DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE, (AUTONOMOUS)
PERAMBALUR – 621 212.

B.E. COMPUTER SCIENCE AND ENGINEERING

REGULATIONS – 2020

CHOICE BASED CREDIT SYSTEM

I - VIII SEMESTER CURRICULUM AND SYLLABI

SEMESTER I

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	U20HS101	Communicative English	HS	3	3	0	0	3
2	U20MA101	Engineering Mathematics	BS	4	3	1	0	4
3	U20PH101	Engineering Physics - I	BS	3	3	0	0	3
4	U20CY101	Engineering Chemistry	BS	3	3	0	0	3
5	U20GE101	C-Programming	ES	3	3	0	0	3
6	U20GE102	Engineering Graphics	ES	6	2	0	4	4
PRACTICALS								
7	U20BS101	Physics and Chemistry Laboratory	BS	4	0	0	4	2
8	U20GE103	C - Programming Laboratory	ES	4	0	0	4	2
			TOTAL	**30**	**17**	**1**	**12**	**24**

SEMESTER II

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	U20HS201	Functional English	HS	3	3	0	0	3
2	U20MA201	Advanced Calculus and Ordinary Differential Equations	BS	4	3	1	0	4
3	U20PH201	Engineering Physics - II	BS	3	3	0	0	3
4	U20GE201	Python Programming	ES	3	3	0	0	3
5	U20CS201	Data Structures and Algorithms	PC	3	3	0	0	3
6	U20EC201	Semiconductor Devices	ES	3	3	0	0	3
PRACTICALS								
7	U20GE203	Engineering Practices Laboratory	ES	4	0	0	4	2
8	U20GE204	Python Programming Laboratory	ES	4	0	0	4	2
9	U20CS202	Data Structures Laboratory	PC	3	0	0	4	2
			TOTAL	**30**	**18**	**1**	**12**	**25**

SEMESTER III

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	U20MA301	Mathematical Foundation of Computer Science	BS	4	3	1	0	4
2	U20CS301	Data Base Management System	PC	3	3	0	0	3
3	U20EC301	Digital Systems	ES	4	3	1	0	4
4	U20CS302	Computer Organization and Architecture	PC	3	3	0	0	3
5	U20CS303	Object Oriented Programming	PC	3	3	0	0	3
PRACTICALS								
6	U20CS304	Data Base Management Systems Laboratory	PC	3	0	0	4	2
7	U20CS305	Object oriented Programming Laboratory	PC	3	0	0	4	2
			TOTAL	**23**	**15**	**2**	**8**	**21**

SEMESTER IV

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	U20HS401	Environmental Science and Engineering	HS	3	3	0	0	3
2	U20CS401	Artificial Intelligence and Expert System.	PC	3	3	0	0	3
3	U20CS402	Design and analysis of algorithm	PC	4	3	1	0	4
4	U20EC401	Microprocessors & Micro controllers	ES	3	3	0	0	3
5	U20CS403	Operating Systems	PC	3	3	0	0	3
6	U20CS404	Computer Networks	PC	3	3	0	0	3
PRACTICALS								
7	U20CS405	Operating Systems Laboratory	PC	3	0	0	4	2
8	U20CS406	Network Laboratory	PC	3	0	0	4	2
			TOTAL	**25**	**18**	**1**	**8**	**23**

SEMESTER V

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	U20CS501	Software Engineering	PC	3	3	0	0	3
2	U20CS502	Theory of Computation	PC	4	3	1	0	4
3	U20CS503	Object Oriented Analysis & Design	PC	3	3	0	0	3
4	U20CS504	Internet Programming	PC	3	3	0	0	3
5		Open Elective-I	OE	3	3	0	0	3
6		Professional Elective-I	PE	3	3	0	0	3
PRACTICALS								
7	U20CS505	Case Tools Laboratory	PC	3	0	0	4	2
8	U20CS506	Internet Programming Laboratory	PC	3	0	0	4	2
			TOTAL	**25**	**18**	**1**	**8**	**23**

SEMESTER VI

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	U20CS601	Cloud Computing	PC	3	3	0	0	3
2	U20CS602	Cryptography and Network Security	PC	3	3	0	0	3
3	U20CS603	Data Warehousing and Data Mining	PC	3	3	0	0	3
4	U20CS604	Mobile Computing	PC	3	3	0	0	3
5		Professional Elective-II	PE	3	3	0	0	3
PRACTICALS								
6	U20CS605	Mobile Application Development Laboratory	PC	3	0	0	4	2
7	U20CS606	Security Laboratory	PC	3	0	0	4	2
8	U20HS601	Inter Personal Skill	EEC	2	0	0	2	2
			TOTAL	**23**	**15**	**0**	**10**	**21**

SEMESTER VII

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	U20CS701	Information Storage Management	PC	3	3	0	0	3
2	U20CS702	Internet of Things	PC	3	3	0	0	3
3	U20CS703	Big Data Analytics	PC	3	3	0	0	3
4		Professional elective-III	PE	3	3	0	0	3
5		Open Elective-II	OE	3	3	0	0	3
PRACTICALS								
6	U20CS704	IoT lab	PC	3	3	0	4	2
7	U20CS705	Mini Project	EEC	3	3	0	2	2
			TOTAL	**21**	**21**	**0**	**6**	**19**

SEMESTER VIII

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1		Professional Elective IV	PE	3	3	0	0	3
2		Professional Elective V	PE	3	3	0	0	3
PRACTICALS								
3	U20HS801	Project Work	EEC	12	0	0	12	6
TOTAL				**18**	**6**	**0**	**12**	**12**

TOTAL NUMBER OF CREDITS: 169

PROFESSIONAL ELECTIVES (PE)

SEMESTER V

ELECTIVE I

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	U20CS511	Principles of Management	PE	3	3	0	0	3
2	U20CS512	Distributed Systems	PE	3	3	0	0	3
3	U20CS513	Social Network Analysis	PE	3	3	0	0	3
4	U20CS514	User Interface Design	PE	3	3	0	0	3
5	U20CS515	Compiler Design	PE	3	3	0	0	3

SEMESTER VI

ELECTIVE II

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	U20CS621	XML and Web Services	PE	3	3	0	0	3
2	U20CS622	Advanced Java Programming	PE	3	3	0	0	3
3	U20CS623	Open Source Systems	PE	3	3	0	0	3
4	U20CS624	Professional Ethics	PE	3	3	0	0	3
5	U20CS625	Computer Vision	PE	3	3	0	0	3

SEMESTER VII

ELECTIVE III

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	U20CS731	Software Project Management	PE	3	3	0	0	3
2	U20CS732	Digital Image Processing	PE	3	3	0	0	3
3	U20CS733	Deep Learning	PE	3	3	0	0	3
4	U20CS734	Natural Language Processing	PE	3	3	0	0	3
5	U20CS735	Machine learning Technique	PE	3	3	0	0	3

SEMESTER VIII

ELECTIVE IV

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	U20CS841	Software Quality Assurance	PE	3	3	0	0	3
2	U20CS842	Deep Learning	PE	3	3	0	0	3
3	U20CS843	Service Oriented Architecture	PE	3	3	0	0	3
4	U20CS844	Scientific Computing	PE	3	3	0	0	3
5	U20CS845	Multi-core Architecture and Programming	PE	3	3	0	0	3

SEMESTER VIII

ELECTIVE V

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	U20CS851	Human Computer Interaction	PE	3	3	0	0	3
2	U20CS852	Software testing Methodologies	PE	3	3	0	0	3
3	U20CS853	Adhoc Networks	PE	3	3	0	0	3
4	U20CS854	Information Extraction	PE	3	3	0	0	3
5	U20CS855	Mobile and pervasive Computing	PE	3	3	0	0	3

CATEGORY WISE SUBJECT DETAILS

HUMANITIES AND SOCIAL SCIENCES (HS)

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1	U20HS101	Communicative English	HS	3	3	0	0	3
2	U20HS201	Functional English	HS	3	3	0	0	3
3	U20HS401	Environmental Science and Engineering	HS	3	3	0	0	3

BASIC SCIENCES (BS)

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1	U20MA101	Engineering Mathematics - I	BS	4	4	0	0	4
2	U20PH101	Engineering Physics – I	BS	3	3	0	0	3
3	U20CY101	Engineering Chemistry	BS	3	3	0	0	3
4	U20BS101	Physics and Chemistry Laboratory	BS	4	0	0	4	2
5	U20MA201	Engineering Mathematics - II	BS	4	4	0	0	4
6	U20PH201	Engineering Physics - II	BS	3	3	0	0	3
7	U20MA301	Mathematical Foundation of Computer Science	BS	4	4	0	0	4

ENGINEERING SCIENCES (ES)

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1	U20GE201	Python Programming	ES	3	3	0	0	3
2	U20GE102	Engineering Graphics	ES	4	4	0	0	4
3	U20GE204	Python Programming Laboratory	ES	4	0	0	4	2
4	U20GE101	C - Programming	ES	3	3	0	0	3
5	U20EC201	Semiconductor devices	ES	3	3	0	0	3
6	U20GE103	C - Programming Laboratory	ES	4	0	0	4	2
7	U20GE203	Engineering Practices Laboratory	ES	4	0	0	4	2
8	U20EC301	Digital Systems	ES	4	4	0	0	4
9	U20EC401	Microprocessors & Micro controllers	ES	3	3	0	0	3

PROFESSIONAL CORE (PC)

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1	U20CS201	Data Structures and Algorithms	PC	3	3	0	0	3
2	U20CS202	Data Structures Laboratory	PC	4	0	0	4	2
3	U20CS301	Data Base Management System	PC	3	3	0	0	3
4	U20CS302	Computer Organization and Architecture	PC	3	3	0	0	3
5	U20CS303	Object Oriented Programming	PC	3	3	0	0	3
6	U20CS304	Data Base Management Systems Laboratory	PC	3	0	0	4	2
7	U20CS305	Object oriented Programming Laboratory	PC	3	0	0	4	2
8	U20CS401	Artificial Intelligence and Expert System.	PC	3	3	0	0	3
9	U20CS402	Design and analysis of algorithm	PC	4	4	0	0	4
10	U20CS403	Operating Systems	PC	3	3	0	0	3
11	U20CS404	Computer Networks	PC	3	3	0	0	3
12	U20CS405	Operating Systems Laboratory	PC	3	0	0	4	2
13	U20CS406	Network Laboratory	PC	3	0	0	4	2
14	U20CS501	Software Engineering	PC	3	3	0	0	3
15	U20CS502	Theory of Computation	PC	4	4	0	0	4
16	U20CS503	Object Oriented Analysis & Design	PC	3	3	0	0	3
17	U20CS504	Internet Programming	PC	3	3	0	0	3
18	U20CS505	Case Tools Laboratory	PC	3	0	0	4	2
19	U20CS506	Internet Programming Laboratory	PC	3	0	0	4	2
20	U20CS601	Cloud Computing	PC	3	3	0	0	3
21	U20CS602	Cryptography and Network Security	PC	3	3	0	0	3
22	U20CS603	Data Warehousing and Data Mining	PC	3	3	0	0	3
23	U20CS604	Mobile Computing	PC	3	3	0	0	3
24	U20CS605	Mobile Application Development Laboratory	PC	3	0	0	4	2
25	U20CS606	Security Laboratory	PC	3	0	0	4	2
26	U20CS701	Information Storage Management	PC	3	3	0	0	3
27	U20CS702	Internet of Things	PC	3	3	0	0	3
28	U20CS703	Big Data Analytics	PC	3	3	0	0	3
29	U20CS704	IoT lab	PC	3	3	0	4	2

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

SL. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1	U20HS601	Inter personal skill	EEC	2	0	0	2	2
2	U20CS705	Mini Project	EEC	3	3	0	3	2
3	U20HS801	Project Work	EEC	12	0	0	12	6

SUMMARY

B. E. COMPUTER SCIENCE AND ENGINEERING											
S. No	Subject Area	Credits per Semester								Credits Total	Percentage %
		I	II	III	IV	V	VI	VII	VIII		
1	Humanities Sciences	3	3							**06**	**3.55**
2	Basic Sciences	12	7	4	3					**26**	**15.38**
3	Engineering Sciences	9	10	4						**23**	**13.61**
4	Professional Cores		6	13	20	17	16	11		**83**	**49.11**
5	Professional Electives					3	3	3	6	**15**	**8.88**
6	Open Electives					3		3		**6**	**3.55**
7	Employability Enhancement Courses						2	2	6	**10**	**5.92**
Total		**24**	**26**	**21**	**23**	**23**	**21**	**19**	**12**	**169**	**100**

SEMESTER I

U20HS101	COMMUNICATIVE ENGLISH (COMMON TO ALL BRANCHES)	L	T	P	C
		3	0	0	3

Pre-requisite: Acquiring Basic grammar knowledge.

COURSE OBJECTIVES

- To enable the engineering students to develop their basic communication skills in English for academic and social purposes.
- To equip the students with appropriate oral and written communication skills.
- To inculcate the skills of listening, reading and critical thinking.
- To integrate English Language learning with employability skills and training.
- To enhance the students' proficiency in reading skills enabling them meet the academic demands of their course.

UNIT I GENERAL INTRODUCTION **9**

Listening - Listening to conversations, Welcome Speeches, Lectures and description of equipment. Speaking - introducing one self - family and friends. Reading - Practice in skimming - scanning and predicting - Writing - completing sentences. Grammar - WH - Questions - asking and answering - Yes or No questions and Question Tag - Parts of Speech. Prefixes - Suffixes - Tense- Present, Past and Future Tense. Word formation.

UNIT II TECHNIQUES OF READING AND WRITING **9**

Reading - Purpose of reading-comprehension - re - reading- post reading - comprehension questions (multiple choice questions or short questions/open-ended questions). Writing - Free writing on any given topic (My favourite place / Hobbies / School life, etc.) - Autobiographical writing (writing about one's leisure time activities, hometown, etc.) - Listening - Situational Conversation, Telephonic Conversation. Speaking - Sharing information of a personal kind - greeting - Taking leave - Grammar - Adjectives, Prepositions, Conjunctions, Articles, Punctuations - Error correction, editing mistakes in grammar, vocabulary, spelling.

UNIT III GRAMMAR AND SKILL DEVELOPMENT **9**

Reading - Reading general contexts and interpreting graphical representations. Writing - understanding text structure - Use of reference words and discourse markers - Coherence - Jumbled Sentences Listening - listening to longer texts and filling up the table - Product description - narratives from different sources. Speaking - asking about routine actions and expressing opinions. Grammar-Past Tense - Kinds of noun, verb and adverb, Impersonal Passive voice.

UNIT IV READING AND LANGUAGE DEVELOPMENT **9**

Reading - Short reading passages for sentence matching exercises, Picking out specific information in a short text. Writing - Letter writing, informal or personal letters - e-mails - conventions of personal e-mail - Listening-listening to dialogues or conversations and completing exercises based on them. Speaking - Group Discussion - Grammar - Future tense, Synonyms - Antonyms - Phrasal verbs.

UNIT V WRITING SKILLS **9**

Reading - Intensive reading - Writing - Writing short essays - Dialogue Writing - Listening - listening to talks - conversations - Speaking - Presenting welcome speech and vote of thank - Grammar - Modal verbs - Collocations - Single word substitutes.

TOTAL: 45 PERIODS

COURSE OUTCOMES

Learners are able to

1. Speak clearly, effortlessly, confidently and appropriately.
2. Write coherently with acceptable accuracy, organizing ideas logically.
3. Listen and comprehend different discourses and genres of texts.
4. Read and comprehend different discourses and genres of texts.
5. Read and infer, analyze, predict, interpret and draw conclusions any printed text.

TEXT BOOKS

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

REFERENCES

1. Bailey, Stephen. "Academic Writing: A practical guide for students". New York: Rutledge, 2011.
2. Raymond Murphy, Murphy's "English Grammar", Cambridge University Press 2004.
3. Meenakshi Raman, Sangeeta Sharma, "Technical Communication: English Skills for Engineers", Oxford University Press, 2009.
4. Dr.S.Sumant, "Technical English-I" Tata McGraw-Hill, New Delhi, 2001.
5. Essential English - E.Suresh Kumar, P. Sreehari, J. Savithri - Orient Blackswan 2011.

U20MA101	ENGINEERING MATHEMATICS (COMMON TO ALL BRANCHES)	L	T	P	C
		3	1	0	4

Prerequisite: Basic ideas of Matrices, Differentiation and Integration.

COURSE OBJECTIVES

- To handle practical problems arising in the field of engineering.
- To achieve conceptual understanding and to retain the best traditions of traditional calculus.
- To provide the basic tools of calculus mainly for the purpose of modeling the engineering problems mathematically and obtaining solutions.
- To deal with topics such as single variable and multivariable Calculus.
- To play an important role in the understanding of science, engineering, economics and computer science, among other disciplines.

UNIT I EVALUATION AND APPLICATION OF MATRICES 12

Definition - Basic concepts of Matrices - Eigen values and Eigen vectors of a real matrix -Characteristic equation -Properties of Eigen values and Eigen vectors - Cayley - Hamilton theorem - Diagonalization of matrices - Reduction of a quadratic form to canonical form by Orthogonal transformation - Nature of quadratic forms.

UNIT II DIFFERENTIAL CALCULUS 12

Limit of a function - Continuity - Derivatives - Differentiation Rules - Mean Value Theorem - Interval of increasing and decreasing functions - Maxima and Minima - Interval of concavity and convexity.

UNIT III MULTIVARIABLE CALCULUS 12

Limits and Continuity - Partial derivatives - Total derivative - Differentiation of implicit functions - Jacobian and properties -Taylor's series for functions of two variables -Maxima, Minima and saddle points - Method of Lagrange multipliers.

UNIT IV INTEGRAL CALCULUS 12

Definite Integrals and its properties - Fundamental theorem of Calculus - Techniques of integration for Indefinite Integrals using basic integration formulas -Integration by parts -Trigonometric Substitutions - Integration of Rational functions by Partial Fractions.

UNIT V MULTIPLE INTEGRAL AND THEIR APPLICATIONS 12

Double integrals - Change the order of integration - Polar Coordinates - Area - Change of variables - Triple integrals - Volume - Applications - Areas and Volumes.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

Learners are able to

1. Express large amounts of data and functions in an organized and concise form apart from diagonalizing matrices.
2. Solve maxima and minima problems using differentiation.
3. Apply functions of several variables to solve problems in engineering and technology.
4. Evaluate integrals by using Fundamental Theorem of Calculus.
5. Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change the order and change of variables.

TEXT BOOKS

1. Grewal B.S.,"Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Ed., 2014.
2. Veerarajan T, "Engineering Mathematics", Tata McGraw-Hill, New Delhi, 2011.

REFERENCES

1. Bali N. P. and Manish Goyal, "Engineering Mathematics" (For Semester I) Third Edition, University Science Press, 2017.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", 10th Edition, John Wiley & Sons,2014
3. Fritz John and Richard Courant, "Introduction to Calculus and Analysis" Springer, 1999.
4. James Stewart, "Calculus: Early Transcendental", Cengage Learning, 7th Edition, New Delhi, 2015.
5. Venkatraman M K, "Engineering Mathematics, Volume-I", Second edition, National Publishing Co, Chennai, 2003.

U20PH101	ENGINEERING PHYSICS - I (COMMON TO ALL BRANCHES)	L	T	P	C
		3	0	0	3

Pre-requisite: Adequate knowledge in basic and modern physics.

COURSE OBJECTIVES

- To import knowledge in basic concepts of physics relevant to engineering applications.
- Capability to understand advanced topics in engineering.
- To acquire the knowledge of recent trends in LASER, Optical Fiber, and Ultrasonic.

UNIT I SOLID STATE PHYSICS 9

Lattice -unit cell -seven crystal systems -Bravai's lattices -lattice planes -Miller indices –derivation for inter-planar spacing in terms of Miller indices-calculation of number of atoms per unit cell , atomic radius , coordination number and packing factor for SC, BCC, FCC and HCP structures. X-ray diffraction: Bragg's law -diffraction methods: powder and Laue methods. Crystal Growth Techniques: melt growth technique (Bridgman and Czochralski techniques).

UNIT II ELASTICITY OF MATTER 9

Introduction- Elasticity - Plasticity–Hooke's law - relationship between three modulii of elasticity (qualitative) -stress –strain diagram -Poisson's ratio - factors affecting elasticity. Beam: Internal Bending moment -Cantilever: theory and experiment-Young's modulus: theory and experiment (uniform and non-uniform bending) -I-shaped girders-advantages and applications -twisting couple of a wire or cylinder - torsion pendulum - determination of moment of inertia of disc and rigidity modulus of cylindrical wire.

UNIT III ULTRASONICS AND ITS APPLICATIONS 9

Introduction-classification of sound- properties of infrasonics, audible and ultrasonics -production: magnetostriction and piezoelectric methods–detection of ultrasonic waves–determination of velocity of sound in liquid (Acoustic grating method). Applications: Engineering and medical field- Non-destructive testing: pulse echo system through transmission and reflection modes. Ultrasonic scanning methods-Sonogram.

UNIT IV MODERN PHYSICS 9

Black body radiation- Basic Laws -Planck's hypothesis and its radiation law: derivation -deduction of Wien's displacement law and Rayleigh Jean's law from Planck's law -Photons and its properties-Compton Effect –derivation –experimental verification. Photo Electric effect and its Laws -Einstein's Equation - Matter waves–de-Broglie hypothesis - de-Broglie wavelength-Schrodinger's time independent and time dependent wave equations -physical significance of the wave function. Application: particle in one dimensional box-normalization - degenerate and non-degenerate states.

UNIT V LASER AND OPTICAL FIBER 9

Laser: properties–population inversion-pumping methods –Einstein's coefficients-derivation. Types: He-Ne and semiconductor lasers (Homo and Hetero junction) –uses of LASER- Hologram -Construction and Reconstruction Process. Optical fiber: Structure-advantages of optical fibre-Principle and propagation of light through optical fiber–expressions for numerical aperture and acceptance angle–fabrication of optical fiber- types of optical fibers-fiber optical communication system -endoscope -Fiber optic sensors (Qualitative Study only).

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Learners are able to

1. Assess the elastic behavior of the materials and bending behavior of beam.
2. Acquire knowledge of NDT and applications of ultrasonics.
3. Know the development of modern physics and its applications.
4. Recognize the uses of laser and fiber optics.
5. Distinguish the different crystal systems, structural determination and synthesis of crystals.

TEXT BOOKS

1. Marikani, "Engineering Physics", PHI, New Delhi, 2013.
2. S. Vadivel & A. Pannerselvam, "Engineering Physics", Jaitech Publications, 2015.

REFERENCES

1. Selladurai, “Engineering Physics Part-I”, PHI learning private limited, New Delhi, 2010.
2. V.Rajendran, “Engineering Physics”, Tata McGraw-Hill. New Delhi.2011
3. P. K. Palanisamy “Engineering Physics”. Scitech Publications, 2011
4. Raymond A. Serway and John Jewett, Jr. , “Physics for Scientist and Engineer with modern Physics”, Mary Finch Publication, 9th edition,2014.
5. William T. Silfvast ,“Laser Fundamentals”, Second Edition, Cambridge University Press, 2008.

U20CY101	ENGINEERING CHEMISTRY (COMMON TO ALL BRANCHES)	L	T	P	C
		3	0	0	3

Pre-requisite: Basics of Ionisation, adsorption phenomenon kinetics, Light emission components

COURSE OBJECTIVES

- To make the students conversant with basics of polymer chemistry.
- To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications in all disciplines.
- To acquaint the student with concepts of important photo physical and photochemical processes and spectroscopy.
- 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.

UNIT I BASICS OF POLYMER 9

Introduction: Classification of Polymers -Natural and Synthetic: Thermoplastic and Thermosetting Functionality -Degree of Polymerization. Types and mechanism of Polymerization: Addition, Condensation and Co-polymerization. Properties of Polymer - Techniques of Polymerization: Bulk, Emulsion, Solution and Suspension. Preparation, Properties and uses of Nylon6.6, and Epoxy resin.

UNIT II SURFACE CHEMISTRY AND CATALYSIS 9

Adsorption: Types of Adsorption -Adsorption of gases on solids -Adsorption of solute from solutions - Adsorption isotherms -Freundlich’s Adsorption Isotherm -Langmuir’s Adsorption Isotherm -Applications of Adsorption on pollution abatement. Catalysis: Catalyst -Types of Catalysis -Criteria -Auto Catalysis - Catalytic Poisoning and Catalytic Promoters - Acid Base Catalysis -Enzyme Catalysis - Michaelis - Menten equation.

UNIT III CHEMICAL THERMODYNAMICS 9

Terminology of Thermodynamics - Second Law: Entropy - Entropy change for an ideal gas, Reversible and Irreversible Processes; Entropy of Phase Transitions; Clausius inequality. Free Energy and Work function: Helmholtz and Gibbs free energy functions - Criteria of Spontaneity: Gibbs - Helmholtz equation -Clausius - Clapeyron equation: Maxwell Relations - Van’t Hoff Isotherm and Isochore.

UNIT IV PHOTO CHEMISTRY AND SPECTROSCOPY 9

Photo Chemistry: Laws of Photo Chemistry - Grotthuss-Draper law, Stark - Einstein Law and Lambert - Beer Law. Quantum Efficiency - Determination - Photo Processes - Internal Conversion, Inter - system crossing, Fluorescence, Phosphorescence, Chemiluminescence and Photo-sensitization. Spectroscopy: Electromagnetic Spectrum- Absorption of Radiation - Electronic, Vibrational and Rotational transitions. UV - visible and IR Spectroscopy.

UNIT V PHASE RULE AND ALLOYS **9**

Phase Rule: Introduction, Definition of terms with examples, One Component System - Water System - Reduced Phase Rule - Two Component Systems - Classification - Lead - Silver system, Zinc - Magnesium system. 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.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Learners able to

1. Describe the General Structure of Polymers. Identify and Explain differences between Addition and Stepwise Polymerization.
2. Explain how selected Isomers could be used for measurement of Surface Area of Materials or in Rationalization of Catalysis.
3. Derive and discuss the First and Second Laws of Thermodynamics.
4. Making possible to apply this knowledge in different areas, other than Photo Chemistry and Spectroscopy.
5. Illustrate the Phase Transition of One Component and Two Component system and Types of Alloys and their applications in industries.

TEXT BOOKS

1. Jain P.C. and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2010.
2. Kannan P., Ravikrishnan A., "Engineering Chemistry", Sri Krishna Hi- tech Publishing Company Pvt. Ltd. Chennai, 2009.

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. Gowariker V. R. , Viswanathan N.V. and Jayadev Sreedhar, "Polymer Science", New Age International P (Ltd.,), Chennai, 2006.
4. Shashi Chawla, "A Text Book of Engineering Chemistry", Dhanapat Rai & Co. (P) Ltd, Delhi, 2013.
5. Satya Prakash and Manish Agarwal, "Engineering Chemistry", Khanna Book Publishing Co.(P) Ltd, Delhi,2018.

U20GE101	C - PROGRAMMING (COMMON TO ALL BRANCHES)	L	T	P	C
		3	0	0	3

Pre-requisite: Basic Computer knowledge to access a computer

COURSE OBJECTIVES

- To develop C Programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop applications in C using functions , pointers and 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: Data Types - Storage classes - Constants - Keywords - Operators: Precedence and Associativity - Expressions - Input/ Output

statements, Assignment statements - Decision making statements - Switch statement - Looping statements - Pre-processor directives - Compilation process

UNIT II ARRAYS AND STRINGS 9

Introduction to Arrays: Declaration, Initialization - One dimensional array - Example Program: Computing Mean, Median and Mode - Two dimensional arrays.- String operations: length, compare, concatenate, copy - Selection sort, linear and binary search.

UNIT III FUNCTIONS AND POINTERS 9

Introduction to functions: Function prototype, function definition, function call, Built-in functions (string functions, math functions) - Recursion - Example Program: Scientific calculator using built-in functions, Binary Search using recursive functions - Pointers - Pointer operators - Pointer arithmetic - Arrays and pointers - Array of pointers.

UNIT IV STRUCTURES 9

Structure - Nested structures - Pointer and Structures - Array of structures - Example Program using structures and pointers - Union- Example Program using unions and pointers.

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: Transaction processing using random access files - Command line arguments.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Learners are able to

1. Develop simple applications in C using basic constructs
2. Design and implement applications using arrays and strings
3. Develop and implement applications in C using functions and pointers.
4. Develop applications in C using structures.
5. Design applications using sequential and random access file processing

TEXT BOOKS

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. L and 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.

U20GE102	ENGINEERING GRAPHICS (COMMON TO ALL BRANCHES)	L	T	P	C
		2	0	4	4

Pre-requisite: Basic knowledge in practical geometry construction, imagination and mathematics.

COURSE 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.

UNIT I PLANE CURVES AND ORTHOGRAPHIC PROJECTION 6+12

Importance of graphics in engineering applications - Use of drafting instruments - BIS conventions and specifications - Size, layout and folding of drawing sheets - Lettering and dimension. 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 concepts and Free Hand sketching: Visualization principles –Representation of Three Dimensional objects - Layout of views- Freehand sketching of multiple views from pictorial views of objects.

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACE 6+12

Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method (polygonal and circular surfaces) inclined to both the planes.

UNIT III PROJECTION OF SOLIDS 6+12

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

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 6+12

Sectioning of above solids in simple vertical position when 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 solids - Prisms, pyramids cylinders and cones.

UNIT V ISOMETRIC PROJECTION 6+12

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.

TOTAL: 30+60 = 90 PERIODS

COURSE OUTCOMES:

Learners are able to

1. Familiarize with the fundamentals and standards of Engineering graphics.
2. Perform freehand sketching of basic geometrical constructions and multiple views of objects.
3. Project orthographic projections of lines and plane surfaces.
4. Draw projections and solids and development of surfaces.
5. Visualize and to project isometric and perspective sections of simple solids.

TEXT BOOKS

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, 50th Edition, 2010.
2. Basant Agarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
3. Gopalakrishna K.R., “Engineering Drawing” (Vol. I&II combined), Subhas Stores, Bangalore, 2007.
4. N S Parthasarathy and Vela Murali, “Engineering Graphics”, Oxford University, Press, New Delhi, 2015.
5. Shah M.B., and Rana B.C., “Engineering Drawing”, Pearson, 2nd Edition, 2009.

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 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

U20BS101	PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C
		0	0	4	2

Pre-requisite: Basic knowledge of Physics and chemistry laboratory apparatus.

PHYSICS LABORATORY

COURSE OBJECTIVE

- To handle different experiments to test the physics concepts applied in optics, thermal physics, electronics, sound, elasticity and etc..

LIST OF EXPERIMENTS

1. Find the Young’s modulus by non-uniform bending method
2. Verify of band gap energy of a PN junction semiconductor using PN junction kit
3. Determination of wavelength of Laser and particle size using Laser grating method
4. Determination of rigidity modulus of given wire using Torsion pendulum method
5. Determination of thickness of a thin specimen using Air wedge method

LABORATORY REQUIREMENT FOR BATCH OF 30 STUDENTS:

Young's Modulus: Non-Uniform bending

a. Travelling Microscope - 6 Nos.
b. Pin -Scale Knife edge - 6 Nos.

Band gap

a. PN Junction diode setup - 6 Nos.
b. Eliminator - 6 Nos.

Particle Size

a. Laser grating - 6 Nos.
b. Circular disc with particle coated - 6 Nos.
c. Laser Source - 6 Nos.

Torsional Pendulum

a. Torsional Pendulum - 6 Nos.
b. Thin wire - 6 Nos.
c. Cloch - 6 Nos.
d. Screw gauge - 6 Nos.

Air wedge

a. Air wedge - 6 Nos.
b. Travelling Microscope - 6 Nos.
c. Mercury vapour lamp - 6 Nos.

TOTAL :30 PERIODS

COURSE OUTCOMES:

Learners are able to

1. Apply the basic theory for the corresponding experiment
2. Know the procedure to use physics equipment

CHEMISTRY LABORATORY

COURSE OBJECTIVES

- To make the student to acquire practical skills in the determination of water quality
- Parameters through volumetric and instrumental analysis.
- To acquaint the students with the determination of molecular weight of a polymer by Viscometery.

LIST OF EXPERIMENTS

1. Determination of DO content of water sample by Winkler's method.
2. Determination of chloride content of water sample by argentometric method.
3. Determination of strength of given hydrochloric acid using pH meter.
4. Determination of strength of HCL using conductivity meter
5. Determination of molecular weight of polyvinyl alcohol using Ostwald visco meter.

LABORATORY REQUIREMENT FOR BATCH OF 30 STUDENTS:

a.	Iodine flask	- 30 Nos.
b.	PH meter	- 5 Nos.
c.	Conductivity meter	- 5Nos.
d.	Spectrophotometer	- 5 Nos.
e.	Ostwald Viscometer	- 10 Nos.
f.	Common Apparatus:	Pipette, Burette, Conical Flask, Porcelain tile, Dropper

TOTAL :30 PERIODS

COURSE OUTCOMES :

Learners are able to

1. The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.
2. Utilize the fundamental laboratory techniques for analyses such as titrations, separation, purification and spectroscopy.

		L	T	P	C
U20GE103	**C - PROGRAMMING LABORATORY (COMMON TO ALL BRANCHES)**	**0**	**0**	**4**	**2**

Pre-requisite: Basic computer knowledge to install software.

COURSE OBJECTIVES

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

LIST OF EXPERIMENTS

1. Programs using I/O statements and expressions.
2. Programs using decision-making constructs.
3. Write a program to find whether the given year is leap year or Not? (Hint: not every centurion year is a leap. For example 1700, 1800 and 1900 is not a leap year)
4. Design a calculator to perform the operations, namely, addition, subtraction, multiplication, division and square of a number.
5. Check whether a given number is Armstrong number or not?
6. Populate an array with height of persons and find how many persons are above the average height.
7. Populate a two dimensional array with height and weight of persons and compute the Body Mass Index of the individuals.
8. Given a string “a$bcd./fg “find its reverse without changing the position of special characters.(Example input:a@gh%;j and output:j@hg%;a)
9. Convert the given decimal number into binary, octal and hexadecimal numbers using user defined functions.
10. From a given paragraph perform the following using built-in functions:
    a. Find the total number of words.
    b. Capitalize the first word of each sentence.
    c. Replace a given word with another word.
11. Solve towers of Hanoi using recursion.

12. Sort the list of numbers using pass by reference.
13. Generate salary slip of employees using structures and pointers.
14. Compute internal marks of students for five different subjects using structures and functions.
15. Insert, update, delete and append telephone details of an individual or a company into a telephone directory using random access file.

TOTAL: 60 PERIODS

LABORATORY REQUIREMENT FOR BATCH OF 30 STUDENTS:

HARDWARE:

1. Standalone desktops 30 Nos.

SOFTWARE:

1. C / Equivalent Compiler 30 Nos.

COURSE OUTCOMES

1. Develop C programs for simple applications making use of basic constructs, arrays and strings.
2. Develop C programs involving functions, recursion, pointers, and structures.
3. Design applications using sequential and random access file processing.

SEMESTER II

		L	T	P	C
U20HS201	**FUNCTIONAL ENGLISH (COMMON TO ALL BRANCHES)**	**3**	**0**	**0**	**3**

Pre-requisite: Basics skills development of Reading and Writing.

COURSE OBJECTIVES

- To develop the basic reading and writing skills of first year engineering and technology students.
- To help learners develop their listening skills, which will, enable them listen to lectures and comprehend them by asking questions; seeking clarifications.
- To help learners develop their speaking skills and speak fluently in real contexts.
- To help learners develop vocabulary of a general kind by developing their reading skills

UNIT I VOCABULARY AND GRAMMAR 9

Listening - Listening to talks mostly of a scientific/technical .Speaking - Asking for and giving directions- Reading - reading short technical texts from journals-newspapers- Writing- purpose statements– extended definitions- issue-writing instructions - recommendations- Language Development–subject verb agreement -compound words. Technical vocabulary.

UNIT II TECHNIQUES OF READING AND WRITING 9

Listening: Listening Process; Types of Listening; Intensive vs. Extensive Listening; Barriers to Listening. Speaking - describing a process-Reading - reading longer technical texts- identifying the various transitions in a text- paragraphing- Writing- interpreting charts, graphs- Language Development - vocabulary used informal letters/emails and reports .Homonyms and Homophones-Common Errors. Numerical adjectives.

UNIT III GRAMMAR AND SKILL DEVELOPMENT 9

Listening- Listening to classroom lectures/ talks on engineering/technology -Speaking –introduction to technical presentations- Reading–longer texts both general and technical, practice in speed reading; Writing- checklists- Describing a process, use of sequence words-Language Development -sequence words- Misspelled words.-use of clauses. Verb forms. Direct/Indirect Speech.

UNIT IV INTERVIEW SKILL AND LANGUAGE DEVELOPMENT 9

Listening- Listening to documentaries and making notes. Speaking - mechanics of presentations- Reading- Reading for detailed comprehension-Writing-email etiquette -job application–cover letter- Résumé preparation (via email and hard copy)- analytical essays and issue based essays-- Language Development -finding suitable synonyms-paraphrasing-. -if conditionals.

UNIT V TECHNICAL WRITING 9

Listening- TED/Ink talks; Speaking–participating in a group discussion - Reading- reading and understanding technical articles Writing- Writing reports- minutes of a meeting- accident and survey- Language Development- Comparative Adjectives

TOTAL: 45 PERIODS

COURSE OUTCOMES

Learners are able to:

1. Use academic and technical vocabulary in relevant contexts. Construct meaningful and grammatically correct sentence.
2. Effectively listen and acquire language and content, read fast and understand texts.
3. Use oral presentation skills in all professional contexts.
4. Demonstrate the understanding of the nature and importance of technical communication Draft various types of technical and business documents like, reports, proposals and business letters.
5. Compose documents like job application, book review etc.

TEXT BOOKS

1. Board of editors. Fluency Using English" A Course book for Undergraduate Engineering Technologists". Orient Blackswan, Hyderabad, 2015.
2. Sudharshana. N.P and Saveetha.C. "English for Technical Communication". Cambridge University Press: New Delhi, 2016.

REFERENCES

1. Barrass, Robert. "Scientists Must Write". London: Routledge.2003.
2. Faculty of English. "Technical Communication". SASTRA Publication. 2017.
3. Raman, Meenakshi & Sangeeta Sharma. "Technical Communication: Wren & Martin. High School English Grammar and Composition". (Revised edn.) New Delhi: Chand & Co. 1995.
4. Dr.S.Sumant, "Technical English" Tata McGraw-Hill, New Delhi, 2001.
5. Essential English - E.Suresh Kumar, P. Sreehari, J. Savithri - Orient Blackswan 2011.

		L	T	P	C
U20MA201	**ADVANCED CALCULUS AND ORDINARY DIFFERENTIAL EQUATIONS (COMMON TO ALL BRANCHES)**	**3**	**1**	**0**	**4**

Prerequisite: Basic concepts of vectors and complex numbers.

COURSE OBJECTIVES

- To familiarize the prospective engineers with techniques in ordinary differential equations, complex variables and complex integration.
- The Study of Laplace transforms help to solve the differential equations that occur in various branches of engineering disciplines.
- Vector calculus can be widely used for modeling the various laws of physics.
- The various methods of complex analysis can be used for efficiently solving the problems that occur in various branches of engineering disciplines.

UNIT I APPLICATIONS OF ORDINARY DIFFERENTIAL EQUATIONS 12

Basic concepts - Separable differential equations - Exact differential equations - Integrating factors - Linear differential equations - Second order linear differential equations with constant coefficients - Particular Integral using operator method and Method of variation of parameters - Homogenous equation of Euler's and Legendre's type-Physical Applications-Oscillations of a Spring.

UNIT II LAPLACE TRANSFORMS 12

Existence conditions - Transforms of elementary functions –Transform of unit step function and unit impulse function - Basic properties - Shifting theorems -Transforms of derivatives and integrals - Transform of periodic functions - Inverse transforms: Convolution theorem (Statement only) and Partial Fractions - Application to solution of linear second order ordinary differential equations with constant

coefficients-Unit Step Function-Unit impulse function.

UNIT III VECTOR CALCULUS AND APPLICATIONS 12

Gradient and directional derivative - Divergence and curl - Irrotational and Solenoidal vector fields - Line integral - Surface integral - Area of a curved surface - Green's, Gauss divergence and Stokes' theorems in evaluating line, surface and volume integrals (Planar, Cylindrical and Spherical Surfaces).

UNIT IV ANALYTIC FUNCTIONS 12

Analytic functions - Necessary and sufficient conditions for analyticity in Cartesian form - Properties - Harmonic conjugates - Construction of analytic function - Conformal mapping - Mapping by function-Bilinear Transformation.

UNIT V CALCULUS OF COMPLEX FUNCTIONS 12

Complex 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 (No poles on the real axis).

TOTAL: 60 PERIODS

COURSE OUTCOMES:

Learners are able to

1. Evaluate the effective mathematical tools to obtain the solutions of first and second order differential equations that model physical processes.
2. Express Gradient, divergence and curl of a vector point function and related identities. Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
3. Apply the tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems.
4. Express Analytic functions, conformal mapping and complex integration.
5. Solve Laplace transform and inverse transform of simple functions, properties, various related theorems and application to solve the differential equations with constant coefficients.

TEXT BOOKS

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.
2. Veerarajan T., "Engineering Mathematics for first year", Tata McGraw-Hill, New Delhi.

REFERENCES

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 9th Edition, John Wiley & Sons, 2014.
2. N. P. Bali and Manish Goyal "Engineering Mathematics" (For Semester II) Third Edition, University Science Press.
3. O'Neil, P.V. "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, New Delhi, 2007.
4. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 7th Edition, New Delhi, 2015.
5. Venkatraman M K, "Engineering Mathematics", Volume 1,Second edition, National Publishing Co,Chennai,2003.

U20PH201	ENGINEERING PHYSICS - II (COMMON TO ALL BRANCHES)	L	T	P	C
		3	0	0	3

Prerequisite: Basic knowledge in material property and its uses.

COURSE OBJECTIVES

- To understand the basics of electric, thermal, magnetic, super conducting and di electric properties of materials
- To aware about recent trends in physics

UNIT I ELECTRON THEORY OF SOLIDS 9

Introduction: types of materials- classical free electron theory: postulates- derivation of electrical conductivity and thermal conductivity- derivation. Wiedemann-Franz law and its verification-merits and demerits of classical free electron theory. Quantum free electron theory: Fermi energy level and its importance -Fermi-Dirac distribution function and its variation with temperature - density of energy states –carrier concentration in metals -average energy of electrons at 0 K.

UNIT II FUNDAMENTALS OF SEMICONDUCTORS 9

Introduction: properties- Types semiconductors- concept of effective mass of an electron and hole. Intrinsic semiconductor: carrier concentration in an intrinsic semiconductor-derivation –variation of Fermi energy level with temperature - Extrinsic semiconductor: carrier concentration derivation (P and N type semiconductor) - Hall effect–theory and experimental determination of Hall coefficient - Applications.

UNIT III DIELECTRICS AND FERRO ELECTRICS 9

Introduction: fundamental definitions in dielectrics–expressions for electronic and ionic polarization mechanisms- orientation polarization - space charge polarization - Langevin - Debye equation - frequency and temperature effects on polarization. Capacitor-energy stored in capacitor- Internal field - Clausius Mossotti relation-dielectric loss –dielectric breakdown - various breakdown mechanisms with characteristics - applications of dielectric materials - Ferro electrics -properties and applications.

UNIT IV MAGNETISM AND SUPER CONDUCTORS 9

Magnetic Materials: Introduction-basic definitions - origin of magnetic moment –Bohr magneton - magnetic materials: classification of dia, para, ferro magnetic materials. Ferro magnetic domains-energies involved in the growth of magnetic domains-hysteresis-explanation of hysteresis curve based on domain theory-soft and hard magnetic materials. Superconducting Materials: properties - types - BCS theory of super conductivity-Applications: cryotron and Mag-lev.

UNIT V NANOMATERIALS 9

Definition of nano system- Quantum confinement - 0D to 3D Quantum confined nanostructures - density of energy states from 3D to 0D- Preparation: top down and bottom up approaches- PLD - PVD - CVD - Electro deposition- Carbon nanotubes-types - SWCNT and MWCNT, Armchair, Zig-zag and Chiral structures-properties-applications

TOTAL: 45 PERIODS

COURSE OUTCOMES :

Learners are able to

1. Select the metals required for specific applications in the area of engineering and technology.
2. Distinguish between different types of semiconductor and determination of Hall co-efficient.

3. Understand the property of dielectric and ferro electric property of materials.
4. Identify different magnetic materials and super conducting materials.
5. Understand the idea used in new technologies

TEXT BOOKS

1. V.Rajendran, “Materials Science”, Tata McGraw- Hill, New Delhi, 2011.
2. S. Vadivel, A. Pannerselvam, “Solid State Physics”, Jaitech Publications, 2015 (Revised edition).

REFERENCES

1. Charles Kittel, “Introduction to Solid State Physics”, John Wiley & sons, 7th edition, Singapore (2007).
2. M. Arumugam, “Materials Science”. Anuradha publishers, 2010.
3. Dr. W. R. Fahrner, "Nanotechnology and Nanoelectronics Materials”, Devices, Measurement Techniques", Springer, 2005
4. J M D. Coey, “Magnetism and Magnetic Materials”, Combridge University Press, 1st edition, 2009.
5. V. Pokropivny, R. Lohmus, I. Hussainova, A. Pokropivny, S. Vlassov. Introduction in nanomaterials and nanotechnology. - University of Tartu. - 2007.

U20GE201	PYTHON PROGRAMMING (COMMON TO ALL BRANCHES)	L	T	P	C
		3	0	0	3

Pre-requisite: Basic Knowledge of concepts like variables, loops and control statement

COURSE OBJECTIVES

- To acquire programming skills in core Python.
- To develop Python programs with conditionals and loops.
- To develop the skill of designing Graphical user Interfaces in Python
- 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 AND 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 AND 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 AND 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, merge sort, histogram.

UNIT V FILES, MODULES AND PACKAGES 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.

TOTAL: 45 PERIODS

COURSE OUTCOMES :

Learners are able to

1. Develop algorithmic solutions to simple computational problems
2. Decompose a Python program into functions.
3. Implement database and GUI applications
4. Represent compound data using Python lists, tuples, dictionaries.
5. 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/think-python/)
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. John V Guttag, "Introduction to Computation and Programming Using Python‘", Revised and expanded Edition, MIT Press , 2013
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-disciplinary Approach", Pearson India Education Services Pvt. Ltd., 2016.
3. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.
4. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem-Solving Focus", Wiley India Edition, 2013.
6. Paul Gries, Jennifer Campbell and Jason Montojo, "Practical Programming: An Introduction to Computer Science using Python 3", Second edition, Pragmatic Programmers, LLC, 2013.

U20CS201	DATA STRUCTURE AND ALGORITHMS	L	T	P	C
		3	0	0	3

Prerequisite: To Know the basic concepts of learning algorithms

COURSE OBJECTIVES

- Apply various non-linear tree data structures in real time applications and projects
- Solve the collision problem using hashing techniques
- Implement and solve problems using heaps
- Design algorithms to solve common graph problems
- Identify the algorithms that are used to solve various problems.

UNIT I TREE STRUCTURE **9**

Tree: Types of Trees - Binary Tree – Representation – Tree Traversals – Expression Trees - Threaded Binary Tree - Application of Trees- Set Representation – Union and Find operations

UNIT II SEARCH STRUCTURES AND INDEXING **9**

Binary Search Tree- AVL Tree - Red-Black Tree- Splay Tree - B-tree - B+ tree - Hashing - Hash functions – Collision resolution techniques: Separate chaining and open addressing

UNIT III STACKS AND QUEUES **9**

Stacks and Queues: Stacks: ADT Stack and its operations: Applications of Stacks: Expression Conversion and evaluation. Queues: ADT Queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each type of Queues

UNIT IV GRAPHS **9**

Graphs: Representation – Graph traversals – Minimum spanning trees: Prim's algorithm, Kruskal's algorithm – Shortest path algorithms: Dijkstra's algorithm, Floyd Warshall algorithm – Applications of Graphs: Topological sort

UNIT V INTRODUCTION TO ALGORITHM DESIGN TECHNIQUES **9**

Overview: Greedy Method - Divide and conquer - Dynamic Programming - Backtracking - Branch and bound.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Learners are able to

1. Derive the time and space complexities and justify the correctness of a given algorithm.
2. Compare the performances of various Searching and Sorting techniques.
3. Create the ADTs and demonstrate the applications of Stacks and Queues.
4. Demonstrate the advantages of dynamic memory allocation via linked lists.
5. Illustrate about different types of Trees & Graph structures and implement search and traversal algorithms.

TEXT BOOKS

1. Ellis Horowitz, SartajSahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Silicon Press, New Jersey, Second Edition, 2005.
2. Data Structures And Algorithm Analysis In C 2nd Edition by Mark Allen Weiss, Pearson Education.

REFERENCES

1. Jean Paul Tremblay and Sorenson, “An Introduction to Data Structures with Applications” McGraw Hill Publishing Company, New Delhi, Second Edition, 2007.
2. Yedidyah Langsam, Moshe J Augenstein and Aaron M Tanenbaum, “Data Structures using C and C++”, Prentice Hall of India/ Pearson Education, New Delhi, 2006.
3. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, Pearson Education, New Delhi, Second Edition, 2012.
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, “Introduction to Algorithms”, 3rd Edition, MIT Press, 2010.

		L	T	P	C
U20EC201	**SEMICONDUCTOR DEVICES**	**3**	**0**	**0**	**3**

Pre-requisite: Basic knowledge of Engineering Physics

COURSE OBJECTIVES

- Accustom with the basics of semiconductor physics
- Understand the operation, characteristics, parameters and specifications of semiconductor diodes and special diodes
- Discuss the operation and performance of important applications of diodes
- Explain the bipolar, field-effect and metal oxide semiconductor transistor construction, operation, characteristics and parameters
- Acquaint with the construction, theory and operation of Special semiconductor and display devices

UNIT I SEMICONDUCTORS 9

History of semiconductor device development - Intrinsic semiconductor - Energy band diagram - Direct and indirect semiconductors - Carrier concentration in intrinsic semiconductor - Extrinsic semiconductors - Carrier concentration in N-type and P-type semiconductors - Semiconductor device materials - Semiconductor devices - Advantages, disadvantages and applications.

UNIT II SEMICONDUCTOR DIODE 9

Equilibrium PN junction - Forward biased PN junction - Reverse biased PN junction - Current-voltage relationship - Calculation of depletion width - Potential barrier - Diode current - Capacitive effects in PN junction - Energy band structure - Ideal diode and its current-voltage characteristics - Terminal characteristics and parameters.

UNIT III DIODE CIRCUITS 9

Diode Characteristics and Parameters - Diode Equivalent Circuit - Half Wave Rectifier - Precision Half Wave Rectifier - Full Wave Rectifier - Bridge Rectifier - Rectifiers with filter capacitors - Diode Switching Time and Frequency Response - Clippers and Clampers - Voltage multipliers Circuits.

UNIT IV JUNCTION TRANSISTORS 9

BJT: NPN and PNP - Operations - Early effect - Current equations - Input and Output characteristics of CE, CB, CC. **JFETs** - Drain and Transfer characteristics - Current equations - Pinch off voltage and its significance - **MOSFET** - Characteristics - Threshold voltage - Channel length modulation - D - MOSFET - E - MOSFET - Characteristics - Comparison of MOSFET with JFET.

UNIT V SPECIAL SEMICONDUCTOR, POWER DEVICES AND DISPLAY DEVICES 9

Schottky barrier diode - Zener diode - Varactor diode - Tunnel diode - LASER diode - LDR - UJT - SCR - DIAC - TRIAC - LED - LCD - Photo transistor - Solar cell.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Learners are able to

1. Confidence in handling and usage of electronic devices, tools and instruments in engineering applications.
2. Know broadly the concepts and functionalities of the electronic devices, tools and instruments.
3. Understand use, general specifications and deployabilities of the electronic devices and assemblies.
4. Operate the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors,
5. Understand the concepts on Power control devices, LED, LCD and other Opto-electronic devices.

TEXT BOOKS:

1. David A. Bell, “Electronic Devices & Circuits”, Oxford University Press, 4th edition, 2006.
2. Donald A Neaman, “Semiconductor Physics and Devices”, 2nd Edition, Tata Mc GrawHill Inc, 2002.

REFERENCES:

1. Adel S. Sedra, Kenneth C. Smith, “Microelectronic Circuits: Theory and Applications”, Oxford University Press, 7th Edition, 2017.
2. Jacob Millman, Christos C Halkias, Satyabrata Jit, Millman's, “Electronic Devices and Circuits”, McGraw Hill Education, 4th Edition, 2015.
3. Salivahanan.S, Suresh Kumar.N, Vallavaraj.A, “Electronic Devices and circuits”, Tata McGraw-Hill, 3rd Edition, 2012.
4. Thomas L. Floyd, “Electronic Devices”, Pearson Education, 7th edition, 2008.
5. Sanjeev Gupta,Santosh Gupta, “Electinic Devicew and Circuits” Rai Publication, 4 edition 2007

U20GE203	ENGINEERING PRACTICES LABORATORY (COMMON TO ALL BRANCHES)	L	T	P	C
		0	0	4	2

Prerequisite: Basic knowledge of Civil, Mechanical, Electrical and Electronics Engineering Equipments

COURSE OBJECTIVE

- 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)

CIVIL ENGINEERING PRACTICES

Buildings:

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

Plumbing Works:

a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.

b) Study of pipe connections requirements for pumps and turbines.

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

d) Hands-on-exercise:

Basic pipe connections - Mixed pipe material connection - Pipe connections with different joining components.

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

Carpentry using Power Tools only:

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

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

MECHANICAL ENGINEERING PRACTICES

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)

ELECTRICAL ENGINEERING PRACTICES

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 an electrical equipment.

ELECTRONICS ENGINEERING PRACTICES

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

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

CIVIL

Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings.

1. Carpentry vice (fitted to work bench	15 sets
2. Standard woodworking tools	15 Nos.
3. Models of industrial trusses, door joints, furniture joints	15 sets
Power Tools:	5 each
(a) Rotary Hammer	2 Nos
(b) Demolition Hammer	2 Nos
(c) Circular Saw	2 Nos
(d) Planer	2 Nos
(e) Hand Drilling Machine	2 Nos
(f) Jigsaw	2 Nos

MECHANICAL

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

ELECTRICAL

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

ELECTRONICS

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

COURSE OUTCOMES:

Learners are 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, foundary and fittings
6. Carry out basic home electrical works and appliances
7. Measure the electrical quantities
8. Elaborate on the components, gates, soldering practices.

U20GE204	PYTHON PROGRAMMING LABORATORY (COMMON TO ALL BRANCHES)	L	T	P	C
		0	0	4	2

Pre-requisite:. Basic knowledge of install programming software

COURSE OBJECTIVES

- To read, write and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- To implement functions for structuring Python programs.
- Represent compound data using Python lists, tuples, and dictionaries.
- To get input data from/to files in Python.

LIST OF PROGRAMS

1. Write python program to Compute the GCD of two numbers.
2. Write python program to Find the square root of a number (Newton‘s method).
3. Write python program to Exponentiation (power of a number).
4. Write python program to Find the maximum of a list of numbers.
5. Write python program to Linear search and Binary search.
6. Write python program to Selection sort, Insertion sort.
7. Write python program to Merge sort
8. Write python program to First n prime numbers.
9. Write python program to Multiply matrices.
10. Implement python programs that take command line arguments (word count).
11. Implement python program to Find the most frequent words in a text read from a file .
12. Write python program to Simulate elliptical orbits in Pygame.
13. Write python program to Simulate bouncing ball using Pygame.

TOTAL :60 PERIODS

LABORATORY REQUIREMENT FOR BATCH OF 30 STUDENTS:

HARDWARE:

1. Standalone Desktops 30 Nos

SOFTWARE:

Python 3 Interpreter for Windows/Linux

COURSE OUTCOMES:

Learners are able to

1. Compile and execute simple Python programs.
2. Implement mathematical calculation in programs
3. Develop Python programs step-wise by defining functions and calling them.
4. Use Python lists, tuples, dictionaries for representing compound data.
5. Execute simulation of pygame programs

		L	T	P	C
U20CS202	**DATA STRUCTURES LABORATORY**	**0**	**0**	**4**	**2**

Pre-requisite: To gain knowledge about different algorithm techniques

COURSE OBJECTIVES:

- To implement Linear and Non - Linear Data Structures
- To understand the different Operations of Search Trees
- To implement Graph Traversal Algorithms
- To get familiarized to Sorting and Searching Algorithms.

LIST OF EXPERIMENTS

1. Array implementation of Stack and Queue ADTs
2. Array implementation of List ADT
3. Linked list implementation of List, Stack and Queue ADTs
4. Applications of List, Stack and Queue ADTs
5. Implementation of Binary Trees and operations of Binary Trees
6. Implementation of Binary Search Trees
7. Implementation of AVL Trees
8. Implementation of Heaps using Priority Queues.
9. Graph representation and Traversal algorithms
10. Applications of Graphs
11. Implementation of searching and sorting algorithms
12. Hashing – any two collision techniques.

LABORATORY REQUIREMENT FOR BATCH OF 30 STUDENTS:

HARDWARE:

Standalone Desktops 30 Nos

SOFTWARE:

C / Equivalent Compiler 30 Nos

TOTAL: 60 PERIODS

COURSE OUTCOMES:

Learners are able to

1. Write functions to implement Linear and Non - Linear Data structure Operations.
2. Suggest appropriate Linear / Non - Linear Data Structure Operations for solving a given problem.
3. Appropriately use the linear / non-linear data structure operations for a given problem.
4. Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval