)
10. Find the most frequent words in a text read from a file
11. Simulate bouncing ball using Pygame

TOTAL PERIODS: 60

Course Outcomes:

- Design simple programs using conditionals and loops.
- Write functions to solve mathematical problems
- Use strings for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Identify to read and write data from and to files in python.

GE 1201A   ENGINEERING PRACTICES LABORATORY   L T P C

                                                             0 0 4 2

OBJECTIVES:

To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP A (CIVIL & MECHANICAL)

I CIVIL ENGINEERING PRACTICE   13

Buildings:

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

Plumbing Works:

(a) Study of pipeline joints, its location and functions: valves, taps, couplings, Unions, reducers, elbows in household fittings.
(b) Study of pipe connections requirements for pumps and turbines.

(c) Preparation of plumbing line sketches for water supply and sewage works.

(d) Hands-on-exercise: Basic pipe connections – Mixed pipe material connection –

    pipe connections with different joining components.

(e) Demonstration of plumbing requirements of high-rise buildings.

Carpentry using Power Tools only:

(a) Study of the joints in roofs, doors, windows and furniture.

(b) Hands-on-exercise: Wood work, joints by sawing, planing and cutting.

II MECHANICAL ENGINEERING PRACTICE   18

Welding:

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

(b) Gas welding practice

Basic Machining:

(a) Simple Turning and Taper turning

(b) Drilling Practice

Sheet Metal Work:

(a) Forming & Bending:

(b) Model making – Trays and funnels.

(c) Different type of joints.

Machine assembly practice:

(a) Study of centrifugal pump

(b) Study of air conditioner

Demonstration on:

(a) Smithy operations, upsetting, swaging, setting down and bending. Example –

Exercise – Production of hexagonal headed bolt.

(b) Foundry operations like mould preparation for gear and step cone pulley.

(c) Fitting – Exercises – Preparation of square fitting and V – fitting models.

GROUP -B (ELECTRICAL & ELECTRONICS)

III   ELECTRICAL ENGINEERING PRACTICE   13

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.

2. Fluorescent lamp wiring.

3. Stair case wiring

4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.

5. Measurement of energy using single phase energy meter.

6. Measurement of resistance to earth of electrical equipment.

IV   ELECTRONICS ENGINEERING PRACTICE   16

1. Study of Electronic components and equipments – Resistor, colour coding measurement of AC Signal parameter (peak-peak, rms period, frequency) using CR.

2. Study of logic gates AND, OR, EX-OR and NOT.

3. Generation of Clock Signal.

4. Soldering practice – Components Devices and Circuits – Using general purpose   PCB.

5. Measurement of ripple factor of HWR and FWR.

TOTAL PERIODS : 60

OUTCOMES:

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

1. Fabricate carpentry components and pipe connections including plumbing works.
2. Use welding equipments to join the structures.
3. Carry out the basic machining operations
4. Make the models using sheet metal works
5. Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings
6. Carry out basic home electrical works and appliances
7. Measure the electrical quantities
8. Elaborate on the components, gates, soldering practices.

CI1101A   **INDIAN CONSTITUTION**   **L-T-P C**
                                                                          2 -0- 0   0

Prerequisites: Basic law.

The Constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the "basic structure" of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of "Constitutionalism" – a modern and progressive concept historically developed by the thinkers of "liberalism" – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism" in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America.

The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India's legacy of "diversity". It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be "static" and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

Course content

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy – Its importance and implementation
7. Federal structure and distribution of legislative and financial powers between the Union and the States
8. Parliamentary Form of Government in India – The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions: National Emergency, President Rule, Financial Emergency
12. Local Self Government – Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality

14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21

TA1101A   TAMILAR THOZHIL NUTPAM/TAMILS AND TECHNOLOGY   L   T   P   C

                                                                0   0   1   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 - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT V   SCIENTIFIC TAMIL & TAMIL COMPUTING   3

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

                                                        TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலொாறு – மக்களும் பண் பொடும் – மக.மக. பிள்மள (தவளியீடு: தமிழ்நொடு பொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித்தமிழ் – முமனவர்இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – மவமக நதிக்கமரயில் ெங்ககொல நகர நொகரிகம்

(தொல்லியல் துறை தவளியீடு)
4. தொபொருமந – ஆற்றங்கமர நொகரிகம். (தொல்லியல் துறை தவளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department ofArchaeology & 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.

HS1201A   **ENGLISH FOR COMMUNICATION**   **L T P C**
                                                                    3 0 0 3

OBJECTIVES:

The Course enables the second semester Engineering and Technology students to:

- Improve their language ability to improve the four basic skills of communication (LSRW).
- Enhance the skills and methods to enrich their reading and comprehending ability.
- Strengthen their skills to listen to the lectures and talks related to their fields of studies.
- Foster their ability to write effectively in all contexts.
- Cultivate their oral presentation skills through technical presentations and contribution in group discussions.

Course Outcomes:

At the end of the course the students will be able to:
CO1: Read for comprehending and responding in general and professional settings.
CO2: Demonstrate the communication skills (LSRW) in academic, professional and social Environment.
CO3: Participate effectively in formal and informal conversations and express findings and opinions with proper language ability.
CO4: Comprehend conversations and short talks delivered in English.
CO5: Use the language effectively to write with clarity and accuracy in general and technical contexts.

UNIT – 1   **9 Periods**

Reading- Reading for detailed comparison **Listening**- Listening to interviews **Writing**- Developing hints, summarizing **Speaking**- Talk about future plans, arrangements intensions **Language development**- Sentence structures **Vocabulary development-** Synonyms, Antonyms, Adverbs

UNIT – 2   **9 Periods**

Reading-Extended reading **Listening**- Listening to telephonic conversations **Writing**- Formal Letter Writing - Letters for bona fide certificate - to the principal for permission for in plant training, industrial visit, paper presentations, inter college events, Letter to the Editor, Recommendations **Speaking**- Formal conversation **Language development**-Use of Punctuation, Modal verbs **Vocabulary development-** One word substitutes, Common Phrasal verbs

UNIT – 3   **9 Periods**

Reading- Identify topic sentences by reading a short story **Listening**- Listening to TED talks **Writing**- Process/product description **Speaking**- Formal Conversations **Language development**- Relative Clauses, Concord, Error correction **Vocabulary development-** Idioms & Phrases, Minimal pairs

UNIT – 4   **9 Periods**

Reading- Reading newspaper articles **Listening**- Listening to inspirational speeches **Writing**-
Essays, Checklist **Speaking**- Technical Presentations **Language development**- Degrees of
Comparison **Vocabulary development-** Articles, Cause and Effect Expressions

UNIT – 5   **9 Periods**

Reading- Close reading **Listening**- Listening for summarizing **Writing**- Dialogue conversations
Speaking- Movie/ Book Review **Language development**- Wh Questions, Yes/ no Questions
Vocabulary development- Foreign Expressions and its applications, Reference words

TOTAL PERIODS: 45

Extensive Reading:

- Kalam, Abdul Dr.A.P.J. - The Wings of Fire, Universities press: 1999

Reference:

- Booth-L. Diana, Project Work, Oxford University Press, Oxford: 2014
- Grussendorf, Marion, English for Presentations, Oxford University Press, Oxford:
  2007
- Kumar, Suresh. E. Engineering English. Orient Blackswan: Hyderabad,2015
- Dutt P. Kiranmai and RajeevanGeeta. Basic Communication Skills, Foundation
  Books: 2013
- Means,L. Thomas and Elaine Langlois. English & Communication For
  Colleges.CengageLearning ,USA: 2007.

Recommended websites:

- TED.com
- learningenglish.voanews.com
- islcollective.com
- examenglish.com
- englishclass101.com

MA1201A   COMPLEX VARIABLES AND TRANSFORMS   L T P C
                                                                                    3 1 0 4

OBJECTIVES
- Understand the concept of Divergence and curl and use it in evaluating Line, Surface and Volume integrals.
1. Understand C-R equations and use it in the construction of Analytic Functions.
2. Understand the methods of Complex Integration using Cauchy's Integral Formula and Cauchy Residue theorem, finding Taylor's and Laurent's Series expansions.
- Find the Laplace Transforms of standard Functions and to find the Inverse Laplace Transform of a function and use it in solving Differential Equations.
- To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems

UNIT I   VECTOR CALCULUS.   **(9 + 3)**

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-simple applications involving cubes and rectangular parallelopipeds.

UNIT II   ANALYTIC FUNCTIONS   **(9 + 3)**

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 ($w = 1/z , w = z^2, w = e^z, w = \sinh z, w = \cosh z$) – Bilinear transformation.

UNIT III COMPLEX INTEGRATION   **(9 + 3)**

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 and semicircular contour.

UNIT IV   LAPLACE TRANSFORMS   **(9 + 3)**

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 V Z - TRANSFORMS AND DIFFERENCE EQUATIONS   **(9 + 3)**

Z-transforms - Elementary properties – Inverse Z-transform (using partial fraction and residues) – Initial and final value theorems - Convolution theorem - Formation of difference equations – Solution of difference equations using Z - transform.

                                                        TOTAL PERIODS : 60

OUTCOMES

On successful completion of this course, the student will be able to
- Solve problems using divergence and curl and evaluate line, Surface and Volume integrals.
- Solve problems in Analytic functions and construction of analytic functions using C-R Equations.
- Evaluate problems using Cauchy's integral formula and Cauchy residue theorem and find Taylor's and Laurent's series expansion of a given function.
- Obtain the Laplace Transforms of standard functions.
- Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

TEXTBOOKS

1. Grewal, B.S., Higher Engineering Mathematics, 43rd Edition, Khanna Publishers, 2016.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, Inc., 2016.

REFERENCE BOOKS

1. Bali,N.P.,Goyal,M.,Watkins,C.,Advanced Engineering Mathematics,Laxmi Publications Pvt. Limited, 2007.
2. Boyce,W.E.,andDiPrima,R.C.,ElementaryDifferentialEquationsandBoundary Value Problems, Wiley India, 2012.
3. O'Neil. P. V. "Advanced Engineering Mathematics", 7th Edition, Cengage Learning India Pvt., Ltd, New Delhi, 2011.
4.T. Veerarajan, Engineering Mathematics, Tata Mcgraw Hill publications co. ltd, New Delhi.2017.

PH1201A   **MATERIAL SCIENCE**   **L T P C**

3   0   0   3

OBJECTIVES:

   To enrich the understanding of various types of materials and their applications in engineering and technology.

UNIT I   CONDUCTING MATERIALS   9

Conductors – classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann – Franz law – Lorentz number – Draw backs of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals.

UNIT II   SEMICONDUCTING MATERIALS   9

Intrinsic semiconductor – carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – electrical conductivity – band gap determination –Elemental and Compound Semiconductors – **N-type and P-type semiconductor (Qualitative)** – Hall effect –Determination of Hall coefficient – Applications.

UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS   9

Origin of magnetic moment – Bohr magneton – comparison of Dia, Para and Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials – antiferromagnetic materials – Ferrites and its applications. **Electro static Discharge (ESD)-**Superconductivity: properties – Type I and Type II superconductors–BCS theory of superconductivity (Qualitative) - High Tc superconductors – Electrical, medical, magnetic and computer application of superconductors.

UNIT IV   DIELECTRIC MATERIALS   9

Electrical susceptibility – dielectric constant – electronic, ionic, orientation and space charge polarization – frequency and temperature dependence of polarisation – **Clausius mosotti relation -** dielectric loss – dielectric breakdown – uses of dielectric materials (capacitor and transformer).

UNIT V   ADVANCED ENGINEERING MATERIALS   9

Metallic glasses - melt spinning process, applications - shape memory alloys: Ni-Ti alloy, applications – nanomaterials: preparation (bottom up and top down approaches), properties and applications- Bio materials – introduction- properties of bio materials-examples- medical applications- Ophthalmology- bio sensors- characteristics.

                                                      Total Periods: 45

OUTCOMES:

At the end of this course,

- ❖ The students will gain knowledge of conducting materials and variation of its properties with temperature.
- ❖ Acquire knowledge on basics of semiconductor physics and its applications in various devices.
- ❖ Get knowledge on magnetic and superconducting materials properties and their various applications.
- ❖ The students will understand the basics of dielectric materials, properties and applications of dielectric materials.
- ❖ The students will get knowledge about new engineering materials and its applications in social applications.

TEXT BOOKS:

1. S.Mohan, Principles of Materials Science, MJP Publishers, 2018.

2. Jasprit Singh, Semiconductor Devices, Basic Principles, Wiley 2012.

3. Umesh K Mishra and Jasprit Singh, Semiconductor Device Physics and Design‖, Springer, 2008.

REFERENCES:

1. Wahab, M.A. Solid State Physics: Structure and Properties of Materials‖, Narosa Publishing House, 2009.
2. William D.Callister Jr, David G. Rethwisch, Materials Science and Engineering, An Introduction, Wiley India (P) Ltd., 8th Edition, 2009.

3. Pillai S.O., Solid State Physics, New Age International (P) Ltd., Publishers, 2009.

4. Semiconductor Introduction, https://youtu.be/k6ZxP9Yr02E (Video lecture)

5. Superconductivity, https://youtu.be/D-9M3GWOBrw (Video lecture)

EE 1201A   BASIC ELECTRICAL AND ELECTRONICS ENGINEERING   L T P C
3 0 0 3

OBJECTIVES:
- To explain the basic Quantities and different componentsused in Electrical circuits
- To explain the operations of electrical machines.
- To explain the working principles of measuring instruments, transducers and calibrationfor instruments.
- To explain the fundamentals of Electronics
- To impart knowledge of communication.

UNIT I   FUNDAMENTALS OF ELECTRICALCIRCUITS   9

Basic Electrical Quantities , Circuit components ,Fundamental laws of electric circuits– Steady State Solution of DC Circuits- Nodal analysis and Mesh analysis-Introduction of AC Circuits-Sinusoidal Steady State Analysis, Power and Power Factor-Current and Voltage equations for Three Phase Balanced Circuits.

UNIT II   ELECTRICAL MACHINES   9

Construction, Principle of Operation and Basic Equations of DC Generator, DCMotor, Single Phase Transformer and Single phase induction Motor.

UNIT III   MEASURING INSTRUMENTS AND TRANSDUCERS   9

Introduction to Measuring instruments –Operating principles of PMMC, Voltmeter,Ammeter,and Dynamometer type Wattmeter & Energy Meter, Introduction to transducers –Stain Gauge, LVDT and RTD-Principles of Calibration.

UNIT IV   ELECTRONICS   9

Introductionto Analog electronics–Characteristics of PN Junction Diode and Zener Diode - Half Wave &Full Wave Rectifiers.Bipolar Junction Transistor and its Characteristics. Introduction to Digital electronics:Number systems -Boolean algebra theorems–Logic Gates-Adder-Multiplexer and Demultiplexer Basics of sequentialCircuits– Flip-Flops – Shift Registers-4 bit Ripple Counter – R-2R ladder type D/A and Successive approximation type A/D Conversion.

UNIT V FUNDAMENTALS OF COMMUNICATION SYSTEMS   9

Introduction – Elements of Communication Systems–Principles of Amplitude and Frequency Modulations. Basic of digital Communication –ASK,PSK and FSK- Communication Systems: Radio, Antenna, TV, ISDN, Microwave, Satellite and Optical Fibre (Block Diagram Approach only) and Comparison of 2G,3G and 4G in mobile communications.

TOTAL PERIODS: 45

OUTCOMES:

Ability to

- Understand electric circuits and fundamental analysis of circuits.
- Understand working principles of electrical machines
- Choose appropriate instruments for electrical measurement and transducers for a specific application.
- Understand the concepts of Analog electronics and Digital electronics.
- Understand and Gain knowledge of types communication systems

TEXT BOOKS:

1. D.P.Kothari and I.J. Nagarath –"Basic Electrical & Electronics Engineering", c.Grawhill publications, 1st Edition, 2014. (All Units)
2. Mehta V K, "Principles of Electronics", S.Chand& Company Ltd, 1994.
3. Gary S. Rogers, " An Introduction to Wireless Technology", Pearson Education, 2008

REFERENCE BOOKS:
1. Vincent Del Toro, Electrical Engineering Fundamentals, Prentice Hall, 2006.
2. Del Toro, "Electrical Engineering Fundamentals", Pearson Education, New Delhi, 2007
3. V.K.Mehta&Rohit Mehta, Principles of Electrical Engineering, S.Chand publications, 2nd Edition, 2003.
4. Simon Haykin, ―Communication Systems‖, 4th Edition, Wiley, 2014.

CS1201A   **PROGRAMMING IN C**   **L T P C**

3 0 0 3

OBJECTIVE:

- To develop C Programs using basic programmingconstructs.
- To develop C programs using arrays andstrings.
- To develop applications in C using functions and pointers.
- To develop applications in C usingstructures.
- To do input/output and file handling inC.

UNIT I   BASICS OF C PROGRAMMING   9

Introduction to programming paradigms - Structure of C program - C programming: Identifiers-Keywords-Data Types - Variables - Constants. Operators: Precedence and Associativity - Expressions- Input/ Output statements - Decision making statements - Switch statement - Looping statements - Pre-processor directives - Compilation process

UNIT II   ARRAYS AND STRINGS   8

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- String operations – String Arrays.

UNIT III   FUNCTIONS AND POINTERS   10

Introduction to functions: Function prototype - function definition - function call - Built-infunctions (stringfunctions,math functions) -   Recursion-Typesof Recursion -   Example Program: Computation of Sine series,Scientific calculator using built-in functions,Binary Search using recursive functions-Storage Classes - Pointers - Pointer operators - Null Pointers - Pointer arithmetic - Arrays and pointers - Array of pointers - Example Program: Sorting of names - Parameterpassing: Passbyvalue,Passbyreference-   ExampleProgram:Swappingoftwonumbers and changing the value of a variable using pass byreference.

UNITIV   STRUCTURES   9

Structures-Introduction – need for structure data type – structure definition – Structure declaration – Structure within a structure – Passing structures to functions – Array of structures – Pointers to structures – Union - Programs using structures and Unions, Enumerated data type-Dynamic Memory Allocation.

UNITV   FILEPROCESSING   9

 Files-Types of file processing: Sequential access,Random access- Sequential accessfile - Example Program: Finding average of numbers stored in sequential access file - Random access file - Example Program: Payroll System and Transaction processing using random access files - Command linearguments

TOTALPERIODS:-45

OUTCOMES:

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

- o Develop simple applications in C using basicconstructs
- o Design and implement applications using arrays andstrings
- o Develop and implement applications in C using functions andpointers.
- o Develop applications in C usingstructures.
- o Design applications using sequential and random access fileProcessing.

TEXTBOOKS:

1. ReemaThareja,"ProgramminginC",OxfordUniversityPress,SecondEdition,2016.
2. Kernighan,B.W and Ritchie,D.M,"The C Programming language", Second Edition, PearsonEducation,2006

REFERENCES:

1. Paul Deitel and Harvey Deitel,"C How to Program",Seventh editin,Pearson Publication
2. Juneja,B,L and Anita Seth ,"Programming in C",CENGAGELearning India pvt.Ltd., 2011
3. Pradip Dey ,Manas Ghosh,"Fundamentals of Computing and Programming in C" ,First Edition,OxfordUniversityPress,2009.
4. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley(India)Pvt.Ltd.,PearsonEducationinSouthAsia,2011.
5. Byron S. Gottfried, ,"Schaum's Outline of Theory and Problems of Programming with C",,McGraw-HillEducation,1996.

ME1101A   **ENGINEERING GRAPHICS**   **LT P C**

                                                        2 0 2 3

OBJECTIVES:

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

CONCEPTS AND CONVENTIONS (Not for Examination)   **1**

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

UNIT I PLANE CURVES AND ORTHOGRAPHIC PROJECTIONS   **6+6**

Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves. Visualization principles – Layout of views- Orthographic projection of multiple views(Free Hand Sketching) from pictorial views of objects-Principal planes-Projection of points-Demo using CAD software for above topics.

UNIT II PROJECTION OF POINTS STRAIGHT LINES AND PLANE SURFACES   **6+6**

Orthographic projections-principles-Principal planes-First angle projection-Projection of points- Projection of straight lines (only First angle projections) inclined to one of the principal planes - Determination of true lengths and true inclinations - Projection of planes (polygonal and circular surfaces) inclined to one of the principal planes - Demo using CAD software for above topics.

UNIT   III PROJECTION OF SOLIDS   **6+6**

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-Demo using CAD software for above topics.

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENTOF SURFACES

6+6

Sectioning of above solids in simple vertical position - the cutting plane is inclined to the 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 cylinders and cones-Demo using CAD software for above topics.

UNITV ISOMETRIC ANDPERSPECTIVEPROJECTIONS   **6+6**

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions –Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method-Demo using CAD software for above topics.

                                                        TOTAL PERIODS:61

OUTCOMES:

On successful completion of this course, the student will be able to
- familiarize with the fundamentals and standards of Engineering graphics
- perform freehand sketching of basic geometrical constructions and multiple views of objects.
- project orthographic projections of lines and plane surfaces.
- draw projections of solids and development of surfaces.
- visualize and to project isometric and perspective sections of simple solids.

TEXT BOOK:
1. NatrajanK.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers,Chennai,2009.
2. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2008.

REFERENCES:
1. Bhatt N.D. andPanchalV.M., "Engineering Drawing", Charotar Publishing House, 50th Edition,2010.
2. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi,2008.
3. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores,Bangalore,2007.
4. Luzzader, Warren.J. and Duff,John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi,2005.
5. N S Parthasarathy and Vela Murali, "Engineering Graphics", Oxford University, Press, NewDelhi, 2015.
6. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson, 2ndEdition,2009.

Publication of Bureau of Indian Standards:
1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation–Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technicaldrawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of TechnicalDrawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – ProjectionMethods.

Special points applicable to University Examinations on Engineering Graphics:
1. There will be five questions, each of either-or type covering all units of thesyllabus.
2. All questions will carry equal marks of 20 each making atotalof100.
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 withinA3size.
4. The examination will be conducted in appropriate sessions on the sameday

CS1203A   **PROGRAMMING IN C LABORATORY**   **L T P C**
                                                                   0 0 4 2

Course Objectives:-
- To develop programs in C using basicconstructs.
- To develop programs in C using controlstatements.
- To develop applications in C using arrays, strings,pointers.
- To develop applications in C using functions,structures.
- To develop applications in C using fileprocessing

List of Experiments

1. Input and Output statements

2. Control statements – Branching &Looping

    o Write a C program to generate Pascal'striangle.

    o Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*,/,% and use SwitchStatement)

    o Write a C program to find the sum of individual digits of a positiveinteger.

    o A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

    o Write a C program to generate all the prime numbers between 1 and n, where n isa value supplied by theuser.

    o Write a C program to swap Numbers Using TemporaryVariables.

3. Arrays
    o Write a C program to search an array element using linearsearch.
    o Write a C program to find both the largest and smallest number in a list ofintegers.
    o Write a C program that uses functions to perform thefollowing:
        ▪ Addition   of   Two   Matrices
        ii)Multiplication of Two Matrices
    o Write a C program to implement Bubblesort.

4. Strings
    o Write a C program that uses functions to perform the followingoperations:
    i) To insert a sub-string in to given main string from a givenposition.
    ii) To delete n Characters from a given position in a givenstring.
    o Write a C program to determine if the given string is a palindrome ornot
5. Functions &Pointers:
    Write C programs that use recursive functions
    i)   To find factorial of givennumber
    ii)   To solve Towers of HanoiProblem.
    iii)   To swap the variables using call by value and call byreference.
6. a. Generate mark sheet of students usingstructures.
    b. Compute salary slip for five employees using structures andfunctions.
7. Insert, Update, delete and append telephone details of an individual or a company into a telephone directory using random access file

TOTAL PERIODS:- 60

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

*   Develop C programs for simple applications making use of basicconstructs

*   Develop C programs for control statements.

*   Develop C programs involving arrays, strings andpointers.

*   Develop C programs involving functions, andstructures.

*   Design applications using sequential and random access fileprocessing.

CY1201A   ENVIRONMENTAL SCIENCE AND ENGINEERING   L T P C

2 0 0 0

COURSE OBJECTIVES
- To understand nature and the facts about the environment.
- To find and implement scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY   14

Definition, scope and importance of environment – need for public awareness – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of major ecosystem – Introduction to biodiversity definition: genetic, species and ecosystem diversity – value of biodiversity – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

UNIT II ENVIRONMENTAL POLLUTION   8

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

UNIT III NATURAL RESOURCES   10

Forest resources: Use and over-exploitation, deforestation, case studies- dams and their effects on forests and tribal people – Water resources: Use and over- utilization of surface and ground water – Mineral resources: environmental effects of extracting and using mineral resources, case studies – Food resources: changes caused by agriculture and overgrazing, effects of modern agriculture, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – 12 Principles of Green chemistry, role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

UNIT IV   SOCIAL ISSUES AND THE ENVIRONMENT   7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case

studies – environment protection act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act –- central and state pollution control boards.

UNIT V   HUMAN POPULATION AND THE ENVIRONMENT   6

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

TOTAL PERIODS: 45

OUTCOMES

- Students will be able to understand the functions of ecosystems and appreciate the bio diversity.
- Students will be able to know the measures to control environmental pollution.
- Students will be able to understand the usage as well as the effects of over exploitation of natural resources.
- Students will have knowledge about finding technological, economic and political solutions to environmental problems with various Environmental Protection Act in mind.
- Students will be able to understand the interrelationship between population explosion and the environment and also role of IT in environment and human health.
- Students will be able to understand that Environmental problems can only be solved by Public participation in all aspects and cannot be solved by mere laws.

TEXT BOOKS

Environmental Science and Engineering by Anubha Kaushik and C.P.Kaushik-New Age International Publishers. New Delhi, 2017.

REFERENCES

1.Benny Joseph , Environmental Studies, Tata mcgraw-Hill Publishing Company, Ltd., New Delhi, 2006.

2. Dr.B.S.Chauhan,. Environmental Studies , University Science Press, New Delhi, 2011.

TA1201A   TAMILAR MARABU/HERITAGE OF TAMILS   L   T   P   C

0   0   1   1

UNIT I   LANGUAGE AND LITERATURE   3

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

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

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

UNIT III   FOLK AND MARTIAL ARTS   3

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

UNIT IV   THINAI CONCEPT OF TAMILS   3

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

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

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

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலௌறு – மக்களும் பண் பொடும் – மக.மக. பிள்மள
   (தவளியீடு:
   தமிழ்நொடு பொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித்தமிழ் – முமனவர்இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – மவமக நதிக்கமரயில் ௸ங௸கொல நகர நொகரிகம்
   (தொல்லியல் துமற தவளியீடு)
4. தபொருமந – ஆற்றங்கமர நொகரிகம். (தொல்லியல் துமற தவளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in
   print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu)

(Published by: International Institute of Tamil Studies.

7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)

9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,Tamil Nadu)

10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)

11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)

12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

MA1303A	**DISCRETE MATHEMATICS**	**L**	**T**	**P**	**C**
		3	**1**	**0**	**4**

(Common to second semester AIDS and third semester CSE/IT)

COURSE OBJECTIVES:

- To extend student's logical and mathematical maturity and ability to deal with abstraction.
- To introduce most of the basic terminologies used in computer science courses and application of Ideas to solve practical problems.
- To understand the basic concepts of combinatorics and graph theory.
- To familiarize the applications of algebraic structures.

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   SET THEORY   12

Basic concepts – Notations – Subset – Algebra of sets – The power set – Ordered pairs and Cartesian product – Relations on sets –Types of relations and their properties – Relational matrix and the graph of a relation – Partitions – Equivalence relations – Partial ordering – Poset – Hasse diagram – Lattices and their properties – Sub lattices – Boolean algebra – Homomorphism.

UNIT III   COMBINATORICS   12

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

UNIT IV   GRAPHS   12

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

UNIT V   ALGEBRAIC STRUCTURES   12

Algebraic systems – Definitions-Examples-Properties-Semi groups and monoids–Homomorphism's-Groups – Subgroups – Normal subgroup and cosets – Lagrange's theorem – Codes and group codes – Basic notions of error correction-Error recovery in group codes.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students would:

- Have knowledge of the concepts needed to test the logic of a program.
- Have an understanding in identifying structures on many levels.
- Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.
- Be aware of the counting principles.
- Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

TEXTBOOKS:

1. Rosen, K.H., "Discrete Mathematics and its Applications", 7th Edition, Tata McGraw
2. Hill Pub. Co. Ltd., New Delhi, Special Indian Edition, 2011.
3. Tremblay, J.P. and Manohar. R, " Discrete Mathematical Structures with Applications To Computer Science", Tata McGraw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.

REFERENCES:

1. Grimaldi, R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition
2. Pearson Education Asia, Delhi, 2007.
3. Lipschutz, S. and Mark Lipson., "Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.

4. Koshy, T. "Discrete Mathematics with Applications", Elsevier Publications, 2006.

CW1301A   DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION   L T P C

3 0 0 3

COURSE OBJECTIVES:

- To analyze and design combination circuits.
- To analyze and design sequential circuits.
- To understand the basic structure and operation of a digital computer.
- To study the design of data path unit, control unit for processor and to familiarize with thehazards.
- To understand the concept of various memories and I/O interfacing

UNIT I   COMBINATIONAL LOGIC   9

Combinational Circuits – Karnaugh Map - Analysis and Design Procedures – Binary Adder – Subtractor – Decimal Adder - Magnitude Comparator – Decoder – Encoder – Multiplexers - Demultiplexers

UNIT II   SYNCHRONOUS SEQUENTIAL LOGIC   9

Introduction to Sequential Circuits – Flip-Flops – operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits – Design – Moore/Mealy models, state minimization, state assignment, circuit implementation - Registers – Counters.

UNIT III COMPUTER FUNDAMENTALS 9

Functional Units of a Digital Computer: Von Neumann Architecture – Operation and Operands of Computer Hardware Instruction – Instruction Set Architecture (ISA): Memory Location, Addressand Operation – Instruction and Instruction Sequencing – Addressing Modes, Encoding of Machine Instruction – Interaction between Assembly and High Level Language.

UNIT IV PROCESSOR 9

Instruction Execution – Building a Data Path – Designing a Control Unit – Hardwired Control, Microprogrammed Control – Pipelining – Data Hazard – Control Hazards.

UNIT V MEMORY AND I/O 9

Memory Concepts and Hierarchy – Memory Management – Cache Memories: Mapping and Replacement Techniques – Virtual Memory – DMA – I/O – Accessing I/O: Parallel and Serial Interface – Interrupt I/O – Interconnection Standards: USB, SATA

45 PERIODS

TEXTBOOKS

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

REFERENCES

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

CS1301A	DATA STRUCTURES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To Study the concepts of ADTs
- To Acquire linear data structures – lists, stacks, and queues
- To learn non-linear data structures and apply Tree and Graph structures.
- To understand sorting, searching and hashing algorithms

UNIT I LINEAR DATA STRUCTURES – LIST 9

Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation — singly linked lists-doubly-linked lists – circularly-linked list-applications of lists –Polynomial Manipulation.

UNIT II   LINEAR DATA STRUCTURES – STACKS, QUEUES   9

Stack ADT – Operations – Evaluating arithmetic expressions- Other Applications-Conversion of Infix to postfix expression – Queue ADT – Operations – Circular Queue –Double Ended Queues – applications of queues.

UNIT III   NON-LINEAR DATA STRUCTURES – TREES   9

Introduction to Tree ADT – Implementations of trees- Binary Tree ADT -tree traversals -expression trees — binary search tree ADT –Threaded Binary Trees- AVL Trees –Multi-way Search Trees-B-Tree – B+ Tree- Heap-Priority Queue.

UNIT IV   GRAPHS AND HASHING   9

Graph and their representations-Graph Traversal Techniques: Breadth First Search (BFS) and Depth First Search (DFS)-Topological Sort- Hashing- Hash Functions – Collision in hashing-Separate Chaining – Open Addressing-Rehashing-Applications of Hashing.

UNIT V   SEARCHING AND SORTING   9

Searching- Linear Search – Binary Search. Sorting – Bubble Sort – Selection Sort – Insertion Sort – Quick Sort-Merge Sort-Shell Sort – Radix Sort-Heap Sort.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- Apply the concept and operations of List ADT
- Understand and apply the concept and operations of Stack and Queue ADT
- Gain the knowledge about Tree ADT and its applications.
- Apply Graph data structures in real world scenarios.
- Execute the implementation of sorting, searching and hashing Techniques.
- Comprehend Minimum Spanning Trees – and algorithms (Kruskal and Prims algorithm)

TEXTBOOKS: -

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education, 1997.
2. Reema Thareja, "Data Structures Using C", Second Edition, Oxford University Press, 2011

REFERENCES: -

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms", Second Edition, Mcgraw Hill, 2002.
2. Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education, 1983.
3. Stephen G. Kochan, "Programming in C", 3rd edition, Pearson Education.
4. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Second Edition, University Press, 2008.

CS1302A   **SOFTWARE ENGINEERING**   **L   T   P   C**

COURSE OBJECTIVES:

- To understand the basic concepts of software engineering applied in developing various software development life cycle models and agile process models.
- Understand the software requirements and the SRS documents for software projects.
- Understand the software design engineering, user-interface design and component level design.
- Learn various testing approaches applied in software development.
- Learn the methods of software project management: estimation, scheduling, planning and software risk management.

UNIT I   SOFTWARE PROCESS AND AGILE DEVELOPMENT   9

Introduction: The Nature of Software, Software Engineering, The Software Process, Software Engineering practice, Software Myths, Process models: Prescriptive Process Perspective and Specialized Process Models, Agile development: Introduction to Agility - Agile Process Models: Scrum, Dynamic system development and Agile unified process-Tool Set for the Agile Process- Extreme programming-XP Process

UNIT II   REQUIREMENT ENGINEERING PROCESS AND MODELING   9

Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management. Requirements Modeling: Behavior, patterns, and web/mobile apps, Case Study: SRS-Library Management, Student Fee Registration Details.

UNIT III   SOFTWARE DESIGN   9

Design engineering: Design Process, Design Concepts, Design Model. Architectural design: Software Architecture, Architectural Genres, Architectural Styles, Architectural Design, Architectural Mapping using Data Flow. User-Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps. Component level Design: Designing Class based components-Component-Level Design for WebApps and Mobile Apps.

UNIT IV TESTING STRATEGIES 9

Software testing strategies: A Strategic Approach to Software Testing, Test Strategies for Conventional Software and Object Oriented Software, Validation Testing, White- Box Testing, Basis Path Testing, Black-Box Testing, System Testing. Software Implementation Techniques: Refactoring-Maintenance and Reengineering-BPR model-Reengineering process model-Reverse and Forward Engineering.

UNIT V PROJECT AND RISK MANAGEMENT 9

Software Project Management: Estimation – LOC, FP Based Estimation, Make/Buy Decision COCOMO I & II Model – Project Scheduling – Scheduling, Earned Value Analysis Planning – Project Plan, Planning Process, Risk management: Reactive versus Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinement, RMMM, RMMM Plan-Case Study: Risk Management-Manufacturing Company, Banks.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

- Differentiate the various life cycle models and agile process models.
- Classify the principle involved in gathering and validating software requirements.
- Apply the gathered requirement and arrive at an appropriate software design.
- Choose suitable testing strategy for testing software during software development.
- Compare the risk and perform the estimation of software under development.
- Analyze the latest concept applied in industry for software development like Kanban, DevOps.

TEXTBOOKS:

1. Roger S. Pressman, "Software Engineering - A Practitioner's Approach", 6thEdition, TMH, 2010.
2. Sommerville, "Software Engineering", 9th Edition, Pearson Education, 2011.

REFERENCES:

1. K.K. Agarwal& Yogesh Singh, "Software Engineering", 3rd Edition, New Age International Publishers, 2008.
2. Shely Cashman Rosenblatt, "System Analysis and Design", 2nd Edition, Thomson Publications, 2011.
3. Pankaj Jalote, "An Integrated Approach to Software Engineering", 3rd Edition, Narosa Publishing House, 2011.

IT1301A	**OBJECT ORIENTED PROGRAMMING**	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand Object Oriented Programming concepts and basic characteristics of Java
- To know the principles of packages, 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

UNIT I   INTRODUCTION TO OOP AND JAVA FUNDAMENTALS   9

Object Oriented Programming - Abstraction – objects and classes - Encapsulation- Inheritance - Polymorphism- OOP in Java – Characteristics of Java –Fundamental Programming Structures in Java – Defining classes in Java – constructors, methods -access specifiers - static members -Comments, Data Types, Variables, Operators, Control Flow, Arrays, Packages

UNIT II   INHERITANCE AND INTERFACES   9

Inheritance–Superclasses-subclasses–Protectedmembers–constructors in subclasses-the Object class–abstract classes and methods –final methods and classes–Interfaces–defining an interface, implementing interface, differences between classes and interfaces and extending interfaces-Object cloning-inner classes, Array Lists-Strings

UNIT III   EXCEPTION HANDLING AND I/O   9

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

UNIT IV   MULTITHREADING AND GENERIC PROGRAMMING   9

Understanding Threads, Thread Priorities, Synchronizing Threads, Thread lifecycle, Inter-thread communication. Generic Programming–Generic classes–generic methods–Bounded Types–Restrictions and Limitations-Introduction to JDBC, JDBC Drivers and Architecture, Accessing Database with JDBC.

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 - Introduction to Swing –Swing GUI Components – Text Fields , Text Areas – Buttons- Check Boxes –Radio Buttons – Lists- choices- Scrollbars – Windows –Menus – Dialog Boxes. Swing packages-Swing Control classes and Methods.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- Develop Java programs using OOP principles
- Develop Java programs using inheritance and interfaces
- Build Java applications using exceptions and I/O streams
- Develop java applications with threads, generic classes and JDBC
- Develop interactive desktop applications using Swing and JDBC
- Explore OOP concepts in Kotlin and write simple programs

TEXT BOOKS:

1. Herbert Schildt, Java The complete reference, 8th Edition, McGraw Hill Education, 2011.
2. CayS.Horstmann, Gary Cornell, Core Java Volume–I Fundamentals, 9th Edition, Prentice Hall, 2013.

REFERENCES:

1. Paul Deitel, Harvey Deitel, Java SE8 for programmers, 3rd Edition, Pearson, 2015.
2. Steven Holzner, Java2Blackbook, Dream tech press, 2011.
3. Timothy Budd, Understanding Object-oriented programming with Java Updated Edition, Pearson Education, 2000.

CS1303A	DATA STRUCTURES LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To implement linear and non-linear data structures
- To understand the different operations of search trees
- To implement graph algorithms
- To get familiarized to sorting, searching, and hashing algorithms.

LIST OF EXPERIMENTS

1. Array implementation of List ADT
2. Implement the following data structures.
   Singly Linked List & Doubly Linked List

3. Array implementation of Stack and Queue ADTs
4. Applications of List, Stack and Queue ADTs
5. Implementation of Binary Search Trees
6. Implementation of AVL Trees
7. Implementation of heaps using priority queues.
8. Programs for implementation of graph traversals
   BFS & DFS

9. Implementation of searching algorithms
10. Implementation of Insertion Sort, Merge Sort, Quick Sort and Heap Sort algorithms
11. Programs to implement hashing Separate Chaining & Open Addressing

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

HARDWARE: 30 terminals

SOFTWARE:C compiler

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- Implement the operations and applications of List, Stack and Queue using array.
- Implement the operations of List, Stack and Queue using Linked List.
- Determine the different operations of various Trees.
- Execute graph traversal algorithms and techniques.
- Examine various sorting, searching and hashing algorithms.
- Determine Minimum spanning trees algorithm.

IT1302   **OBJECT ORIENTED PROGRAMMING LABORATORY**   **L   T   P   C**

                                                                        0   0   4   2

COURSE OBJECTIVES:

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

LIST OF EXPERIMENTS

1. Develop a java application using classes & objects

2. Develop a java application using packages.

3. Develop a java application using Inheritance.

4. Design a Java interface for ADT Stack. Provide necessary exception handling.

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 and demonstrate polymorphism.

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

8. Write a Java program that reads a filename 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 implement multi-threading.

10. Write a java program to create 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 simple student database management system using event-driven and concurrent programming paradigms of Java. Use JDBC to connect a back-end database.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

HARDWARE: 30 terminals

SOFTWARE:Java

TOTAL: 60 PERIODS

COURSE OUTCOMES:

- Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.
- Develop and implement Java Programs with Array list and exception handling.
- Develop and implement Java programs using concept of multithreading.
- Design and develop the applications file processing, generic programming.
- Design and develop the applications using event handling mechanism.
- Develop the mini-project using the concepts of kotlin programming.

HS1301A	INTERPERSONAL SKILLS LABORATORY	L	T	P	C
		0	0	2	1

OBJECTIVES: The Course will enable learners to:

- Equip students with the English language skills required for the successful undertaking of academic studies with primary emphasis on academic speaking and listening skills.
- Provide guidance and practice in basic general and classroom conversation and to engage in specific academic speaking activities.
- Improve general and academic listening skills.
- Make effective presentation.

UNIT I   COMMUNICATION   6

Listening As A Key Skill- Its Importance- Speaking- Give Personal Information- Ask For Personal Information- Improving Pronunciation- Pronunciation Basics- Taking Lecture Notes- Preparing To Listen To A Lecture- Listen to TED/INK Talks - Articulate A Complete Idea.

UNIT II   INTERPERSONAL SKILLS   6

Interpersonal Skills- Nurturing- Empathetic- Self-Control- Patient- Sociability- Warmth- Social Skills- Team Work-Work Ethic- Willing To Work- Initiative- Self-Motivated - Integrity.

UNIT III   SPEAKING NUANCES   6

Factors Influence Fluency- Deliver A Five-Minute Informal Talk- Greet- Respond To Greetings-Describe Health And Symptoms-Invite And Offer- Accept- Decline- Take Leave- Listen For And Follow The Gist- Listen For Detail – Book/ Movie/Newspaper Articles Review

UNIT IV   GROUP DISCUSSION   6

Being An Active Listener: Giving Verbal And Non-Verbal Feedback- Participating In A Group Discussion- Asking And Getting Clarifications-Summarizing Academic Readings And Lectures- Conversational Speech- Listening To And Participating In Conversations- Persuade.

Formal And Informal Talk- Listen To Follow And Respond To Explanations, Directions And Instructions In Academic And Business Contexts- Strategies For Formal Presentations And Interactive Communication- Group/Pair Presentations.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

- Listen and respond appropriately.
- Participate in group discussions
- Make effective presentations
- Participate confidently and appropriately in conversations both formal and informal

TEXT BOOKS:

1. Brooks, Margret. Skills for Success. Listening and Speaking. Level 4 Oxford University Press, Oxford: 2011.
2. Richards, C. Jack. & David Bholke. Speak Now Level 3. Oxford University Press, Oxford: 2010

REFERENCES:

1. Bhatnagar, Nitin and Mamta Bhatnagar. Communicative English for Engineers and Professionals. Pearson: New Delhi, 2010.
2. Hughes, Glyn and Josephine Moate. Practical English Classroom. Oxford University Press: Oxford, 2014.
3. Ladousse, Gillian Porter. Role Play. Oxford University Press: Oxford, 2014
4. Richards C. Jack. Person to Person (Starter). Oxford University Press: Oxford, 2006.
5. Vargo, Mari. Speak Now Level 4. Oxford University Press: Oxford, 2013

WEBSITES:

https://learnenglish.britishcouncil.org/skills/listening
https://agendaweb.org/listening-exercises.html
https://www.bbc.com/
https://placement.freshersworld.com
https://ielts-up.com
www.learnenglishteens.britishcouncil.org