

**S.A.ENGINEERING COLLEGE,CHENNAI-600 077**  
**(An Autonomous Institution, Affiliated to Anna University)**  
**B.TECH COMPUTER SCIENCE AND BUSINESS SYSTEMS**  
**REGULATIONS – 2020A**  
**CHOICE BASED CREDIT SYSTEM**

**SEMESTER I**

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT HOURS	L	T	P	C
<b>THEORY</b>								
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
<b>PRACTICALS</b>								
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
<b>MANDATORY COURSE</b>								
9.	CI1101A	Indian Constitution	MC	2	2	0	0	0
10.	FL0001A	French/Japanese	MC	2	2	0	0	0
<b>TOTAL</b>				30	17	1	12	22

**SEMESTER II**

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT HOURS	L	T	P	C
<b>THEORY</b>								
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.	EE1201A	Basic Electrical and Electronics Engineering	ES	3	3	0	0	3
5.	CS1201A	Programming in C	PC	3	3	0	0	3
6.	CS1202A	Fundamentals of Computer Science	PC	3	3	0	0	3
7	ME1101A	Engineering Graphics	ES	4	2	0	2	3
<b>PRACTICALS</b>								
8.	CS1203A	Programming in C Laboratory	ES	4	0	0	4	2
9.	CS1204A	Fundamentals of Computer Science Laboratory	PC	4	0	0	4	2
<b>MANDATORY COURSE</b>								
10.	CY1201A	Environmental Science and Engineering	MC	2	2	0	0	0
<b>TOTAL</b>				35	24	1	12	26

### SEMESTER III

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT HOURS	L	T	P	C
<b>THEORY</b>								
1.	HS1302A	Business Communication & Value Science – I	HS	3	2	1	0	3
2.	IT1301A	Object Oriented programming	PC	3	3	0	0	3
3.	CS1301A	Data Structures	PC	3	3	0	0	3
4.	CS1401A	Computer Architecture	PC	3	3	0	0	3
5.	CS1302A	Software Engineering	PC	3	3	0	0	3
<b>PRACTICALS</b>								
6.	IT1302A	Object Oriented Programming Laboratory	PC	4	0	0	4	2
7.	CS1303A	Data Structures Laboratory	PC	4	0	0	4	2
8.	HS1301A	Interpersonal Skills Laboratory	EEC	2	0	0	2	1
<b>TOTAL</b>				<b>25</b>	<b>14</b>	<b>1</b>	<b>10</b>	<b>20</b>

### SEMESTER IV

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	No. of Hours/ Week			Credits
				L	T	P	
<b>THEORY COURSES</b>							
1	CS1501A	Operating Systems	PC	3	0	0	3
2	IT1401A	Database Management Systems	PC	3	0	0	3
3	CB1401A	Introduction to Innovation, IP Management & Entrepreneurship	ES	3	0	0	3
4	HS1402A	Business Communication & Value Science–II	HS	3	0	0	3
5	MA1403A	Optimization Techniques	HS	3	1	0	4
6	CB1402A	Software Design with UML	PC	3	0	2	4
<b>PRACTICAL COURSES</b>							
7	CS1503A	Operating Systems Lab	PC	0	0	4	2
8	IT1402A	Database Management Systems Lab	PC	0	0	4	2
<b>Total</b>				<b>18</b>	<b>1</b>	<b>10</b>	<b>24</b>

### SEMESTER V

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	No. of Hours/ Week			Credits
				L	T	P	
<b>THEORY COURSES</b>							
1		Fundamentals of Management	ES	2	0	0	2
2		Business Strategy	ES	3	0	0	3
3		Business Communication & Value Science - III	HS	2	0	0	2
4		Design Thinking	ES	3	0	0	3
5		Computer Networks	PC	3	0	0	3
6		Professional Elective-I	PE	3	0	2	4
<b>PRACTICAL COURSES</b>							
7		Networks Lab	PC	0	0	4	2
8		Mini Project	PC	0	0	4	2
<b>Total</b>				<b>17</b>	<b>0</b>	<b>10</b>	<b>21</b>

### SEMESTER VI

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	No. of Hours/ Week			Credits
				L	T	P	
<b>THEORY COURSES</b>							
1		Mobile Communication	PC	3	0	0	3
2		Information Security	PC	3	0	0	3
3		Artificial Intelligence	PC	3	0	0	3
4		Financial & Cost Accounting	ES	2	0	0	2
5		Business Communication & Value Science-IV	HS	2	0	0	2
6		Professional Elective-II	PE	3	0	2	4
<b>PRACTICAL COURSES</b>							
7		Mobile and Application Development Lab	PC	0	0	4	2
8		Information Security Lab	PC	0	0	4	2
9		Artificial Intelligence Lab	PC	0	0	4	2
<b>Total</b>				<b>16</b>	<b>0</b>	<b>14</b>	<b>23</b>

### SEMESTER VII

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	No. of Hours/ Week			Credits
				L	T	P	
<b>THEORY COURSES</b>							
1		IT Workshop <b>Scilab</b> / Matlab	PC	1	0	4	3
2		Services Science & Service Operational Management	ES	3	0	0	3
3		Usability Design of Software Applications	PC	3	0	0	3
4		IT project Management	PC	3	0	0	3
5		Professional Elective-III	PE	3	0	0	3
6		Professional Elective-IV	PE	3	0	0	3
<b>PRACTICAL COURSES</b>							
7		Project Evaluation -I	PC	0	0	2	1
<b>Total</b>				<b>16</b>	<b>0</b>	<b>6</b>	<b>19</b>

**SEMESTER VIII**

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	No. of Hours/ Week			Credits
				L	T	P	
<b>THEORY COURSES</b>							
1		Professional Elective-V	PE	3	0	0	3
2		Professional Elective-VI	PE	3	0	0	3
<b>PRACTICAL COURSES</b>							
3		Project Evaluation II	PC	0	0	16	8
<b>Total</b>				<b>6</b>	<b>0</b>	<b>16</b>	<b>14</b>

**Total Credits: 160****PROFESSIONAL ELECTIVE LIST****SEMESTER V****PROFESSIONAL ELECTIVE – I**

S.NO	COURSE CODE	COURSE TITLE	CONTACT HOURS/WEEK			CRED ITS
			L	T	p	
1		Conversational Systems	3	0	2	4
2		Cloud, Micro services and Application	3	0	2	4
3		Machine Learning	3	0	2	4

**SEMESTER VI****PROFESSIONAL ELECTIVE –II**

S.NO	COURSE CODE	COURSE TITLE	CONTACT HOURS/WEEK			CRED ITS
			L	T	p	
1		Robotics and Embedded Systems	3	0	2	4
2		Modern Web Application	3	0	2	4
3		Data mining and Analytics	3	0	2	4

**SEMESTER VII****PROFESSIONAL ELECTIVE –III**

S.NO	COURSE CODE	COURSE TITLE	CONTACT HOURS/WEEK			CRED ITS
			L	T	p	
1		Cognitive Science and Analytics	3	0	0	3
2		Introduction to IoT	3	0	0	3
3		Cryptology	3	0	0	3

**PROFESSIONAL ELECTIVE –IV**

S.NO	COURSE CODE	COURSE TITLE	CONTACT HOURS/WEEK			CREDI TS
			L	T	p	
1		Quantum Computation and Quantum Information	3	0	0	3
2		Advance Social, Text and Media Analytics	3	0	0	3
3		Mobile Computing	3	0	0	3

**SEMESTER VIII****PROFESSIONAL ELECTIVE –V**

S.NO	COURSE CODE	COURSE TITLE	CONTACT HOURS/WEEK			CREDITS
			L	T	p	
1		Behavioral Economics	3	0	0	3
2		Computation Finance and Modeling	3	0	0	3
3		Psychology	3	0	0	3

**PROFESSIONAL ELECTIVE –VI**

S.NO	COURSE CODE	COURSE TITLE	CONTACT HOURS/WEEK			CREDITS
			L	T	p	
1		Enterprise Systems	3	0	0	3
2		Advance Finance	3	0	0	3
3		Image processing and Pattern recognition	3	0	0	3

**HS1101A****TECHNICAL ENGLISH****L T P C  
3 0 0 3****Programme:** B.E./B.Tech. (Common to all Branches)**Category:** HS**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**

**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**

**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**

**Reading-** Reading for predicting the content **Listening-** Listening to situational s 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**

**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**

**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

**Total Periods: 45**

### **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

MA1101A  
C

**CALCULUS AND ITS APPLICATIONS**

L T P

3

1 0 4

### OBJECTIVES:

- To understand the concepts of limits, continuity, differentiation and use it to find maxima and minima of functions of one variable.
- 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.
- To familiarize the student with functions of several variables that is needed in many branches of engineering.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

### UNIT I- DIFFERENTIAL CALCULUS

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:

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

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

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**

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.

### **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.

### **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.



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<sub>2</sub> – 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- - Searle's and Lee's disc methods: theory and experiment- **Newton's law of cooling** - 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 CRYSTALLOGRAPHY 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 8<sup>th</sup> 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, Prof.Manabendra-chandra-IIT  
<https://youtu.be/TvfiZHXUtXg>
5. Lattice structures, Mark McClure-University of North Carolina  
<https://youtu.be/Rm-i1c7zr6Q>

## CY1101A ENGINEERING CHEMISTRY

L T P C  
3 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<sub>2</sub> 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<sub>2</sub>-O<sub>2</sub>).

### **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.

#### **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., “Nanotechnology: 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 ALGORITHMIC PROBLEM SOLVING 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 CONTROL FLOW, 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, 2<sup>nd</sup> 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, Pragmatic Programmers,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.

ME1101A

ENGINEERING GRAPHICS L T 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.

#### UNITI

#### 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.

#### UNITII

#### 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.

#### UNITIII

#### 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.

#### UNITIV

#### PROJECTION OF SECTIONED SOLIDS AND

6+6

#### DEVELOPMENTOF SURFACES

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.

## UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS

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: 61 PERIODS

### 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 and solids and development of surfaces.
- visualize and to project isometric and perspective sections of simple solids.

### TEXT BOOK:

1. Natrajan K.V., “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2009.
2. Venugopal K. and Prabhu Raja V., “Engineering Graphics”, New Age International (P) Limited, 2008.

### REFERENCES:

1. Bhatt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 50<sup>th</sup> 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, New Delhi, 2015.
6. Shah M.B., and Rana B.C., “Engineering Drawing”, Pearson, 2<sup>nd</sup> Edition, 2009.

### Publication of Bureau of Indian Standards:

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

### Special points applicable to University Examinations on Engineering Graphics:

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

**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 unknown resistance using Carey- Foster's bridge
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)**

Estimation of HCl using  $\text{Na}_2\text{CO}_3$  as primary standard and Determination of alkalinity in water sample.

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

## 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 and loops
- To use functions for python structured programs.
- Use strings for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- To read and write data from and to files in python.

### LIST OF EXPERIMENTS:

1. Write a program to display the largest number among three numbers.
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.

## CI1101A

## INDIAN CONSTITUTION

L T P C

3 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

**HS1201A**

**ENGLISH FOR COMMUNICATION**

**L T P C**

**4 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**

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

**UNIT – 2**

**9**

**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**

**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****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****Reading-** Close reading **Listening-** Listening for summarizing **Writing-** Dialogueconversations **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
- [iscollective.com](http://iscollective.com)
- [examenglish.com](http://examenglish.com)
- [englishclass101.com](http://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.
- Understand C-R equations and use it in the construction of Analytic Functions.
- 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**

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**

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**

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**

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**

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.

**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., and DiPrima, R.C., Elementary Differential Equations and 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, Tata Mcgraw Hill publications co. Ltd, New Delhi, 2017.

## 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 T<sub>c</sub> 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 Designll, Springer,

**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, Electronic materials, devices, and fabrication by Prof S. Parasuraman, Department of Metallurgy and Material Science, IIT Madras.  
<https://youtu.be/k6ZxP9Yr02E>
5. Superconductivity, Physics of Materials by Dr. Prathap Haridoss, Department of Metallurgical & Materials Engineering, IIT Madras.. <https://youtu.be/D-9M3GWOBw>

**EE1202A                    BASIC ELECTRICAL, ELECTRONICS AND ENGINEERING**  
**L T P C**

**3 0 0 3****OBJECTIVES:**

- To learn the fundamental laws, theorems of electrical circuits and also to analyze them
- To study the basic principles of electrical machines and their performance
- To study the different energy sources, protective devices and their field applications
- To understand the fundamentals of electronic circuit constructions
- To understand the principles and operation of measuring instruments and transducers

**UNIT I ELECTRICAL CIRCUITS ANALYSIS 9**

Ohms Law, Kirchhoff's Law-Instantaneous power- series and parallel circuit analysis with resistive, capacitive and inductive network - nodal analysis, mesh analysis- network theorems –Thevenin's theorem, Norton theorem and superposition theorem, three phase supply-Instantaneous, Reactive and apparent power-star delta conversion.

**UNIT II ELECTRICAL MACHINES 9**

DC and AC rotating machines: Types, Construction, principle, Emf and torque equation, application -Speed Control- Basics of Stepper Motor – Brushless DC motors- Transformers-Introduction- types and construction, working principle of Ideal transformer- Emf equation

**UNIT III UTILIZATION OF ELECTRICAL POWER 9**

Overview of Renewable Energy Sources". ( Wind and Solar ), . Illumination by lamps- Energy Saving lamps(Compact Fluorescent Lamp, Cold Cathode Tube, LED bulbs). Domestic refrigerator and air conditioner-Electric circuit, construction and working principle. Li-Ion Battery's Operation & Maintenance. Protection-need for earthing, fuses and circuit breakers – MCB, RCB and ELCB. Energy Tariff calculation for domestic loads.

**UNIT IV ELECTRONIC CIRCUITS 9**

Introduction to Electron Devices – PN Junction diode, Zener Diode, Transistor)-. Op-amps- Amplifiers, differentiator, integrator, ADC, DAC. Multi vibrator using 555 Timer IC . Voltage regulator IC using LM 723, LM 317.

**UNIT V ELECTRICAL MEASUREMENT 9**

Characteristics of measurement-errors in measurement, torque in indicating instruments-moving coil and moving iron meters, Energy meter and watt meter. Transducers-classification-RTD, Strain gauge, LVDT, LDR and piezoelectric. functional Block diagram of DSO

## OUTCOMES:

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

- Discuss the essentials of electric circuits and analysis
- Discuss the basic operation of electric machines and transformers
- Introduction of renewable sources and recent trends in illumination
- Discuss the basics of electronics components
- Introduction to measurement and metering for electric circuits

## TEXT BOOKS:

1. D.P. Kothari and I.J Nagrath, Basic Electrical and Electronics Engineering, Mc Graw Hill, 2016,Third Edition.
2. M.S. Sukhija and T.K. Nagsarkar, Basic Electrical and Electronic Engineering, Oxford, 2016.

## REFERENCES:

1. S.B. Lal Seksena and Kaustuv Dasgupta, fundamentals of Electrical Engineering, Cambridge,2016.
2. B.L. Theraja, Fundamentals of Electrical Engineering and Electronics, Chand & Co, 2008.
3. S.K.Sahdev, Basic of Electrical Engineering, Pearson 2015.
4. John Bird,-Electrical and electronic principles and Technology, Fourth Edition, Elsevier, 2010.
5. Mittle, Mittal, Basic Electrical Engineering, 2<sup>nd</sup> edition, Tata McGraw-Hill Edition, 2016.
6. C.L.Wadhwa, "Generation, Distribution and utilization of Electrical Energy", New Age international pvt ltd .2003.

CS1201A

PROGRAMMING IN C

L T P C

3 0 0 3

## OBJECTIVE:

- To develop C Programs using basic programming constructs.
- To develop C programs using arrays and strings.
- To develop applications in C using functions and functions.
- To develop applications in C using structures.
- To do input/output and file handling in C.

## 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-in functions (string functions, , math functions) - Recursion-Types of 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 - Parameter passing: Pass by value, Pass by reference - Example Program: Swapping of two numbers and changing the value of a variable using pass by reference.

### UNIT IV STRUCTURES 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.

### UNIT V FILE PROCESSING 9

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

TOTAL PERIODS:-45

#### OUTCOMES:

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

- Develop simple applications in C using basic constructs
- Design and implement applications using arrays and strings
- Develop and implement applications in C using functions and pointers.
- Develop applications in C using structures.
- Design applications using sequential and random access file Processing.

#### TEXTBOOKS:

1. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016.
2. Kernighan, B.W and Ritchie,D.M,"The C Programming language", Second Edition, Pearson Education, 2006

#### REFERENCES:

1. Paul Deitel and Harvey Deitel, "C How to Program", Seventh edition, Pearson Publication
2. Juneja, B. Land Anita Seth, "Programming in C", CENGAGE Learning India pvt. Ltd., 2011
3. Pradip Dey, Manas Ghosh, "Fundamentals of Computing and Programming in C", First Edition, Oxford University Press, 2009.
4. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
5. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.



**Course Objectives:-**

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

**LIST OF EXPERIMENTS**

1. Input and Output statements
2. Control statements – Branching & Looping
  - a) Write a C program to generate Pascal's triangle.
  - b) 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 Switch Statement)
  - c) Write a C program to find the sum of individual digits of a positive integer.
  - d) 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.
  - e) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
  - f) Write a C program to swap Numbers Using Temporary Variables.
3. Arrays
  - a) Write a C program to search an array element using linear search.
  - b) Write a C program to find both the largest and smallest number in a list of integers.
  - c) Write a C program that uses functions to perform the following:
    - i) Addition of Two Matrices
    - ii) Multiplication of Two Matrices
  - d) Write a C program to implement Bubble sort.
4. Strings
  - a) Write a C program that uses functions to perform the following operations:
    - i) To insert a sub-string in to given main string from a given position.
    - ii) To delete n Characters from a given position in a given string.
  - b) Write a C program to determine if the given string is a palindrome or not
5. Functions & Pointers:
 

Write C programs that use recursive functions

  - i) To find factorial of given number
  - ii) To solve Towers of Hanoi Problem.
  - iii) To swap the variables using call by value and call by reference.
6. a. Generate mark sheet of students using structures.
6. b. Compute salary slip for five employees using structures and functions.
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

**COURSE OUTCOMES:**

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

- Develop C programs for simple applications making use of basic constructs
- Develop C programs for control statements.
- Develop C programs involving arrays, strings and pointers.
- Develop C programs involving functions, and structures.
- Design applications using sequential and random access file processing.

**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: 60 PERIODS**

#### **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.

### **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: 45 PERIODS**

## **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.

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

### **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.

### **UNITII INHERITANCE AND INTERFACES 9**

Inheritance – Super classes- sub classes –Protected members – constructors in sub classes- the Object class – abstract classes and methods- final methods and classes – Interfaces – defining an interface, implementing interface, differences between classes and interfaces and extending interfaces - Object cloning -inner classes, ArrayLists - Strings

### **UNITIII 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

### **UNITIV MULTITHREADING AND GENERIC PROGRAMMING 9**

Understanding Threads, Thread Priorities, Synchronizing Threads, Thread life cycle, 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 – Menu – Dialog Boxes. Swing packages-Swing Control classes and Methods.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

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

- Develop Java programs using OOP principles
- Develop Java programs with the concepts of inheritance and interfaces
- Build Java applications using exceptions and I/O streams
- Design problems solutions using Generic Collections and Exception Handling
- Create a Database connectivity and manipulate database using JDBC
- Develop interactive Java programs using swings

**TEXT BOOKS:**

1. Herbert Schildt, —Java The complete referencell, 8th Edition, McGraw Hill Education, 2011.
2. Cay S. Horstmann, Gary cornell, —Core Java Volume –I Fundamentalsll, 9th Edition, Prentice Hall, 2013.

**REFERENCES:**

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

**CS1301A  
3 0 0 3**

**DATA STRUCTURES**

**L T P C**

**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 – Priority 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- applications of trees-Heaps-Application of heaps.

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

**9**

Graph and their representations-Graph Traversal Techniques: Breadth First Search (BFS) and Depth First Search (DFS)- Topological Sort -Minimum Spanning Tree: Prim's and Kruskal's Algorithm- Dijkstra's algorithm -Applications of graphs.

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

Searching- Linear Search – Binary Search. Sorting – Bubble sort – Selection sort – Insertion sort – Quick Sort-Merge sort-Shell sort – Radix sort. Hashing- Hash Functions – Collision in hashing-Separate Chaining – Open Addressing-Rehashing-Applications of Hashing.

### **COURSE OUTCOMES:**

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

- Learn and 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.
- Ability to apply Graph data structures in real world scenarios.
- Ability to comprehend the implementation of sorting, searching and hashing Techniques.

### **TEXT BOOKS:-**

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.

**CS1401A**

**COMPUTER ARCHITECTURE**

**L T P C**

**3 0 0 3**

## **UNIT I      FUNDAMENTALS OF COMPUTER ARCHITECTURE**

**9**

Overview- Eight great Ideas in Computer architecture-components of computer system-Instructions – Operations and Operands – Representing Instructions – Arithmetic & Logical operations – control operations – Performance - needs and types of various addressing modes

## **UNIT II      ARCHITECTURE OF COMPUTER ARITHMETIC OPERATIONS**

**9**

Data Representation, Architecture of Hardware implementation of arithmetic unit for common arithmetic operations: addition, subtraction, multiplication, division( Fixed point and floating point)

## **UNIT III ORGANIZATION AND ARCHITECTURE OF INSTRUCTION EXECUTION**

**9**

Introduction-Logic Design Convention-Building a datapath – A simple Control Implementation

scheme – An Overview of Pipelining – Pipelined datapath and control – Handling Data hazards & Control hazards-Exceptions.

#### **UNIT IV PARALLELISIM & MEMORY SYSTEM**

**9**

Parallel processing challenges – Flynn’s classification – SISD, MIMD, SIMD, SPMD, and Vector Architectures - Hardware multithreading – Multi-core processors and other Shared Memory Multiprocessors. Exploiting Memory Hierarchy:Introduction-Memory Technologies-Basics of caches-Measuring and improving Cache Performance-Virtual Memory-Cache Coherence.

#### **UNIT V INPUT/ OUTPUT ORGANIZATION**

**9**

Accessing I/O devices-Interrupts-External Devices-I/O Modules-Programmed I/O-Interrupt Driven I/O-Direct Memory Access-Bus Arbitration-Buses-synchronous Bus-Asynchronous Bus-Interface Circuits-Parallel Port-Serial; Port-Standard I/O Interfaces-Universal serial Bus(USB).

#### **TEXT BOOKS:-**

1. David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, Fifth Edition, Morgan Kaufmann / Elsevier, 2014.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky,Computer Organization, Fifth Edition, Tata McGraw Hill, 2012.
3. W. Stallings, Computer organization and architecture, Prentice-Hall, 2012 M. M. Mano, Computer System Architecture, 3rd Edition,1992,Prentice-Hall

#### **REFERENCE BOOKS:-**

1. John P. Hayes, Computer Architecture and Organization, Third Edition, Tata McGraw Hill, 2012.
2. John L. Hennessey and David A. Patterson, Computer Architecture – A Quantitative Approachll, Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.

**IT1302A**

**OBJECT ORIENTED PROGRAMMING LABORATORY**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>	

#### **OBJECTIVES**

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

#### **LIST OF EXPERIMENTS**

1. Develop a java application 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 file name from the user, displays information about whether the file exists, whether the file is readable, or writable, the type of file and the length of the file in bytes.
9. Write a java program that implements 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.

**TOTAL : 60 PERIODS**

### **OUTCOMES**

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

- Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.
- Develop and implement Java Programs with Arraylist.
- Develop and implement Java programs with exception handling and multithreading.
- Design applications using file processing, generic programming and event handling.
- Ability to solve real world problems using features of Object Oriented Programming
- Ability to write, debug and document well-structured Java Applications

CS1303A            DATA STRUCTURES LABORATORY            L T P C  
0042

### **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
  - i. Singly Linked List
  - ii. 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. Programs for implementation of graph traversals
  - (i) BFS and (ii) DFS

8. Programs to find out minimum spanning tree of simple connected undirected graph
  - i. Prim's Algorithm
  - ii. Kruskal's Algorithm
9. Program to implement Dijkstra's algorithm for solving single source shortest path.
10. Implementation of searching algorithms and Selection Sort, Insertion sort algorithms
11. Programs to implement hashing (i) Separate Chaining and (ii) Open Addressing

## **COURSE OUTCOMES:-**

CO1: Implement abstract data types for linear data structures

CO2: To apply different linear data structures to problem solutions

CO3: Comprehend and implement the different operations of various Trees.

CO4: Critically analyze the various algorithms

CO5: Understand and implement various sorting, searching and hashing algorithms

**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**

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- articulate a complete idea.

### **UNIT II**

Interpersonal skills- nurturing- empathetic- self-control- patient- sociability- warmth- social skills-Team Work-Work Ethic- willing to work- initiative- self-motivated - Integrity.

### **UNIT III**

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.

### **UNIT IV**

Being an active listener: giving verbal and non-verbal feedback- participating in a group discussion- asking and getting clarifications- Summarising academic readings and lectures- Conversational speech- listening to and participating in conversations- persuade.

### **UNIT V**

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.

**OUTCOMES: At the end of the course Learners will be able to:**

- 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 forSuccess. 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 MamtaBhatnagar. 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.

**CS1501A**

**OPERATING SYSTEMS**

**L T P C**

**3 0 0 3**

**OBJECTIVES:**

- To understand the basic concepts, functions, processes and threads of operating systems.
- To analyse Scheduling algorithms and understand the concept of Deadlocks.
- To analyse various memory management schemes.
- To understand I/O management and File systems.
- To be familiar with the basics of Linux system and Mobile OS like iOS and Android.

**UNIT I**

**OPERATING SYSTEM OVERVIEW**

**7**

Operating system overview-objectives and functions, Evolution of Operating System - Computer System Organization-Virtualization-Operating System Structure and Operations- System Calls, OS Generations, Process Concept, Threads- Overview, Multithreading Models, Threading issues

**UNIT II**

**PROCESS MANAGEMENT**

**11**

Processes-Process Scheduling, Operations on Processes, Inter-process Communication; ; CPU Scheduling - Scheduling criteria, CPU Scheduling Algorithms, Process Synchronization - Critical Section Problem, Mutex Locks, Semaphores, Classic problems of synchronization, Critical regions, Monitors; Deadlock - Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

**UNIT III**

**MEMORY MANAGEMENT**

**9**

Main Memory-Non Contiguous Memory Allocation - Contiguous Memory Allocation, Paging, Segmentation, Examples; Virtual Memory- Demand Paging, Page Placement and Replacement policies - FIFO Page Replacement, Optimal Page Replacement, LRU Page Replacement, Allocation, Thrashing;

**UNIT IV FILE SYSTEMS AND I/O SYSTEMS 9**

Mass Storage system – Overview of Mass Storage Structure, Disk Structure, Disk Scheduling and Management; swap space management; File concept, Access methods, Directory Structure, File Sharing and Protection, File System Structure, Directory Implementation, Allocation Methods, Free-Space Management, I/O Systems - I/O Hardware, Application I/O interface, Kernel I/O subsystem, Streams, Performance.

**UNIT V CASE STUDY 9**

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

**TOTAL: 45 PERIODS**

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

- Understand the basic concepts, functions, processes and threads of operating systems.
- Analyze various scheduling algorithms, Understand deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Understand the functionality of file systems.
- Perform administrative tasks on Linux Servers and compare iOS and Android Operating Systems.

**TEXT BOOK :**

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2012.

**REFERENCES :**

1. RamazElmasri, A. Gil Carrick, David Levine, "Operating Systems – A Spiral Approach", Tata McGraw Hill Edition, 2010.
2. AchyutS.Godbole, AtulKahate, "Operating Systems", McGraw Hill Education, 2016.
3. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Pearson Education, 2004.
4. Gary Nutt, "Operating Systems", Third Edition, Pearson Education, 2004.
5. Harvey M. Deitel, "Operating Systems", Third Edition, Pearson Education, 2004.
6. Daniel P Bovet and Marco Cesati, "Understanding the Linux kernel", 3rd edition, O'Reilly, 2005.
7. Neil Smyth, "iPhone iOS 4 Development Essentials – Xcode", Fourth Edition, Payload media, 2011.

**OBJECTIVES:**

- To learn the fundamentals of data models, conceptualize and depict a database system using ER diagram.
- To study the principles to be followed to create an effective relational database and write SQL queries to store/retrieve data to/from database systems.
- To know the fundamental concepts of transaction processing, concurrency control techniques and recovery procedure.
- To learn about the internal storage structures using different file and indexing techniques and the basics of query processing and optimization.
- To study the basics of distributed databases, semi-structured and un-structured data models

**UNIT I RELATIONAL DATABASES****9**

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

**UNIT II DATABASE DESIGN****9**

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

**UNIT III TRANSACTIONS****9**

Transaction Concepts – ACID Properties – Schedules – Serializability – Concurrency Control – Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Transaction Recovery - Save Points – Isolation Levels – SQL Facilities for Concurrency and Recovery.

**UNIT IV IMPLEMENTATION TECHNIQUES****9**

RAID – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Algorithms for SELECT and JOIN operations – Query optimization using Heuristics and Cost Estimation .

**UNIT V ADVANCED TOPICS****9**

Overview of Distributed Databases – Data Fragmentation – Replication — Introduction to Object-based Databases - Enhanced Data bases: Temporal Database –Spatial Database –Multimedia Database - XML Databases: XML schema - NOSQL Database: Characteristics – Schema-less models– Applications – Current Trends.

**OUTCOMES:**

**On completion of the course, the student will be able to:**

**CO1:** Model an application's data requirements using conceptual modeling and design database schemas based on the conceptual model.

**CO2:** Formulate solutions to a broad range of query problems using relational algebra/SQL.

**CO3:** Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.

**CO4:** Run transactions and estimate the procedures for controlling the consequences of

concurrent data access.

**CO5:** Explain basic database storage structures, access techniques and query processing.

**CO6:** Describe distributed, semi-structured and unstructured database systems.

### **TEXT BOOKS:**

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, —Database System ConceptsII, Sixth Edition, Tata McGraw Hill, 2014.
2. Ramez Elmasri, Shamkant B. Navathe, —Fundamentals of Database SystemsII, Sixth Edition, Pearson Education, 2017.
3. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", Morgan Kaufmann/El Sevier Publishers, 2013.

### **REFERENCES:**

1. C.J.Date, A.Kannan, S.Swamynathan, —An Introduction to Database SystemsII, Eighth Edition, Pearson Education, 2006.
2. Raghu Ramakrishnan, —Database Management SystemsII, Fourth Edition, McGraw-Hill College Publications, 2015.
3. G.K.Gupta, "Database Management SystemsII, Tata McGraw Hill, 2011.
3. G. K. Gupta, "Database Management Systems", Tata McGraw Hill, 2011.
4. Carlos Coronel, Steven Morris, Peter Rob, "Database Systems: Design, Implementation and Management", Ninth Edition, Cengage Learning, 2011.

**CS1504A**

**OPERATING SYSTEMS LABORATORY**

**L T P C**

**0 0 4 2**

### **OBJECTIVES**

- To learn Unix commands and shell programming
- To implement Process Creation, Inter Process Communication and various CPU Scheduling Algorithms
- To implement Deadlock Avoidance and Deadlock Detection Algorithms
- To implement Page Replacement Algorithms
- To implement File Allocation Strategies

### **LIST OF EXPERIMENTS**

1. Installation of LINUX using Virtual Machine
2. Basics of UNIX and LINUX commands
3. Write programs using the following system calls of UNIX operating system fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Write C programs to simulate UNIX commands like cp, ls, grep, etc.
5. Shell Programming
6. Write C programs to implement the various CPU Scheduling Algorithms
7. Implementation of Semaphores
8. Implementation of Shared memory and IPC
9. Bankers Algorithm for Deadlock Avoidance
10. Implementation of Deadlock Detection Algorithm

11. Write C program to implement Threading & Synchronization Applications
12. Implementation of the following Memory Allocation Methods for fixed partition a) First Fit b) Worst Fit c) Best Fit
13. Implementation of Paging Technique of Memory Management
14. Implementation of the following Page Replacement Algorithms a) FIFO b) LRU c) LFU
15. Implementation of the various file organization techniques and the following File Allocation Strategies a) Sequential b) Indexed c) Linked

**TOTAL: 60 PERIODS**

### **OUTCOMES:**

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

- Learn various UNIX commands, shell programming
- Compare the performance of various CPU Scheduling Algorithms
- Implement Deadlock avoidance and Detection Algorithms
- Create processes, implement IPC and Semaphores
- Analyze the performance of the various Page Replacement Algorithms
- Implement File Organization and File Allocation Strategies

**IT1402A**

**DATABASE MANAGEMENT SYSTEMS LABORATORY**

**L T P C**

**0 0 4 2**

### **OBJECTIVES:**

- To learn and implement important commands in SQL.
- To learn the usage of nested and joint queries.
- To understand functions, procedures and procedural extensions of databases.
- To understand design and implementation of typical database applications.
- To be familiar with the use of a front end tool for GUI based application development

### **Experiments:**

1. Data Definition Commands, Data Manipulation Commands for inserting, deleting, updating and retrieving Tables and Transaction Control statements
2. Database Querying – Simple queries, Nested queries, Sub queries and Joins
3. Views, Sequences, Synonyms
4. Database Programming: Implicit and Explicit Cursors
5. Procedures and Functions
6. Triggers
7. Exception Handling
8. Database Design using ER modeling, normalization and Implementation for any application
9. Create Document, column and graph based data using NOSQL database tools.
10. Develop a simple GUI based database application

### **OUTCOMES:**

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

- Use typical data definitions and manipulation commands.
- Design applications to test Nested and Join Queries
- Implement simple applications that use Views
- Critically analyze the use of Tables, Views, Functions and Procedures

- Implement a GUI application that require a Front-end and Back end Tool
- Create and manipulate data using NOSQL database.