DEPARTMENT OF INFORMATION TECHNOLOGY

R20
Course Structure

I Year - I Semester

Sl. No.	Course code	Name of the Course / Laboratory		No. of periods per week			Total Credits
				L	T	P	
1	EG3501	Functional English	HSS	3	-	-	3
2	MA3501	Linear Algebra and Calculus	BS	3	1	-	4
3	CH3507	Applied Chemistry	BS	3	-	-	3
4	EC3501	Elements of Electronics Engineering	ES	3	-	-	3
5	CT3502	Programming for Problem solving	ES	3	-	-	3
6	EG3502	Functional English Lab	HSS	-	-	2	1
7	CT3503	C Programming Lab	ES	-	-	4	2
8	CH3508	Applied Chemistry lab	BS	-	-	2	1
			Total:	15	1	8	20

I Year - II Semester

Sl. No.	Course code	Name of the Course / Laboratory		No. of periods per week			Total Credits
				L	T	P	
1	EG3503	Professional Communication	HSS	2	-	-	2
2	MA3504	Integral Transforms and Vector Calculus	BS	3	1	-	4
3	PH3508	Applied Physics	BS	3	-	-	3
4	CT3505	Data Structures	PC	3	-	-	3
5		Universal Human Values-2	HSS	2	1	-	3
6	EG3504	Professional Communication Lab	HSS	-	-	4	2
7	PH3509	Applied Physics Lab	BS	-	-	2	1
8	CT3507	Data Structures Lab	PC	-	-	4	2
		Total:		13	2	10	20
9	CI3501	Constitution of India (Mandatory Non-Credit Course)		-	-	2	-

II Year - I semester

Sl. No.	Course Code	Name of the Course / Laboratory		No.of Periods per week			No.of Credits
				L	T	P	
1	CT	Discrete Mathematical Structures	BS	3	-	-	3
2	CT	Object Oriented Programming through Java	ES	3	-	-	3
3	CT	Digital Logic Design	ES	3	-	-	3
4	CT	Database Management Systems	PC	3	-	-	3
5	IT	Principles of Software Engineering	PC	3	-	-	3
6	CT	Object Oriented Programming Lab	ES	-	-	4	2
7	CT	Database Management Systems Lab	PC	-	-	4	2
8	IT	Unified Modeling Language Lab	PC	-	-	2	1
9	CT	Logic Building & Algorithmic Programming	ES	-	-	2	1
Total				**15**	**-**	**12**	**21**
10	NS	NSS / Fine Arts / Yoga / Self Defense (Mandatory Non-Credit Course)		-	-	2	-

II Year - II semester

Sl. No.	Course Code	Name of the Course / Laboratory		No.of Periods per week			No.of Credits
				L	T	P	
1	IT	Probability and Statistics	BS	3	-	-	3
2	CT	Web Technologies	PC	3	-	-	3
3	IT	Computer Organization	ES	3	-	-	3
4	CT	Python Programming	ES	3	-	-	3
5	IT	Theory of Computation	PC	2	-	-	2
6	IT	**Open Elective –I** • Data Communications • ICT for Development	OE	3	-	-	3
7	CT	Web Technologies Lab	PC	-	-	4	2
8	CT	Python Programming Lab	PC	-	-	4	2
9	CT	Programming for Corporate	ES	-	-	2	1
Total				**17**	**-**	**10**	**22**
9	SG	Sports and Games / Cultural (Mandatory Non-Credit Course)		-	-	2	-

III Year – I semester

Sl. No.	Course Code	Name of the Course / Laboratory		No. of Periods per week			No. of Credits
				L	T	P	
1	IT	Numerical Methods & Optimization Techniques	BS	2	-	-	2
2	CT	Operating Systems	PC	3	-	-	3
3	CT	Compiler Design	PC	3	-	-	3
4	IT	Artificial Intelligence	PC	3	-	-	3
5	IT	**Open Elective-II** 1. Information Theory and Coding 2. Open Source Software	OE	3	-	-	3
6	IT	**Professional Elective – I** 1) Biometrics 2) Neural Networks and Fuzzy Systems 3) Advanced Data Structures 4) Computer Graphics	PE	3	-	-	3
7	IT	AI Tools & Techniques Lab	PC	-	-	2	1
8	IT	UNIX Operating Systems Lab	PC	-	-	2	1
9	IT	Socially Relevant Project	PR	-	-	2	1
10	CT	Competitive Coding(T&P)	ES	-	-	2	1
		Total		**17**	**-**	**8**	**21**

III Year – II semester

Sl. No.	Course Code	Name of the Course / Laboratory		No. of Periods per week			No. of Credits
				L	T	P	
1	IT	Design and Analysis of Algorithms	PC	3	-	-	3
2	CT	Data Warehousing and Data Mining	PC	3	-	-	3
3	IT	Computer Networks	PC	3	-	-	3
4	IT	**Open Elective-III** 1. Cyber Security 2. Scripting Languages	OE	3	-	-	3
5	IT	**Professional Elective – II** 1) Mobile Computing 2) Data Science Using R 3) Software Project Management 4) Image Processing	PE	3	-	-	3
6	IT	Computer Networks & Data Mining Lab	PC	-	-	4	2
7	CT	Mobile Application Development Lab	PC	-	-	2	1
8	CT	MOOCs/Mini Project	PC	-	-	4	2
9	CT	Linguistic Competency Building(T&P)	HSS	-	-	2	1
		Total		**15**	**-**	**12**	**21**

L : Lecture   T : Tutorial   P : Practical

IV Year - I semester

Sl. No.	Course Code	Name of the Course / Laboratory		No.of Periods per week			No.of Credits
				L	T	P	
1	CT	Cryptography & Network Security*	PC	2	-	2	3
2	CT	Machine Learning**	PC	2	-	2	3
3	IT	Bigdata Analytics	PC	3	-	-	3
4	IT	Managerial Economics and Financial Analysis	HSS	2	-	-	2
5	IT	**Professional Elective – III** 1) Cloud Computing 2) M-Commerce 3) Software Testing Methodologies 4) Game Theory	PE	3	-	-	3
6	IT	Bigdata Analytics lab	PC	-	-	4	2
7	CT	Internship/Industrial Training/Practical Training	PR	-	-	-	2
8	CT	Mini Project / MOOCs	PR	-	-	4	2
Total				**13**	**-**	**12**	**20**

* Integrated Theory and Lab Course
** Project based Theory Course

IV Year - II semester

Sl. No.	Course Code	Name of the Course / Laboratory		No. of Periods per week			No.of Credits
				L	T	P	
1	IT	Professional Elective – IV 1) Quantum Computing 2) Internet of Things 3) Agile software Development 4) Multimedia Tools	PE	3	-	-	3
2	IT	Professional Elective – V 1) Block Chain Technologies 2) Deep Learning 3) DevOps 4) Virtual and Augmented Reality	PE	3	-	-	3
3	IT	Project	PR	-	-	9	9
Total				**6**	**-**	**9**	**15**

Stream	Professional Elective - I	Professional Elective - II	Professional Elective - III	Professional Elective - IV	Professional Elective – V
	3-1	3-2	4-1	4-2	4-2
Networks and Security	Biometrics	Mobile Computing	Cloud Computing	Quantum Computing	Block Chain Technologies
Expert Systems	Neural Networks and Fuzzy Systems	Data Science Using R	M-Commerce	Internet of Things	Deep Learning
Software Engineering & Applications	Advanced Data Structures	Software Project Management	Software Testing Methodologies	Agile Software Development	DevOps
Graphics and Visualization	Computer Graphics	Image Processing	Game Theory	Multimedia Tools	Virtual and Augmented Reality

Basic Sciences			
1	CT	Linear Algebra and Calculus	3
2	CT	Applied Physics	3
3	CT	Applied Physics Lab	1
4	CT	Environmental Studies	2
5	CT	Integral Transforms and Vector Calculus	3
5	IT	Applied Chemistry	3
6	IT	Applied Chemistry lab	1
7	CT	Discrete Mathematical Structures	3
8	CT	Probability and Statistics	3
9	IT	Numerical Methods & Optimization Techniques	2
TOTAL CREDITS			24

		HSS	
1	CT	Functional English	3
2	CT	Functional English Lab	1
3	CT	Professional Communication	2
4	CT	Professional Communication Lab	2
5	CT	Universal Human Values-2	3
6	CT	Managerial Economics and Financial Analysis	2
7	CT	Linguistic Competency Building	1
		TOTAL CREDITS	14

		Professional Core	
1	CT	Data Structures	3
2	CT	Data Structures Lab	2
3	CT	Database Management Systems	3
4	CT	Database Management Systems Lab	2
5	CT	Web Technologies	3
6	IT	Principles of Software Engineering	3
7	CT	Web Technologies Lab	2
8	CT	Operating Systems	3
9	IT	Artificial Intelligence	3
10	IT	Design and Analysis of Algorithms	3
11	IT	Theory of Computation	2
12	IT	AI Tools & Techniques Lab	1
13	IT	UNIX Operating Systems Lab	1
14	CT	Compiler Design	3
15	IT	Data Warehousing and Data Mining	3
16	CT	Computer Networks	3
17	CT	Computer Networks and Data Mining Lab	2
18	IT	Mobile Application Development Lab	1
19	IT	Cryptography & Network Security*	3
20	CT	Bigdata Analytics	3
21	IT	Machine Learning**	3
22	CT	Bigdata Analytics Lab	2
		TOTAL CREDITS	**54**

	Open Electives	
1	**Open Elective –I** 1. Data Communications 2. ICT for Development	3
2	**Open Elective-II** 1. Information Theory & Coding 2. Open Source Software	3
3	**Open Elective-III** 1. Cyber Security 2. Scripting Languages	3
	TOTAL CREDITS	**9**

		Engineering Sciences (ES)		
1	CT	Elements of Electronics Engineering	3
2	CT	Programming for Problem Solving	3
3	CT	Computer Programming Lab	2
4	CT	Object Oriented Programming through Java	3
5	CT	Digital Logic Design	3
6	CT	Object Oriented Programming Lab	2
7	CT	Computer Organization	3
8	CT	Python Programming	3
9	CT	Python Programming Lab	2
10	CT	Logic Building & Algorithmic Programming	1
11	CT	Programming for Corporate	1
12	CT	Competitive coding	1
TOTAL CREDITS			**27**

		Project & Others		
1	CT	Socially Relevant Projects	1
2	CT	Mini Project	2
3	CT	Internship/Industrial Training/Practical Training	2
4	CT	PROJECT	9
TOTAL CREDITS			**14**

	Mandatory Non-Credit Courses	
1	Constitution of India	2
2	NSS / Fine Arts / Yoga / Self Defense (Mandatory Non-Credit Course)	2
3	Sports and Games / Cultural (Mandatory Non-Credit Course)	2
Total hours		**6**

FUNCTIONAL ENGLISH
I Year – I Semester

Lecture :3   Internal Marks : 30

Credits :3   External Marks : 70

==

Course Objectives

o To equip the students for their present and future academic pursuits involving the following:

- listening to (and viewing) classroom lectures and other academic presentations with a reasonable degree of accuracy, understanding, and appreciation, and responding to them appropriately;
- speaking in academic (e.g. classroom discussions) and social contexts with a fair degree of fluency, accuracy and intelligibility, and with due attention to factors such as purpose, audience, context, and culture;
- reading a wide range of informational and functional texts, including course books and reference materials, from print and non-print sources and using them for a variety of purposes; and
- writing for academic purposes (e.g. assignments, examination answers) in an organized way following the rules of discourse and using vocabulary and grammar appropriately and accurately; and

o To develop in them the communication strategies and social graces necessary for functioning effectively in social, academic, and other situations in which they may be called upon to use English.

Learning Outcomes

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

- speak with a reasonable degree of fluency using communication strategies (i.e. using language appropriately to carry out functions such as greeting, requesting information, seeking confirmation, disagreeing) as well conventions of politeness and courtesy
- speak with a reasonable degree of fluency and accuracy in contexts requiring tasks such as narrating and describing
- listen to short audio and video clips

  - in standard Indian accent with understanding of the types listed in D (1) (a) below; and
  - in native English accent (British and American), especially clips in which the speakers or voice actors speak slowly, and gain both understanding of messages and sensitivity to native-speaker accents

- read fluently comprehending texts of different kinds using multiple strategies to understand explicitly-stated information as well as underlying meanings
- write coherent paragraphs with attention to elements of writing such as content, organization, language, style, and mechanics and the conventions of academic writing
- write survey reports with attention to conventions of report writing
- guard against mistakes Indians typically make in their speech and writing in English

UNIT -1 (11 PERIODS)

S. No.	Components	No. of Periods
1	**Listening**: Listening Comprehension – Task 1 (IWE - Chapt II)	1
2	**Speaking**: Communication Functions – Conversation between Raghu and Sridhar (IWE - Chapt II)	2
3	**Reading**: Reading Comprehension – Task 1 (DPM)	2
4	**Vocabulary**: (a) GRE Words – 1.1, (b) Collocations – 2.1 (VB)	2
5	**Grammar**: Tenses – Simple Present and Present Continuous (IWE - Chapt II)	2
6	**Writing**: Paragraph-Writing (IWE - Chapt II)	2

UNIT -2 (11 PERIODS)

S. No.	Components	No. of Periods
1	**Listening**: Listening comprehension – Task 2 (WR)	1
2	**Speaking**: Communication Functions – Exercise (DPM)	2
3	**Reading**: Reading Comprehension – Task 2 (DPM)	2
4	**Vocabulary:** (a) Words Often Confused – 3.1, (b) One-Word Substitutes – 4.1 (VB)	2
5	**Grammar: (a)** Indianism and (b) *Have to* (IWE - Chapt II)	2
6	**Writing**: Paragraph-Writing (IWE - Chapt II)	2

UNIT -3 (12 PERIODS)

S. No.	Components	No. of Periods
1	**Listening**: Listening Comprehension – Task 3 (IWE - Chapt III)	1
2	**Speaking**: Communication Functions – Conversation between Shreya and Kalpana (IWE - Chapt III)	3
3	**Intensive Reading**: Reading Comprehension Task – 3 (DPM) **Extensive Reading**: *The Adventures of Huckleberry Finn* by Mark Twain	2
4	**Vocabulary:** (a)Idioms – 5.1, (b) Phrasal Verbs – 6.1 (VB)	2
5	**Grammar:** Tenses – Simple Past and Present Perfect (IWE - Chapt III)	2
6	**Writing**: Paragraph-Writing – Coherence (IWE - Chapt III)	2

UNIT - 4 (12 PERIODS)

S. No.	Components	No. of Periods
1	**Listening**: Listening Comprehension – Task 4 (IWE - Chapt IV)	1
2	**Speaking**: Communication Functions – Conversation between professor and Mayur (IWE - Chapt IV)	2
3	**Reading**: Reading Comprehension – Task 4 (DPM)	2
4	**Vocabulary:** (a) GRE words – 1.2, (b) Collocations – 2.2, (c) Words Often Confused – 3.2 (VB)	3
5	**Grammar**: Expressing Futurity (IWE - Chapt IV)	2
6	**Writing**: Clutter-Free Writing (IWE - Chapt IV)	2

UNIT -5 (11 PERIODS)

S. No.	Components	No. of Periods
1	**Listening**: Listening comprehension – Task 5 (WR)	1
2	**Speaking**: (a) Communication Functions and (b) Telephone Etiquette – Exercises (IWE - Chapt IV)	2
3	**Intensive Reading**: Reading Comprehension – Task 5 (DPM) **Extensive Reading**: *More Tales from Shakespeare* by Charles and Mary Lamb	2
4	**Vocabulary:** (a) One-Word Substitutes – 4.2, (b) Idioms – 5.2, (c) Phrasal verbs – 6.2 (VB)	2
5	**Grammar**: Structure – *Going to* (IWE - Chapt IV)	1
6	**Writing**: Technical Report Writing (DPM)	3

- IWE – *Innovate with English* by T Samson (Foundation)
- Chapt – Chapter
- DPM – Department-produced materials (handouts)
- WR – Web-resources
- VB – *Vocabulary Builder for Students of Engineering and Technology* by Vijaya Lakshmi et al (Maruthi)

Note:

1 To be done in 56-58 periods of 50 minutes each.
2 Mid I test to be set on Units 1, 2 and 3 and Mid II test on Units 4 and 5.
3 Where a section requires more number of periods than suggested above for one component and fewer for another, adjustments may be made in consultation with the Head of the Department.

>>0<<<

LINEAR ALGEBRA AND CALCULUS
(Common to CE, EEE, ME,ECE,IOT,CSE, IT)
I Year – I Semester

Lecture : 3+1   Internal Marks : 30

Credits : 3   External Marks : 70
==

Course Objectives

To make the students
- o understand the procedure to solve the system of linear equations.
- o know the method for finding eigenvalues and eigenvectors.
- o familiar with the knowledge of differential calculus to support their concurrent and subsequent engineering studies.
- o know how to find maxima and/or minima for a given surface.
- o understand the methods to evaluate areas and volumes using integrals.

Learning Outcomes
Upon successful completion of the course, the students will be able to
- • solve the system of linear equations in various engineering problems.
- • evaluate the eigenvalues and eigenvectors.
- • solve linear ordinary differential equations .
- • apply the techniques of partial differentiation in optimization problems and solve first order partial differential equations.
- • compute areas and volumes using double and triple integrals.

UNIT– I: System of Linear Equations
Rank of a matrix – Echelon form, Normal form. System of linear equations – consistency and inconsistency - Gauss-elimination method.

UNIT– II: Eigenvalues and Eigenvectors
Finding eigenvalues and eigenvectors for a given matrix, Properties of Eigenvalues and Eigenvectors, Cayley –Hamilton theorem - finding inverse and powers of a matrix. Singular value decomposition.

UNIT– III: Ordinary Differential Equations
Review on first order ordinary differential equations. Application – Newton's Law of cooling. Solving Second and Higher Order Differential Equations : Homogeneous differential equations and Non-Homogeneous differential equations when RHS terms are of the form e^{ax}, sin ax,   cos ax, polynomial in x, $e^{ax}v(x)$ and method of variation of parameters.
Overview of Cauchy's and legendre's differential equations.

UNIT– IV: Partial Derivatives and Partial Differential Equations
Introduction - total derivative, chain rule. Jacobian, Applications - finding maxima and minima (two & three variables).
Solutions of first order linear P.D.E. Solving Non-Linear P.D.E by charpit's method.

UNIT– V: Multiple Integrals
Evaluation of double and triple integrals. Areas by double integrals and Volumes by triple integrals. Change the Order of integration.

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th edition, MaitreyPrintech Pvt. Ltd, Noida, 2011.
2. B.S.Grewal, Higher Engineering Mathematics, 43rd edition, Khanna Publishers, New Delhi, 2015.

Reference Books:

1. Schaum's Series, Differential Equations, Tata-Mc Graw Hill Company Limited.
2. Bali &Iyengar,Text Book of Engineering Mathematics, Laxmi Publications (P) Ltd.

* * *

APPLIED CHEMISTRY
(IT)

Lecture:3   **Internal Marks:30**
Credits:3   **External Marks:70**

==

Course Objectives:
- o To impart the knowledge of chemistry of advanced materials and electrochemical energy systems.
- o To impart the knowledge of spectroscopic techniques for structure analysis.

Learning Outcomes:

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

- apply BET method to determine surface area of a nano material and discuss the preparation, properties and applications of nanomaterials. Explain the principles of green chemistry for sustainable development.
- explain the electrochemistry of batteries and sensors.
- explain the structure of bio-molecules and their application in molecular machines.
- discuss the different types of semi-conductors, preparation and properties of polymer materials used in electronic components.
- interpret the spectral data to analyse the structure of simple molecules.

Unit-I: Advanced materials
Nano materials: Classification, synthesis of nanomaterials – sol-gel method –Carbon nanotubes – types – properties and applications. Quantum dots – applications. Determination of surface area by BET method, numerical problems on calculation of surface area based on BET method.

Green chemistry: Principles – E-waste management– outline of green computing.

Unit-II: Electrochemical energy systems and Sensors

Electrochemical energy systems: Electrochemistry and applications of lead-acid battery, VRLA technology, lithium ion battery, Zinc-air battery and H_2-O_2 fuel cell.

Sensors: Principle, description of an electro chemical sensor – applications, working principle of glucometer – applications of bio-sensors.

Unit-III: Chemistry of bio-molecules
Chemistry of bio-molecules:

Carbohydrates: Classification – structures – mutarotation – biochemical importance of monosaccharides.

Amino acids and Proteins: Composition of proteins – classification of amino acids.

Nucleic Acids: Chemical composition – structure of DNA and RNA.

Molecular switches: Characteristics of molecular motors and machines, Rotaxanes and Catenanes as artificial molecular machines.

Unit-IV: Semi conductors and Polymers

Semi-conductors: Introduction – elemental and non-elemental semi-conductors – preparation of ultra pure Si.

Fibre reinforced plastics: Definition of matrix and reinforcement – Carbon fibres and Aramid fibres – preparation, properties and applications.

Conducting polymers: Introduction – types – applications– working principle of OLED and its comparison with LCD.

Unit-V: Spectroscopic techniques and applications

Basic concepts of spectroscopy – Beer Lambert's Law – numerical problems.

UV-visible spectroscopy– principle – types of electronic transitions – Applications.

^{1}H NMR spectroscopy– Principle – interpretation of NMR spectra of methanol, ethanol and simple haloalkanes.

Text Books:

1. Engineering Chemistry - Fundamentals and Applications by Shikha Agarwal, first edition Cambridge University Press, New Delhi, 2015.

2. A Text book of Applied Chemistry by Dr. Bharathi Kumari Yalamanchili. VGS Techno series, sixth edition, 2019.

Reference Books:

1. A Textbook of Engineering Chemistry by Sunita Rattan, S.K. Kataria& Sons, New Delhi, first edition, 2012.

2. Text book of Engineering Chemistry by Jain & Jain. Dhanpat Rai Publishing Company, sixteenthedition, 2015.

3. Essentials of Physical Chemistry, B.S. Bahl, G. D. Tuli and ArunBahl, S. Chand and Company Limited, New Delhi.

4. Spectroscopic identification of organic compounds by Robert M.Silverstein, sixth edition,Wiley, 2005.

5. Physical chemistry, Peter Atkins, tenth edition, Oxford University Press, 2014.

****

ELEMENTS OF ELECTRONICS ENGINEERING
(IT)
I Year – I Semester

Lecture: 3   Internal Marks: 30

Credits: 3   External Marks: 70

Course Objectives

- o To familiarize the student with the basic construction, characteristics of semiconductor devices like diode, transistor, FET, MOSFET and various applications of the devices.
- o To introduce Logic Families.

Course Outcomes

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

- Understand the behavior of various semiconductor devices.
- Identify appropriate semiconductor devices for different applications.
- Describe the switching and rectification action of a diode.
- Recognize unipolar and bipolar logic families and their use in ICs.

UNIT–I: Review of Semiconductors and PN-Junction Diode Characteristics
Material classification, Mobility and conductivity, Intrinsic and extrinsic semiconductor, Mass-action Law, Hall Effect, Drift and Diffusion currents, Problems.

Open circuited PN junction, The Volt-Ampere characteristics, Temperature dependence of V-I characteristics, Diode Resistance, Diode Capacitances: Transition and Diffusion(No derivation for diode current equation and diode capacitances), Diode as a switch and Rectifier, Problems.

UNIT- II: Special Semiconductor Devices
Breakdown mechanisms: Avalanche break down and Zener breakdown, Zener diode, Tunnel diode, Varactor diode, Photo diode, LED, UJT(Only V-I Characteristics).

UNIT–III: Bipolar Junction Transistor
Construction of a transistor, transistor current components, Transistor configurations – CB, CE and CC, Early effect, comparison of CB, CE and CC, Transistor operating regions, BJT as a switch and Amplifier, Problems.

UNIT–IV: Field Effect Transistors
Classification of FETs, Construction of JFET, Characteristics of FET, Transfers Characteristics, Comparison with BJT, Depletion type MOSFET, Enhancement type MOSFET, Comparison of E-MOS and D-MOS, MOS as a switch and Amplifier, Problems.

UNIT–V: Logic Families
Evaluation of Semiconductor devices, Classification of ICs, Performance Characteristics of ICs, Types of Logic Families, Diode Logic (AND and OR Logic), Transistor Logic: Bipolar Logic, unipolar Logic (NMOS, PMOS, CMOS)

Text Books
1. Jacob Millman and Christos C Halkias, Electronic Devices and Circuits, 3rd Edition, TMH, 2014.

2. Robert L Boylested and Louis Nashelsky, Electronic Devices and Circuit Theory, 11th Edition, Pearson, 2015.

Reference Books
1. Ben G. Streetman, Sanjay Kumar Banerjee, Solid State Electronic Devices, 6th Edition,

PHI Publications, 2013.

2. Theodore F Bogart Jr., Jeffrey S Beasley and Guiliermo Rico, Elecronic Devices and Circuits, 6th Edition, Pearson Education 2004.

3. David A Bell, Electronic Devices and Circuits, 4th Edition, PHI, 2003.

4. Floyd, Thomas, Electronic Devices, Pearson Education, 9th Edition, 2015.

PROGRAMMING FOR PROBLEM SOLVING
(Common to CSE, AI & DS and IT)
I Year – I Semester

Lecture: 3
Credits: 3

Internal Marks: 30
External Marks: 70

_____

Course Objectives
- To emphasize the use of algorithm and flowchart in problem solving.
- To apply C language in problem solving.

Course Outcomes
Upon successful completion of the course, the students will be able to
- Outline problem solving steps and solve sample problems
- Use control statements for writing the programs.
- Apply the concepts of arrays and strings in problem solving.
- Decompose a problem into functions to develop modular reusable code.
- Apply user- defined data types and text I/O operations.

UNIT–I: Problem Solving Steps and Basics of C
Problem Solving Steps – Understanding problem, developing algorithm, flowchart, coding, debugging and testing.

General form of a C program, Identifiers, Types, Variables, Constants, Operators, I/O statements, Expressions, Precedence and Associativity, Type Conversion.

Problem Solving – Sample problems such as evaluating formulae.

UNIT–II: Control Statements
Selection - Making Decisions – Single-way, Two-Way Selection, Multi-way Selection, Dangling else Problem.

Repetition –Concept of loop, Loops in C: while, do-while and for.

Jump Statements – return, goto, break, exit and continue.

Problem Solving–Factorial computation, generation of Fibonacci sequence, reversing digits of an integer, generating prime numbers.

UNIT–III: Arrays and Strings
Arrays -Arrays Concepts, Using Arrays in C, Array Applications, Two-Dimensional Arrays and Multidimensional arrays.

Strings -Strings Concepts, C Strings, String Input/Output Functions, Arrays of Strings, String Handling Functions.

Problem Solving – Computing mean and variance of a set of numbers, reverse the elements in an array, addition and multiplication of two matrices, insert sub-string into main-string, reverse of given string without using string handling functions.

UNIT–IV: Pointers and Functions
Pointers – Declarations, initialization, Pointer Arithmetic, Memory allocation Functions, Arrays and Pointers, Lvalue and Rvalue.

Functions –Designing Structured Programs, User-Defined Functions, Standard Functions, Parameter Passing Techniques, Passing Array to Functions, Passing Pointers to Function, Recursion, storage classes.,

Problem solving–Using functions print the sum of all elements of the array using pointers, convert decimal number to binary number using function, calculate the GCD of two non-negative integers using recursion.

UNIT–V:User defined Data types and File Handling

Enumerated, Structure and Union Types: The Type Definition (typedef), Enumerated Types, Structure: Declaration, Initialization, accessing structures, Operations on Structures, Nested Structures, Structure Containing Arrays, Pointers and Structures, Arrays of Structures Unions.

Text Input/Output - Files, Streams, Standard Library Input/Output Functions, Formatting Input/Output Functions, Character Input/Output Functions and random access to files.

Problem solving –To implement a structure to read and display the name, salary and address of an Employee (Use nested structure for address),Copy the contents of one file to another, count the number of characters, words and lines in a file.

Text Books
1. Programming for Problem Solving, Behrouz A. Forouzan, Richard F.Gilberg, Cengage, 2020.
2. Programming in C, 2nd Edition Pradip Dey and Manas Ghosh, OXFORD Higher Education.

Reference Books
1. Programming in C, Reema Thareja, OXFORD.
2. C Programming, E Balaguruswamy, 3rd edition, TMH
3. R G Dromey, How to Solve it by Computer, Prentice-Hall of India, 1999.

FUNCTIONAL ENGLISH LAB

I Year – I Semester

Lecture : 2   Internal Marks : 30
Credits : 1   External Marks : 70

==

Course Objectives

o Functional English (Lab) seeks to develop in the students the communication strategies and social graces necessary in order to function effectively in social and other situations in which they may be called upon to speak in English; and
o It seeks to develop in them a greater awareness of English pronunciation and provides for focused practice with the sounds of English and intonation patterns improve their pronunciation skills and to enable them to speak with a reasonable degree of intelligibility.

Course Outcomes

Upon successful completion of Functional English (Lab), the students will be able to:

- give short impromptu speeches with confidence and fluency
- take part in conversations in different functional contexts using English following appropriate communication strategies.
- use conventions of politeness and courtesy in speech and enhance the effectiveness of their communication in English
- articulate the sounds of English (vowels, consonants, and diphthongs) with accuracy
- check the pronunciation of words in a dictionary using their knowledge of phonemic symbols.
- pause at appropriate places in their speech in English, enhancing thereby the comprehensibility of their communication
- speak English with adequate attention to stress, rhythm, and intonation
- speak without their pronunciation being marred by regional peculiarities, achieving thereby greater intelligibility in their communication with non-Telugu speakers of English
- read out texts of different kinds fluently with appropriate pauses, stress, and intonation

Unit No.	Components		No. of Periods
1	(A) Using expressions for :	a. Greeting others b. Taking leave c. Introducing	6
	(B): Pure vowels (identifying and pronouncing vowel sounds)		3
2	(A) Using expressions for :	a. Asking for information and b. Giving information	3
	(B): Diphthongs (identifying and pronouncing diphthongs)		3
3	(A) Using expressions for :	a. Inviting b. Accepting and declining invitations	6
	(B): Consonants (identifying and pronouncing consonants)		3
4	(A) Using expressions for :	a. Giving commands or instructions b. Requesting	3
	(B): Accent and rhythm (speaking rhythmically)		6
5	(A) Using expressions for :	a. Giving suggestions b. Expressing opinions	3
	(B): Intonation (using different tones in connected speech)		6

Lab Manual

HariPrasad,M.,SalivendraRaju,J.,andSuvarnaLakshmi,G.(2013).*Strengthen Your Communication Skills*. Hyderabad: Maruthi Publications

Software used:
1 'Multimedia Language Lab': K-Van Solution, Hyderabad
2 'Foundation Course in Communication Skills' : Andhra Pradesh State Council of Higher Education (APSCHE), Government of Andhra Pradesh.

Note:
1 To be done in 42-45 periods.
2 Each laboratory session consists of 3 periods of 50 minutes; there is one lab session every week.
3 Where a section requires more number of periods than suggested above for one component and fewer for another, adjustments may be made in consultation with the Head of the Department.

>>>0<<<

C PROGRAMMING LAB
(Common to CSE, AI & DS and IT)
I Year I Semester

Practical: 4
Credits: 2

Internal Marks: 30
External Marks: 70

Course Objectives
- To familiarize with the discrete components of a computer, MS Office.
- To design flowcharts, algorithms and knowing how to debug programs.
- To develop of C programs using arrays, strings pointers & function.
- To review the file operations

Course Outcomes

Upon successful completion of the course, the students will be able to
- draw flowcharts and write algorithms
- apply problem solving steps to solve a problem.
- design and develop modular programming skills.
- Apply structures and unions to solve a problem.
- Apply file I/O to solve a problem.

Exercise 1: Basics of C
a) Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches and width of 5 inches.

b) The area of a triangle is given by Area $= \sqrt{p(p-a)(p-b)(p-c)}$, where p is half of the perimeter, or (a + b + c) / 2. Let a,b,c be the lengths of the sides of the given triangle. Write a C program to calculate the area of triangle using this herons Formula.

Exercise 2: Selection Statements
a) A triangle is a polygon with three edges and three vertices. It is one of the basic shapes in geometry. A triangle with vertices *A*, *B*, and *C* is denoted ΔABCTriangles can be classified according to the lengths of their sides, An equilateral triangle has all sides the same length,An isosceles triangle has two sides of equal length and An scalene triangle has all its sides of different lengths. Write a Menu-Driven Program to display various geometrical shapes of a triangle.
b) Write a C Program to find maximum and minimum of three numbers using ternary operator.
c) Read two integer operands and one operator form the user, perform the operation and then print the result. (Consider the operators +, -, *, /, % and use Switch Statement).

Exercise 3: Iterative Statements-I

Develop a C Program for the following:
a) Reversing digits of an integer.
b) An Armstrong number is a number that is sum of its own digits each raised to the power of number of digits. Write a C program to check whether the given number is Armstrong number or not.

for example:
$9=9^1=9$
$371=3^3+7^3+1^3=27+343+1=371$

$8208=8^4+2^4+0^4+8^4=4096+16+0+4096=8028$

Exercise 4: Iterative Statements-II

Develop a C program for the following:

a) Display the n terms of harmonic series and their sum. $1 + 1/2 + 1/3 + 1/4 + 1/5 +...+ 1/n$ terms.

b) To print following Inverted half pyramid using numbers.

1 2 3 4 5
1 2 3 4
1 2 3
1 2
1

c) To print the Pascal triangle. A user will enter how many numbers of rows.

Exercise 5: Arrays

Design a C program for the following:

a) To print all unique elements in an array.

b) Computing mean and variance of a set of numbers.

c) To perform matrix multiplication using two dimensional arrays.

Exercise 6: Strings

Develop a C program for the following:

a) To check whether the given String is a Palindrome (Without using String Handling functions).

b) To insert sub-string into main string.

Exercise 7: Functions

Implement a C program for the following:

a) To convert decimal number to binary number using function.

b) To get the nth largest element of an array using the function.

c) GCD of two non-negative integers using recursion.

Exercise 8: Pointers

Implement a C program for the following:

a) To print the sum of all elements of the array using pointers.

b) To count the number of vowels and consonants in a string using a pointer.

c) To find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.

Exercise 9: Structures-I

Develop a C program for the following:

a) To implement a structure to read and display the name, salary and address of an Employee (Use nested structure for address).

b) To display the Name, Marks in five subjects and total marks of given number of students. (Using array of structures).

Exercise 10: Structures-II

Develop a C program thatuses functions to perform the following operations using Structure:

i) Addition of two complex numbers

ii) Subtraction of two complex numbers

iii) Multiplication of two complex numbers.

iv) Division of two complex numbers.

Exercise 11: Files

Implement a C program for the following:

a) To copy contents of one file to another.
b) To count the number of characters, words and lines in a given text file.

References
1. Programming for Problem Solving, Behrouz A. Forouzan, Richard F.Gilberg, Cengage, 2020.
2. Programming in C, 2nd Edition Pradip Dey and Manas Ghosh, OXFORD Higher Education.
3. C Programming, E Balaguruswamy, 3rd edition, TMH
4. R G Dromey, How to Solve it by Computer, Prentice-Hall of India, 1999.

APPLIED CHEMISTRY LAB

Lecture: 2   **Internal Marks: 30**
Credits: 1   **External Marks:70**
==

Course objectives:

- o To develop the skill on chemical and instrumental methods of analysis.
- o To acquire the skill in preparation of synthetic materials.

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

- analyze the total hardness of water by volumetric method.
- operate the pH meter, conductivity meter and turbidity meter for analyzing the water quality
- synthesize phenol – formaldehyde resin (Bakelite), poly aniline and obtain cell potential by the construction of an electrochemical cell.
- analyze the corrosion rate of a given metal in a given environment by gravimetric method.
- operate spectrophotometer and determine the concentration of Ferric Iron in a given solution.

List of Experiments
Introduction to Chemistry Lab (the teachers are expected to teach fundamentals like Primary, Secondary Standard Solutions, Normality, Molarity, Molality etc. and laboratory ware used, error, accuracy, precision, theory of indicators, use of volumetric titrations, potable water - WHO standards).

1. Practice experiment-Determination of the amount of HCl in a given solution using standard Na_2CO_3.
2. Determination of total hardness of the given water sample by EDTA method.
3. (a)Determination of pH of different water samples by using pH meter.

(b)Determination of conductivity of different water samples by using conductivity meter.

4. Determination of turbidity of different water samples by using turbidity meter.
5. Determination of total dissolved salts present in a given water sample.
6. Determination of concentration of the given acid by using standard base

conducto metrically.

7. Construction of an Electrochemical cell and determination of emf.
8. Determination of rate of corrosion of carbon steel metal in acid medium in the absence and presence of Thiourea inhibitor by gravimetric method.
9. Preparation of polyaniline.
10. (a) Preparation of Printed circuit board by electro less plating.

(b) Preparation of Phenol - Formaldehyde resin.

11. Determination of concentration of Ferric iron in a given solution spectrophotometrically.

Lab Manual:

1. Vogel's Textbook of Quantitative Chemical Analysis, Fifth edition, John Wiley & Sons, Inc., New York.

2. Fernandez, A., Engineering Chemistry, Owl Book Publishers.

3. Engineering chemistry laboratory manual & record by Srinivasulu.D, Parshva publications.

4. Engineering Chemistry Lab Manual by K.Mukkanti, B.S publications, 2009.

PROFESSIONAL COMMUNICATION

I Year – II Semester

Lecture : 2   Internal Marks : 30

Credits : 2   External Marks : 70

==

Course Objectives

o To equip the students with common employability skills (the skills required for gaining employment and performing successfully in different careers) which can enable them to perform communication tasks of increasing length and complexity.

o To develop in them the interactional communication strategies and social graces which have the potential to add to the effectiveness of professional communication

Course Outcomes

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

- speak with a reasonable degree of fluency and accuracy in professional communication situations (such as arriving at a consensus through discussion, making a presentation, and taking part in a telephone conversation)
- add to the effectiveness of their oral communication by using communication strategies, conventions of politeness and courtesy, and stress and intonation.
- listen to short audio and video clips in native English accent (British and American), and gain both understanding of messages and sensitivity to native- speaker accents
- read fluently, comprehending texts of different kinds using multiple strategies and higher-order skills
- produce written discourses of different kinds (e.g. texts expressing opinions and making a convincing case for one's standpoint, professional emails, and summaries of lengthy texts) with attention to elements of writing such as content, organization, language, style, and mechanics
- guard against grammatical errors Indians typically make in their speech and writing in English

UNIT - 1 (09 PERIODS)

S. No.	Components	No. of Periods
1.	**Listening**: Listening comprehension – Task 1 (IWE – Chapt VII)	1
2.	**Speaking**: Communication Strategies: Conversation Amith& Mahesh (IWE – Chap VII)	2
3.	**Reading**: Reading Comprehension – Task 1 (IWE – Chapt VII)	1
4.	**Vocabulary**: (a) GRE words – 1.3, (b) Collocations – 2.3 (VB)	2
5.	**Grammar**: *If* Clause (IWE – Chapt VII)	2
6.	**Writing**: Email writing (IWE – Chapt VII)	1

UNIT - 2 (08 PERIODS)

S. No.	Components	No. of Periods
1.	**Listening**: Listening comprehension – Task 2 (WR)	1
2.	**Speaking**: Exercise on Communication Strategies (IWE – Chapt VII)	1
3.	**Reading**: Reading Comprehension – Task 2 (DPM)	1
4.	**Vocabulary**: Words often confused – 3.3, One-word substitutes – 4.3 (VB)	2
5.	**Grammar**: Modal verbs (IWE – Chap VII)	1
6.	**Writing**: Email writing and Argumentative Essay (IWE – Chapt VII)	2

UNIT - 3 (09 PERIODS)

S. No.	Components	No. of Periods
1.	**Listening**: Listening comprehension – Task 3 (WR)	1
2.	**Speaking**: Communication Strategies – Exercise (DPM)	1
3.	**Intensive Reading**: Reading Comprehension – Task 3 (DPM) **Extensive Reading:** *Pride and Prejudice* by Jane Austen	2
4.	**Vocabulary**: (a) Idioms – 5.3, (b) Phrasal verbs – 6.3 (VB)	2
5.	**Grammar**: Indianism (IWE – Chapt VII)	1
6.	**Writing**: Argumentative Essay (DPM)	2

UNIT - 4 (09 PERIODS)

S. No.	Components	No. of Periods
1.	**Listening**: Listening comprehension – Task 4 (IWE – Chapt VIII)	1
2.	**Speaking**: Communication Strategies and Presentation: Conversation between Suchitra, Lakshmi, Guhan and Karan ((IWE – Chapt VIII)	2
3.	**Reading**: Reading Comprehension – Task 4 (DPM)	1
4.	**Vocabulary**: (a) GRE Words – 1.4, (b) Collocations – 2.4, (c) Words Often Confused – 3.4 (VB)	3
5.	**Grammar**: Indefinite Articles (IWE – Chapt VIII)	1
6.	**Writing:** Presentation – Analysis (DPM)	1

UNIT - 5 (08 PERIODS)

S. No.	Components	No. of Periods
1.	**Listening**: Listening comprehension – Task 5 (WR)	1
2.	**Speaking**: Communication Strategies – Exercise (IWE – Chapt VIII)	1
3.	**Intensive Reading**: Reading Comprehension Task – 5 (DPM) **Extensive Reading**: *Gulliver's Travels* by Jonathan Swift	2
4.	**Vocabulary**: (a) One-Word Substitutes – 4.4, (b) Idioms – 5.4, (c) Phrasal verbs – 6.4 (VB)	2
5.	**Grammar**: Definite Articles (IWE – Chapt VIII)	1
6.	**Writing:** Presentation – Rewriting	1

- IWE – *Innovate with English* by T Samson (Foundation)

- Chapt - Chapter
- DPM – Department-produced materials (handouts)
- WR – Web-resources
- VB– *Vocabulary Builder for Students of Engineering and Technology* by Vijaya Lakshmi et al (Maruthi)

Note:

1 To be done in 43-45 periods of 50 minutes each.
2 Mid I test to be set on Units 1, 2 and 3 and Mid II test on Units 4 and 5.
3 Where a section requires more number of periods than suggested above for one component and fewer for another, adjustments may be made in consultation with the Head of the Department.

>>>0<<<

INTEGRAL TRANSFORMS AND VECTOR CALCULUS
(Common to CE, EEE, ME,ECE,IOT, CSE, IT, AI&DS)
I Year – II Semester

Lecture : 3+1   Internal Marks : 30
Credits : 3   External Marks : 70
===

Course Objectives
To make the students
- o gain the knowledge of Laplace and inverse transforms.
- o understand the concepts of Fourier series and Fourier Transforms.
- o know about vector differentiation and integration.

Course Outcomes
Upon successful completion of the course, the students will be able to
- evaluate improper integrals using Laplace transforms.
- apply Laplace transforms to find the solutions of initial and boundary value problems.
- find the Fourier series representation of a function in one variable and apply Fourier transform in various engineering problems.
- apply the concepts of vector differentiation in their engineering fields.
- verify the relation between line, surface and volume integrals using integral theorems.

UNIT–I: Laplace Transforms
Laplace transforms of standard functions – Shifting Theorems - Multiplication and division by t, transforms of derivatives and Evaluation of Improper Integrals - Unit step function – Dirac Delta function.

UNIT– II: Inverse Laplace Transforms
Inverse Laplace transforms – by partial fractions – Convolution theorem (without proof).
Application: Solution of Initial value problems and Boundary value problems.

UNIT–III: Fourier Series and Fourier Transforms
Fourier series: Fourier series in an arbitrary interval,   Half-range sine and cosine series.
Fourier integral theorem (only statement). Fourier transforms and inverse Fourier transforms, Fourier sine and cosine transforms and inverses.   Properties of Fourier transforms.

UNIT–IV: Vector Differentiation
Gradient – unit normal – angle between surfaces – directional derivative . Divergence – solenoidal vector. Curl – irrotational vector – scalar potential. Laplacian operator.

UNIT–V: Vector Integral theorems
Greens theorem , Stokes theorem and Gauss Divergence Theorem - related problems.
Applications: Work done, flux across the surface.

Text Books
1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th edition, Maitrey Printech Pvt. Ltd, Noida, 2013.
2. B.S. Grewal, Higher Engineering Mathematics, 43 nd edition, Khanna Publishers, New Delhi, 2014.

Reference Books
1. Schaum's Series, Differential Equtions, Tata-Mc Graw Hill Company Limited.
2. Bali &Iyengar,Text Book of Engineering Mathemtics, Laxmi Publications (P) Ltd.

* * *

APPLIED PHYSICS
I B.Tech- II Sem.

Lecture : 3   Internal Marks : 30

Credits : 3   External Marks : 70

===

Course Objectives
- o To comprehend the characteristics of stimulated emission.
- o To infer conditions for propagation of laser light in guided medium.
- o To estimate the behavior of subatomic particles along with application of Schrödinger wave equation.
- o To examine principles of solid state materials for use in the engineering applications.

Course Outcomes
Upon successful completion of the course, the students will be able to
- explain construction and working of laser
- relate the principles of propagation of light in optical fibers for applications in communications
- solve Schrodinger's wave equation to find the wave function and associated probabilities for simple potentials
- identify conductivity mechanism in semiconductors
- correlate the electrical and magnetic properties of materials to the properties of atoms

UNIT– I: Lasers
Introduction- Basic characteristics -Spontaneous and stimulated emission **-** Einstein's coefficients and their relations **-** Pumping Schemes **-** Ruby laser **–** He-Ne Laser **-** Semi conductor laser **– A**pplications of LASERs

UNIT–II: Optical Fibers
Introduction to Optical Fibers - Principle of light propagation in optical fiber-Total IR - Numerical Aperture-Types of fibers - Fiber Optic Communication System - Applications

UNIT–III: Principles of Quantum Mechanics and its Applications
Origin of quantum mechanics - Planck's Quantum theory- Matter waves , de Broglie's hypothesis, de Broglie's wave length, Davisson – Germer's experiment - Uncertainty principle and its application - Schrodinger time independent and Time dependent wave equation - Particle in one dimensional infinite potential box.

UNIT–IV: Semi Conductors
Introduction- Intrinsic and Extrinsic semi conductors, Density of charge carries, Fermi Energy -Electrical conductivity - Dependence of Fermi energy on carrier concentration and temperature - Direct and Indirect Band Gap Semi Conductors - Drift and Diffusion currents - applications- LED, LCD and their Applications.

UNIT–V: Dielectrics & Magnetic materials
Introduction- Types of polarization in Dielectrics- Frequency and temperature dependence of Polarization- Internal field in a dielectrics, Clausius and Mossotti equation - Piezo electricity, Ferro electricity and their applications

Magnetic materials

Classification of magnetic materials -Weiss theory of Ferro magnetism- Soft and hard magnetic –Ferrites and their applications

Text Books
1. Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar, Engineering Physics, 9th Edition, S. Chand Publications.
2. RK Gaur & SL Gupta, Engineering Physics, Dhanapat Rai publications.

Reference Books

1. A.J. Dekker, Solid state physics.
2. AjoyGhatak and K. Thyagarajan, Lasers - Fundamentals and Applications, Second Edition, Springer. .
3. Gerd Keiser, Optical fiber communications, Third Edition, Mc Graw Hill.
4. Charles Kittel, Introduction to Solid-state physics, 8th Edition, John Wiley & Sons, Inc

* * *

ENVIRONMENTAL STUDIES
(Common to EEE, CSE, IT)
I Year – II Semester

Lecture: 2   Internal Marks : 30

Credits: 2   External Marks: 70

===

Course Objectives
- o To impart the basic knowledge about the environment and ecology.
- o To develop an attitude of concern for biodiversity and its conservation.
- o To create awareness on environmental pollution and waste management.

Course Outcomes
Upon successful completion of the course, the students will be able to
- create awareness among the people in protection of environment.
- analyze structure and functional attributes of an ecosystem.
- explain the values of biodiversity.
- identify the sources of environmental pollution, assess their effects and suggest suitable control measures.
- adopt sustainable waste management practices.

UNIT - I: Multidisciplinary Nature of Environmental Studies
Definition – Scope – Importance – Need for Public Awareness –Awareness activities – Multidisciplinary nature of Environmental Studies – Role of a citizen in protection of environment.

UNIT - II: Ecosystem
Concept of an ecosystem – Structural features of an ecosystem – Functional attributes of an ecosystem: Trophic structure – Food Chains – Food Web – Ecological Pyramids – Energy Flow – Biogeochemical Cycles – Ecological Succession.

UNIT - III: Biodiversity & Its Conservation
Definition – Levels of Biodiversity – Bio-geographical zones of India – Values of biodiversity (Consumptive use value, Productive use value, Social value, Ethical value, Aesthetic value, Option value, Ecosystem service value) – India as a mega diversity nation – Hot spots of biodiversity – Threats to biodiversity – Endangered &Endemic species of India – Conservation of biodiversity.

UNIT - IV: Environmental Pollution
Definition, causes, effects & control measures of : Air pollution – Water pollution – Noise pollution – Soil pollution. Global climatic issues: IPCC – Introduction – Role of IPCC- Global warming – Acid rains – Ozone layer depletion.

UNIT - V: Waste Management
Waste water treatment – Municipal solid waste management – Biomedical waste management – Hazardous waste management – E-waste management – Environmental legislations : Wild life (Protection) Act,1972 – Water (Prevention and Control of Pollution) Act, 1974 – Forest (Conservation) Act,1980 – Air (Prevention and Control of Pollution) Act, 1981 – Environmental (Protection) Act,1986.

Text Books:

1. Anubha Kaushik, C.P.Kaushik, Environmental Studies, Fourth Edition, New Age International Publishers
2. P.Anandan, R.Kumaravelan, Environmental Science & Engineering, Scitech Publications (INDIA) Pvt. Ltd.

Reference Books:

1. Shashi Chawala, Environmental Studies, Tata McGraw Hill Education Private Limited.
2. Deeksha Dave & P. UdayaBhaskar, Environmental Studies, Cengage Learning.
3. Dr.Suresh, K.Dhameja, Society and Environment, S.K. Kataria& Sons.
4. Benny Joseph, Environmental studies, Tata McGraw Hill Publishing Company Limited.

* * *

DATA STRUCTURES
(Common to CSE, IT)
I Year II Semester

Lecture: 3

Credits: 3

Internal Marks: 30

External Marks: 70

Course Objectives
- To impart knowledge on various sorting and searching techniques.
- To familiarize with various types of data structures.

Course Outcomes
Upon completion of the course, the students will be able to
- apply different sorting and searching techniques on the given data.
- create and perform operations on single, double and circular linked lists.
- design algorithms for implementing stacks and queues and apply stacks for manipulating arithmetic expressions.
- construct binary tree for any given data and perform the basic operations on it.
- represent graphs using adjacency matrix and adjacency list and perform traversal operation.
- create a hash table and perform operations on it.

UNIT – I: Sorting and Searching
Introduction- Concept of data structures, overview of data structures.
Searching: Linear Search, Binary Search.
Sorting (Internal): Basic concepts, Sorting by: insertion (Insertion sort), selection (selection sort), exchange (Bubble sort).

UNIT – II: Linked lists
Linked Lists- Basic concepts, operations on Single linked list, Circular linked list and Double linked list.

UNIT – III: Stacks and Queues
Stack: Introduction, representation using Arrays and Linked List, operations on stack, Applications of Stacks- Expression Conversion and evaluation – corresponding algorithms.
Queue: Introduction, representation using Arrays and Linked List, operations on Queue, Circular Queue.

UNIT - IV: Trees
Binary Trees: Basic tree concepts, Properties, Representation of Binary Trees using Arrays and Linked List, Binary Tree Traversals, Creation of binary tree from in-order and pre (post) order traversals.
Binary Search Trees: Basic concepts, BST operations: Search, insertion, deletion and traversals.
Heap Trees: Basic Concepts, operations, Application-Heap sort.

UNIT - V: Graphs and Hashing
Graphs- Basic concepts, representations of graphs, graph traversals-Breadth First Search and Depth First Search techniques.
Hashing: Basic concepts, Hashing Functions (Division Method, Multiplication Method), Collision Resolution Techniques- Open Hashing and Closed Hashing.
Text Books

1. Horowitz, Sahani, Anderson Freed, "Fundamentals of Data Structure in C", 2nd edition, University Press.
2. Richard F, Gilberg, Forouzan, "Data Structures", 2nd edition, Cengage.

Reference Books
1. G. A. V. Pai, "Data Structures and Algorithms", TMH, 2008.
2. Debasis Samanta, "Classic Data Structures", 2nd edition, PHI, 2011.

UNIVERSAL HUMAN VALUES-2
I Year – II Semester

Lecture   : 3
Credits   : 3

Internal Marks:30
External Marks:70

==

Course Objective:

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

Course Outcomes

- By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.

- They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to- day settings in real life, at least a beginning would be made in this direction.

- This is only an introductory foundational input. It would be desirable to follow it up by faculty-student or mentor-mentee programs throughout their time with the institution Higher level courses on human values in every aspect of living. E.g. as a professional

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I.
2. Self-Exploration–what is it? - Its content and process; 'Natural Acceptance'and Experiential Validation-as the process for self-exploration.
3. Continuous Happiness and Prosperity-Alookat basic Human Aspirations
4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfillment of aspirations of every human being with their correct priority.
5. Understanding Happiness and Prosperity correctly-A critical appraisal of the current scenario
6. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

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

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

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

Include practice sessions to discuss the role others have played in making material goods available to

me. Identifying from one's own life.

Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

Module 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

1. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship

2. Understanding the meaning of Trust; Difference between intention and competence

3. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship

4. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals

5. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

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

Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

1. Understanding the harmony in the Nature

2. Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature.

3. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space.

4. Holistic perception of harmony at all levels of existence.

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

Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

1. Natural acceptance of human values

2. Definitiveness of Ethical Human Conduct

3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

4. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

5. Case studies of typical holistic technologies, management models and production systems

6. Strategy for transition from the present state to Universal Human Order:
   a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers
   b. At the level of society: as mutually enriching institutions and organizations

7. Sum up.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions e.g.To discuss the conduct as an engineer or scientist etc.

******

Text Book:

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

Reference Books

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

PROFESSIONAL COMMUNICATION LAB
I Year -II Sem.

Practical:4   Internal Marks: 30
Credits: 2   External Marks:70

==

Course Objectives

➢ Professional Communication (Lab) is a career-oriented programme. It seeks to develop in the students the competence required to perform professional communication tasks of increasing length and complexity, which can help them secure employment and perform successfully in their careers.

Course Outcomes

Upon successful completion of Professional Communication (Lab), the students will be able to:

- enhance the effectiveness of their communication through body language;
- take part in interactional communication (i.e. communication that serves the purpose of social interaction or small talk) with fluency
- take part in transactional communication (i.e. communication that serves the purpose of carrying out functions such as giving directions, complaining, and apologizing) with fluency
- speak professionally in telephone conversations;
- make effective presentations using a range of strategies, including a good organization of the content, impressive opening and closing, the use of suitable visual aids, the use of stories/anecdotes to illustrate a point, effective use of body language, and good handling of the question-and-answer session;
- take part in group discussions and debates successfully;
- answer questions at an elementary level in job interviews (e.g. *Can you tell us something about yourself? What kinds of things do you worry about? What are your key skills? What skills do you need to improve? What do you see as your strengths? What do you like doing in your spare time? How would you describe the way you work? Tell us about a time when you showed strong leadership skills. Tell us about a time when you had to make a difficult decision. How do you see yourself in five years' time?*) ;and
- use team-building skills with impact in different situations

Unit no.		Components	No. of Periods
1	**Body Language**	a. Knowing how to use body language in communication b. Interpreting non-verbal symbols	4
2	**Dialogues**	a. Starting a conversation b. Useful functions c. Telephone etiquette d. Making small talk	8
3	**Presentation Skills**	a. Presentation: Learning the dynamics b. Individual presentations (oral) c. Group presentations using PPTs	4 + 4 +4
4	**Group Discussion**	a. Group discussion: Learning the dynamics b. Performing: Guided group discussion c. Performing: Free group discussion	2 + 4 + 4
5	**Interviews**	a. Learning various types of interviews & answering some frequently asked questions b. Participating in mock interviews c. Participating in telephonic Interviews	4 + 4 + 4

| 6 | **Debates** | a. Debating: Learning the dynamics
b. Participating in guided debates
c. Participating in free debates | 2 + 4 + 4 |

Lab Manual:

HariPrasad,M.,SalivendraRaju,J.,andSuvarnaLakshmi,G.(2013).*Strengthen Your Communication Skills*. Hyderabad: Maruthi Publications

Software used:

1 'Multimedia Language Lab': K-Van Solution, Hyderabad
2 'Foundation Course in Communication Skills': Andhra Pradesh State Council of Higher Education (APSCHE)

Note:

1 To be done in 56-58 periods.
2 Each laboratory session consists of 2 periods of 50 minutes each; there are two lab sessions in a week.
3 Where a section requires more number of periods than suggested above for one component and fewer for another, adjustments may be made in consultation with the Head of the Department.

>>>0<<<

APPLIED PHYSICS LAB
I Year –I sem (CSE) / II Sem (IT)

Practical:2   Internal Marks: 30
Credits: 1   External Marks:70
==

Course Objectives

➢ To draw the relevance from the theoretical knowledge and to imply it in a practical manner to analyze various electronic circuits and its components.
➢ To classify the behavior and characteristics of various semiconductor devices.
➢ To enable utilization of laser source for optical fiber communication

Course Outcomes
Upon successful completion of the course, the students will be able to
- calculate light gathering power of optical fiber and bending losses
- study the directionality and wavelength of laser
- identify the nature of semiconductor from the obtained energy gap and Hall coefficient.
- draw characteristic curves of thermistor and LED.
- study regulatory nature of zener diode
- Estimate magnetic induction, Magnetic susceptibility and Dielectric constant.

List of Experiments
1. Calculate the bending losses in optical fiber.
2. Determination of numerical aperture of an optical fiber.
3. Evaluate the energy band gap of a semiconductor.
4. Determination of thermal resistance by thermistor.
5. Evaluate the magnetic field along the axis of circular coil by using Stewart and Gee's Apparatus.
6. Estimate the Hall coefficient by Hall Effect.
7. Characterization of Magnetic Materials – Illustrate the phase lag between Applied Magnetic field and Magnetization of a Ferro magnetic material.
8. Determine the dielectric constant of a dielectric material.
9. Characterization of magnetic materails - Magnetic susceptibility by Quinke's method.
10. Estimate the wave length of laser source by means of diffraction grating
11. Calculate the divergence of Laser beam and determine spot size.
12. Illustrate the Voltage regulatory nature of Zener diode.
13. Voltage – Current characteristics of given LED.

 (Any 8 out of the 13 experiments)
Reference Books
1. Vijay Kumar & T. Radha Krishna, Practical Physics for engineering students.
2. Dr. Y. Aparna and Dr. K.Venkateswara Rao, Lab manual of Engineering Physics, VGS Books links, Vijayawada.
3. R. Jayaraman,V. Umadevi, S. Maruthamuthu, B. Saravana Kumar, Engineering Physics laboratory manual(1st edition) Pearson publishers.

DATA STRUCTURES LAB
(Common to CSE, IT)
I Year II Semester

Practical: 4   Internal Marks: 30
Credits: 2   External Marks: 70

Course Objectives
- To implement different searching and sorting algorithms.
- To implement linear and non-linear data structures.

Course Outcomes
Upon completion of the course students will be able to
- implement sorting and searching algorithms.
- develop code to simulate the operations on single, double and circular linked lists.
- implement operations on stacks and queues and apply stack for manipulating arithmetic expressions.
- perform operations on binary search trees and graphs.
- create a hash table and perform operations on it.

Write a C program for the following
Exercise - I
1. Develop recursive and non-recursive functions to perform search for a Key value in a given list using

(i) Linear Search

(ii) Binary Search

Exercise - II
2. Implement the following sorting techniques to sort a given list of integers in ascending order

(i) Bubble sort

(ii) Insertion sort

(iii) Selection sort

Exercise - III
3. Use functions to

      (i) Create a singly linked list.
      (ii) Insert an element into a singly linked list.
      (iii) Delete an element from a singly linked list.

Exercise- IV
4. Use functions to

      (i) Create a circular linked list.
      (ii) Insert an element into a circular linked list.
      (iii) Delete an element from a circular linked list.

5. Use functions to

      (i) Create a Doubly linked list.
      (ii) Insert an element into a doubly linked list.
      (iii) Delete an element from a doubly linked list.

Exercise - V
6. Implement stack (its operations) using arrays.
7. Implement Queue (its operations) using linked lists.

Exercise - VI
8. To convert infix expression into postfix expression.

9. To evaluate postfix expression.

Exercise – VII

10. Create a Binary Search Tree of integers and perform the following operations

(i) insert (ii) delete (iii). Search (iv) traversals (pre-order, in-order, post-order)

Exercise - VIII

11. Implement the DFS and BFS Traversals on Graphs.

Exercise - IX

12. Implement Heap sort to sort given set of integers.

13. Create a Hash Table to perform the following operations

(i) Insertion

(ii) Deletion

(iii) Search

References

1. Horowitz, Sahni, Anderson Freed, "Fundamentals of Data Structure in C", 2nd edition, University Press.
2. Richard F, Gilberg ,Forouzan, "Data Structures", 2nd edition, Cengage.