COURSE STRUCTURE (R20) – ECE

I - SEMESTER

S.No	Course Code	Course Title	Contact hours/week			Credits	Scheme of Valuation		
			L	T	P		CIE	SEE	Total
Theory Courses									
1	20FE01	Professional Communication-I	2	0	0	2	30	70	100
2	20FE03	Differential Equations	2	1	0	3	30	70	100
3	20FE07	Applied Physics	2	1	0	3	30	70	100
4	20EE01	Basic Electrical Engineering	3	0	0	3	30	70	100
5	20EC01	Electronic Devices and Circuits	3	0	0	3	30	70	100
Laboratory Courses									
6	20FE51	Professional Communication Skills Lab	0	0	2	1	30	70	100
7	20FE54	Applied Physics Lab	0	0	3	1.5	30	70	100
8	20EE51	Basic Electrical Engineering Lab	0	0	3	1.5	30	70	100
9	20EC51	Electronic Devices and Circuits Lab	0	0	3	1.5	30	70	100
Total			**12**	**2**	**11**	**19.5**	**270**	**630**	**900**

II - SEMESTER

S. No	Course Code	Course Title	Contact hours/week			Credits	Scheme of Valuation		
			L	T	P		CIE	SEE	Total
Theory Courses									
1	20FE02	Professional Communication-II	2	0	0	2	30	70	100
2	20FE04	Linear Algebra and Transformation Techniques	2	1	0	3	30	70	100
3	20FE06	Engineering Chemistry	3	0	0	3	30	70	100
4	20CS01	Programming for Problem Solving Using C	3	0	0	3	30	70	100
5	20EC02	Digital Logic Circuits	3	0	0	3	30	70	100
6	20MC01	Constitution of India	2	0	0	0	30	70	100
Laboratory Courses									
7	20FE53	Engineering Chemistry Lab	0	0	3	1.5	30	70	100
8	20CS51	Programming for Problem Solving Using C Lab	0	0	3	1.5	30	70	100
9	20EC52	Digital Logic Circuits Lab	0	0	2	1	30	70	100
10	20ME51	Engineering Workshop	0	0	3	1.5	30	70	100
Total			**15**	**1**	**11**	**19.5**	**300**	**700**	**1000**

B.Tech. (I Sem.)	20FE01 - PROFESSIONAL COMMUNICATION – I	L	T	P	Cr.
		2	0	0	2

Pre-requisites: Nil

Course Educational Objectives: To improve English language proficiency of the students on various aspects like vocabulary, grammar, communication skills, listening skills, Reading & Writing skills.

Course Outcomes: At the end of the course, the student will be able to

CO1 : Write sentences and paragraphs using proper grammatical structures and word forms. **(Remember – L1)**
CO2 : Comprehend the given text by employing suitable strategies for skimming and scanning and draw inferences. **(Understand – L2)**
CO3 : Write summaries of reading texts using correct tense forms & appropriate structures. **(Remember – L1)**
CO4 : Write Formal Letters; Memos & E-Mails. **(Apply – L3)**
CO5 : Edit the sentences/short texts by identifying basic errors of grammar/vocabulary/syntax. **(Understand – L2)**

Unit - I
Exploration - 'A Proposal to Girdle the Earth – Nellie Bly'; Reading: Skimming for main idea; Scanning for specific information; Grammar & Vocabulary: Content Words; Function Words; Word Forms: verbs, nouns, adjectives and adverbs; Nouns: Countable and Uncountable, Singular and Plural forms; Wh - Questions; Word Order in Sentences; Writing: Paragraph Analysis; Paragraph Writing; Punctuation and Capital Letters

Unit – II
On Campus- 'The District School as it Was by One Who Went to it – Warren Burton'; Reading: Identifying Sequence of Ideas; Grammar & Vocabulary: Cohesive Devices: Linkers/signposts/Transition signals, Synonyms, Meanings of Words/Phrases in the context; Writing: Memo Drafting.

Unit – III
Working Together-'The Future of Work'
Reading: Making basic inferences; Strategies to use text clues for comprehension; Summarizing; Grammar & Vocabulary: Verbs: Tenses; Reporting Verbs for Academic Purpose; Writing**:** Rephrasing what is read; Avoiding redundancies and repetitions Abstract Writing/ Summarizing.

Unit – IV
'A.P.J.AbdulKalam'; Grammar & Vocabulary: Direct & Indirect Speech; articles and their Omission; Writing: E-Mail Drafting.

Unit – V
'C.V.Raman'; Grammar & Vocabulary: Subject-Verb Agreement; Prepositions; Writing: Formal Letter Writing.

Text Books:

1. Prabhavati. Y & et al, "English All Round – Communication Skills for Undergraduate Learners", Orient Black Swan, Hyderabad, 2019.
2. "Panorama – A Course on Reading", A collection of prose selections, Oxford University Press, New Delhi, 2016.

Reference Books:

1. Swan,M., "Practical English Usage", Oxford University Press, 2016.
2. Kumar,S and Latha, P, "Communication Skills", Oxford University Press, 2018.
3. Rizvi Ashraf M., "Effective Technical Communication", Tata Mc Graw Hill, New Delhi, 2008.
4. BaradwajKumkum, "Professional Communication", I.K.International Publishing House Pvt.Lt., New Delhi, 2008.
5. Wood,F.T., "Remedial English Grammar", Macmillan, 2007.

B.Tech. (I Sem.) **20FE03 - DIFFERENTIAL EQUATIONS**

L	T	P	Cr.
2	1	0	3

Pre-requisites: Nil

Course Educational Objective: The objective of this course is to introduce the first order and higher order differential equations, functions of several variables. The students also learn solving of first order partial differential equations.

Course Outcomes: At the end of the course, the student will be able to:

- **CO1**: Apply first order and first-degree differential equations to find orthogonal trajectories. **(Apply – L3)**
- **CO2**: Distinguish between the structure and methodology of solving higher order differential equations with constant coefficients. **(Understand – L2)**
- **CO3**: Apply various Numerical methods to solve initial value problem. **(Apply – L3)**
- **CO4**: Generate the infinite series for continuous functions and investigate the functional dependence. **(Understand – L2)**
- **CO5**: Solve partial differential equations using Lagrange's method. **(Apply – L3)**

UNIT –I
Differential Equations of First Order and First Degree
Differential equations of first order and first degree – Exact and Non Exact differential Equations, Applications of differential equations – Orthogonal Trajectories.

UNIT –II
Linear Differential Equations of Higher Order
Homogeneous and Non-Homogeneous Linear differential equations of second and higher order with constant coefficients with R.H.S. functions e^{ax}, sin $(ax+b)$, cos $(ax+b)$, x^m, $e^{ax}V(x)$, $xV(x)$, Method of variation of parameters.

UNIT – III
Numerical solution of Ordinary Differential Equations
Numerical solution of Ordinary Differential equations, Solution by Taylor's series - Picard's Method of successive approximations.
Euler's Method - Runge- Kutta Methods.

UNIT –IV
Functions of several variables

Generalized Mean Value Theorem (without proof), Maclaurin's series, Functions of several variables, Jacobians (Cartesian and polar coordinates), Functional dependence. Maxima and Minima of function with two variables.

UNIT – V
Partial Differential Equations
Formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions. Solution of first order and first degree linear partial differential equation – Lagrange's method.

Text Books:

1. B.S. Grewal, "*Higher Engineering Mathematics*", 42nd Edition, Khanna Publishers, New Delhi, 2012.
2. B. V. Ramana, "*Higher Engineering Mathematics*", 1st Edition, TMH Publications, New Delhi, 2010.

Reference Books:

1. M. D. Greenberg, "*Advanced Engineering Mathematics*", 2nd Edition, TMH Publications, New Delhi, 2011.
2. Erwin Kreyszig, *"Advanced Engineering Mathematics"*, 8th Edition, John Wiley & sons, New Delhi, 2011.
3. W.E. Boyce and R. C. Diprima, " *Elementary Differential Equations"* , 7th Edition, John Wiley & sons, New Delhi, 2011.
4. S. S. Sastry, *"Introductory Methods of Numerical Analysis"* 5th Edition, PHI Learning Private Limited, New Delhi, 2012.

L	T	P	Cr.
2	1	0	3

B.Tech. (I Sem.) **20FE07 - APPLIED PHYSICS**

Pre-requisites: Nil

Course Educational Objectives: It enables the students to understand the fundamental concepts of optics, quantum mechanics, free electron theory of metals, semiconductors, dielectrics and their applications.

Course Outcomes: At the end of the course, the student will be able to,

CO1: Define the nature of interference and diffraction. **(Remember – L1)**
CO2: Apply the lasers and optical fibres in different fields. **(Apply – L3)**
CO3: Estimate the electrical conductivity of metals. **(Understand – L2)**
CO4: Analyze the properties of semiconducting materials. **(Understand – L2)**
CO5: Classify the different types of magnetic and dielectric materials. **(Understand – L2)**

UNIT – I

Wave Optics

Interference**:** Principle of super position, Conditions for Interference, Interference in thin parallel film by reflection, Newton's rings (reflection), working principle of Interferometer.

Diffraction**:** Introduction, Fraunhofer diffraction at single slit- Diffraction due to circular aperture, Diffraction Grating- Resolving power of Grating.

UNIT – II

Lasers and optical fibers

Lasers**:** Introduction - Principle of laser (absorption, spontaneous and stimulated emission of radiation), Einstein Coefficients – Nd-YAG laser, Helium Neon laser- applications.

Optical Fibers: Optical Fiber principle, Structure of optical fiber, numerical aperture and acceptance angle, types of optical fibers - applications.

UNIT – III

Principles of Quantum Mechanics &Free electron theory

Principles of quantum mechanics: de Broglie Hypothesis, Davisson - Germer experiment, Schrodinger time independent and dependent wave equations, physical significance of the wave function – particle in a box.

Free electron theory

Classical free electron theory- Postulates, Advantages and Draw backs, Fermi-Dirac distribution function-Temperature dependence of Fermi- Dirac distribution function, Classification of Solids on the basis of Band theory.

UNIT – IV

Semiconductor physics

Conductivity of Intrinsic and Extrinsic semiconductors, Drift and Diffusion Current, Einstein relation, Hall Effect, Differences between direct and indirect Band Gap semiconductors, Solar Cell, Applications of Solar Cells.

UNIT – V

Magnetic &Dielectricmaterials

Magnetic parameters, Classification of magnetic materials-Diamagnetic, paramagnetic and ferromagnetic materials, Hysteresis loop, soft and hard magnetic materials, Applications of Ferro magnetic materials

Dielectrics: polarization - Electronic and ionic polarization, orientation polarization (Qualitative), Local field, ClaussiusMosotti equation, Applications of dielectric materials.

TEXT BOOKS

1. V. Rajendran, "*Engineering Physics*", TMH, New Delhi, 6th Edition, 2014.
2. M.N. Avadhanulu, P.G. Kshirsagar, "Engineering *Physics*", S. Chand & Co., 2ndEdition, 2014.

REFERENCE BOOKS

1. M.N. Avadhanulu, TVS Arun Murthy, "Applied *Physics*", S. Chand & Co., 2ndEdition, 2007.
2. P.K. PalaniSamy, "*Applied Physics*", Sci. Publ. Chennai, 4th Edition, 2016.
3. P. Sreenivasa Rao, K Muralidhar, "*Applied Physics*", Him. Publi. Mumbai, 1st Edition, 2016.
4. HitendraK Mallik , AK Singh " *Engineering Physics*", TMH, New Delhi, 1st Edition, 2009.

B.Tech. (I Sem.) **20EE01 - BASIC ELECTRICAL ENGINEERING**

L	T	P	Cr.
3	0	0	3

Prerequisite: Physics

COURSE OBJECTIVE: This course deals with nature of basic electrical components, analysis of steady state and transient response of linear electrical networks. It also deals with the principle of operation of AC and DC machines.

Course Outcomes: At the end of the course, students will be able to

CO1: Illustrate the behavior of active and passive components, series and parallel circuits, self and mutual inductance of magnetic circuits, network functions and two port networks using circuit and mathematical approaches. **(Understand – L2)**

CO2: Interpret the working principles of AC and DC machines along with grounding and earthling using electrical engineering fundamentals and mathematical approaches. **(Understand – L2)**

CO3: Apply mesh analysis, nodal analysis and network theorems to solve the Thevinen's voltage, Norton's current and maximum power transfer of the linear circuits. **(Apply – L3)**

CO4: Analyze the concepts of bandwidth, quality factor of series and parallel resonant circuits using circuit and mathematical approaches. **(Analyze – L4)**

UNIT – I: Electrical Circuit Fundamentals

Basic definitions, Types of elements-active and passive, Ohm's Law, Kirchhoff's Laws-Network reduction techniques- series, parallel, star to delta, delta to star transformations, source transformations, mesh analysis, nodal analysis, duality and dual networks.

UNIT – II: MAGNETIC CIRCUITS & AC FUNDAMENTALS

Magnetic Circuits: Self and mutual inductance, dot convention, coefficient of coupling, analysis of series and parallel magnetic circuits, coupled circuits.

AC Fundamentals: Peak, R.M.S, average and instantaneous values, Form factor and Peak factor for periodic waveforms – Phase and Phase difference –Concepts of Reactance, Impedance, Susceptance and Admittance, Real , Reactive and apparent Powers, Power Factor.

UNIT – III: NETWORK THEOREMS & RESONANCE CIRCUITS

Network Theorems (DC Networks): Superposition, Thevenin's, Norton's, Maximum power transfer, reciprocity and Milliman's theorems.

Resonant circuits: Series and parallel resonant circuits, concept of band width, quality factor.

UNIT – IV: NETWORK FUNCTIONS & TWO PORT NETWORKS

Network Functions: Driving point and transfer functions, poles and zeros of network functions, Restrictions of pole and zero locations for driving point and transfer functions.

Two-Port Networks: Z, Y, ABCD & h-parameters, Inter-relationship between parameters, Two port network connections in series, parallel and cascaded.

UNIT – V: ELECTRICAL MACHINES

Electrical Machines: Types of Electrical Machines and their applications; Working principle of DC machines, single phase transformer, 3-phase induction motor; EMF equation.

Electrical Safety: Definition, precautions, concepts of grounding and earthing.

TEXT BOOKS

1. Ravish R Singh, *"Network Analysis and synthesis"*, Tata McGraw Hill Pvt Ltd, New Delhi.2013
2. B.L Theraja, A.K. Theraja, "Electrical Technology in S.I. UNITS. Volume *II*. AC & DC MACHINES" Published by S. Chand & Company Ltd 2016

REFERENCE BOOKS

1. M.S Naidu and S. Kamakshaiah, "Introduction to Electrical Engineering", TMH Publication, 3rd edition 2017.
2. A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7th Edition, New Delhi 2017.

B.Tech. (I Sem.) **20EC01 - ELECTRONIC DEVICES AND CIRCUITS**

L	T	P	Cr.
3	0	0	3

Pre-requisites: Fundamentals of Physics.

Course Educational Objective: This course introduces the Device construction, characteristics and applications of semiconductor devices like PN junction diode, Bipolar Junction Transistor (BJT), Field Effect Transistor (FET), Metal oxide Semiconductor Field Effect Transistor (MOSFET) and various special devices.

Course Outcomes: At the end of the course, the student will be able to

CO1: Identify the types of Diodes, Transistors, FETs, Biasing techniques and their comparisons to select the best approaches for designing the electronic circuits using Devices and components. **(Apply – L3)**

CO2: Interpret the mathematical models of Currents and Voltages of Diodes, Bipolar Junction Transistors and Field Effect Transistors and biasing of BJT and FET using fundamental circuits. **(Understand – L2)**

CO3: Apply the knowledge of diodes, transistors and filters for designing the rectifiers, Filters, Regulators and Amplifier circuits using Devices and components. **(Apply – L3)**

CO4: Analyze the characteristics of Diodes, Bipolar Junction Transistors, Field Effect Transistors and their equivalent models using VI Characteristics and mathematical models. **(Analyze – L4)**

UNIT – I

PN Junction Diode: Qualitative theory of the p-n Junction; The Current components in a p-n Diode; The Volt- Ampere Characteristic; Diode Capacitance- Transition Capacitance and Diffusion Capacitance. Operation and characteristics of Zener Diode, Tunnel Diode, UJT and SCR.

UNIT – II

Diode Applications: Half wave Rectifier, Full wave Rectifiers, ripple removal using Capacitive. Inductive, and L section Filters. Voltage Regulator using Zener diode, Clippers, and Clampers.

UNIT – III

Bipolar Junction Transistor: BJT-construction and types, different regions of operations; Transistor Current components-Emitter Efficiency, Transport Factor, Large Signal Current Gain; Input and Output characteristics of Transistor configurations; Relation between α , β and γ; Ebers-Moll Model.

UNIT – IV

Field Effect Transistors: Construction and Operation, classification of FET, Comparison between FET and BJT; Drain and Transfer Characteristics of JFET and MOSFET and MOS Capacitor.

UNIT –V

BJT Biasing: Need for biasing; Operating Point, DC load line, AC load line and Stability factors S,S' and S''; Biasing circuits- Fixed bias, Collector to Base Bias and Self Bias; Thermal Runaway and Thermal Stability, Bias Compensation techniques.

FET Biasing: Voltage divider bias, Small signal equivalent of FET.

TEXT BOOKS

1. Jacob Millman, Christos C Halkias, Electronic Devices and Circuits, Third edition, Tata McGraw Hill, Publishers, New Delhi.2012

REFERENCE

1. Boylestad R.L. and Louis Nashelsky, Electronic Devices and Circuits, Fourth edition, Pearson/Prentice Hall Publishers,2014.
2. Ben Streetman and Sanjay Banerjee, Solid State Electronic Devices, Fourth edition, Prentice Hall Publishers,2014.
3. Thomas L. Floyd, Electronic Devices, Third edition, Pearson Education Publishers,2014.

B.Tech. (I Sem.)	20FE51 - PROFESSIONAL COMMUNICATION SKILLS LAB	L	T	P	Cr.
		0	0	2	1

Pre-requisites : Nil

Course Educational Objective: To improve the proficiency of students in English with an emphasis on better communication in formal and informal situations; Develop speaking skills required for expressing their knowledge and abilities and to face interviews with confidence.

Course Outcomes: At the end of this course, the student will be able to

CO1: Introduce oneself and others using appropriate language and details. **(Understand–L2)**
CO2: Comprehend short talks and speak clearly on a specific topic using **(Understand – L2)**
CO3: Report effectively after participating in informal discussions ethically**. (Remember-L1)**
CO4: Interpret data aptly, ethically & make oral presentations without. **(Apply – L3)**

Syllabus: Professional Communication Lab (PCS) shall have two parts:

- **Computer Assisted Language Learning (CALL) Lab** for 60 students with 60 systems, LAN facility and English language software for self- study by learners.
- **Interactive Communication Skills (ICS) Lab.** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo – audio & video system and camcorder etc.

Exercise – I

CALL Lab: Understand - Sentence structure.

ICS Lab: Practice - Listening: Identifying the topic, the context and specific information
Speaking: Introducing oneself and others.

Exercise – II

CALL Lab: Understand - Framing questions.

ICS Lab: Practice - Listening: Answering a series of questions about main idea and supporting ideas after listening to audio text.
Speaking: Discussing in pairs/small groups on specific topics; Delivering short structured talks using suitable cohesive devices (JAM)

Exercise – III

CALL Lab: Understand - Comprehension practice – Strategies for Effective Communication

ICS Lab: Practice - Listening: Listening for global comprehension and summarizing
Speaking: Discussing specific topics in pairs/small groups, reporting what is discussed

Exercise – IV

CALL Lab: Understand- Features of Good Conversation – Strategies for Effective Communication.

ICS Lab: Practice -Listening: making predictions while listening to conversations/transactional dialogues with/without video Speaking: Role – plays – formal & informal – asking for and giving information/directions/instructions/suggestions

Exercise – V

CALL Lab: Understand - Features of Good Presentation, Methodology of Group Discussion
ICS Lab:Practice - Introduction to Group Discussions.
Listening: Answering questions identifying key terms and understanding concepts.
Speaking: Formal Oral & Poster presentations on topics from academic contexts without the use of PPT.

Lab Manual:

1. Prabhavati. Y & et al, "English All Round – Communication Skills for Undergraduate Learners", Orient Black Swan, Hyderabad, 2019.

Suggested Software:

1. Digital Mentor: Globarena, Hyderabad, 2005
2. Sky Pronunciation Suite: Young India Films, Chennai, 2009
3. Mastering English in Vocabulary, Grammar, Spelling, Composition, Dorling Kindersley,USA,2001
4. Dorling Kindersley Series of Grammar, Punctuation, Composition, USA, 2001
5. Oxford Talking Dictionary, The Learning Company, USA, 2002
6. Learning to Speak English - 4 CDs. The Learning Company,USA,2002
7. Cambridge Advanced Learners English Dictionary (CD). Cambridge University Press, New Delhi,2008.

B.Tech. (I Sem.)	20FE54 - APPLIED PHYSICS LAB	L	T	P	Cr.
		0	0	3	1.5

Pre-requisites: Nil

Course Educational Objective: This course enables the students to acquire theoretical ideas, analytical techniques, and graphical analysis, by completing a host of experiments with the procedures and observational skills for appropriate use of simple and complex apparatus.

Course Outcomes: At the end of the course, the student will be able to,

Co1: Analyze the wave characteristics of light. **(Understand – L2)**
Co2: Estimate the magnetic field using Stewart's and Gee's apparatus. **(Understand – L2)**
Co3: Verify the characteristics of semiconductor diodes. **(Apply – L3)**
Co4: Determine the acceptance angle and numerical aperture of optical fiber. **(Apply – L3)**
Co5: Improve report writing skills and individual teamwork with ethical values. **(Understand–L2)**

List of Experiments

(Any of the 10 experiments are required to be conducted)

General experiments**:**

1. Determine the energy band gap of a semiconductor Diode.
2. Study the characteristics of Zener Diode.
3. Study the magnetic field along the axis of a current carrying circular coil using Stewart's& Gee's apparatusand to verify Biot - Savart's law.
4. Study the characteristics of Solar cell
5. Determination of dielectric constant by charging and discharging method.
6. Study the characteristics of Photo diode.
7. Determination of resistivity of semiconductor by four probe method.

Optics lab experiments:

8. Determine the wavelength of a laser radiation.
9. Determine the width of a single slit by forming diffraction pattern.
10. Determine the Radius of Curvature of a Plano - Convex lens by forming Newton's Rings.
11. Determine the Wavelengths of various spectral lines by using diffraction grating.
12. Resolving power of grating.
13. Determine the acceptance angle and numerical aperture of a fiber.
14. Measure the bending losses in the optical fiber cable at different wavelengths.

B.Tech. (I Sem.)	20EE51 - BASIC ELECTRICAL ENGINEERING LAB	L	T	P	Cr.
		0	0	3	1.5

Pre-requisites: Nil

COURSE OBJECTIVE: This is a course to expose basic circuit concepts, circuit modeling and methods of circuit analysis in time domain and frequency domain for solving simple circuits including DC and AC circuit theory and network theorems.

Course Outcomes: At the end of the course, the student will be able to:

CO1: Interpret the behavior of passive components of electrical circuits, inductance of magnetic circuits, two port networks and principle of DC machines using fundamental electrical laws and mathematical models. **(Understand – L2)**

CO2: Apply Kirchhoff's laws, Network theorems to verify the linear electrical circuits using fundamental electrical laws and mathematical equations. **(Apply – L3)**

CO3: Examine the active & reactive powers of single phase electrical circuits and resonant frequency, bandwidth & quality factor of electrical circuits. **(Apply – L3)**

CO4: Adapt effective Communication, presentation and report writing skills. **(Apply – L3)**

List of Experiments

(Any of the 10 experiments are required to be conducted)

1. Identify and test passive elements in linear electrical circuits.
2. Determination of closed Loop voltages and node currents using Kirchhoff's laws.
3. Determination of node voltages and branch currents using voltage division and current division rules.
4. Determination of Self inductance, Mutual inductance and Coefficient coupling factor of a Magnetic circuits.
5. Determination of Active and Reactive powers in a Single phase series R-L/R-C circuits.
6. Determination of Resonant frequency, Bandwidth and Quality factor of RLC circuits.
7. Analysis of linear circuit branch response using Superposition theorem.
8. Determination and verification of Voltage & Resistance using Thevenin's theorems, and current & resistance using Norton's theorem.
9. Determination and verification of power transfer using Maximum power transfer theorem.
10. Determination and verification of Z parameters and Y Parameters of two port network.
11. Measurement of efficiency of DC machines using Swinburne's test.
12. Measurement of Torque, Speed and Armature current of DC shunt motor from its characteristics.

B.Tech. (I Sem.)	20EC51 - ELECTRONIC DEVICES AND CIRCUITS LAB	L	T	P	Cr.
		0	0	3	1.5

Pre-requisites: Nil

Course Educational Objective: This course introduces the characteristics and applications of semiconductor devices; emphasis is placed on characteristics and testing practically to strengthen the knowledge.

Course Outcomes: At the end of the course, the student will be able to

CO1: Demonstrate the characteristics of Diodes, BJT, FET, Voltage regulators, Diode applications. **(Understand – L2)**

CO2: Analyze the device parameters of Diodes, Bipolar Junction Transistors, and Field Effect Transistors for its electrical parameters using VI characteristics. **(Analyze – L4)**

CO3: Apply the knowledge of diodes, Capacitors and transistors for the realization of rectifiers, regulators, Clippers and Clampers circuits. **(Apply – L3)**

CO4: Adapt effective Communication, presentation and report writing skills. **(Apply – L3)**

List of Experiments

(Any of the 10 experiments are required to be conducted)

1. Identification of components, Active and Passive Devices, Study and operation of Regulated Power Supplies, CRO and Function generators.
2. Determination of Cut-in Voltage, Forward and Reverse resistances of PN Junction diode using Characteristics.
3. Realization and performance evaluation of Half wave rectifier with and without Capacitor filter.
4. Realization and performance evaluation of Full wave rectifier with and without Capacitor filter.
5. Analysis of Transistor CB Configuration for its Input and Output resistances and Current gains using VI Characteristics.
6. Analysis of Transistor CE Configuration for its Input and Output resistances and Current gains using VI Characteristics.
7. Analysis of Drain and Transfer Characteristics of Field Effect Transistor for its Drain Resistance, Transconductance and Amplification factor.
8. Determination of Breakdown voltage of Zener diode and Design of Zener Voltage regulator.
9. Design and Realization of Series Voltage Clippers with and without bias voltage.
10. Design and Realization of Shunt Voltage Clippers with and without bias voltage.
11. Design and Realization of Voltage Clampers circuits using Diode and capacitors.
12. Realization of Voltage multiplier using Clampers.

B.Tech. (II Sem.)	20FE02 - PROFESSIONAL COMMUNICATION – II	L	T	P	Cr.
		2	0	0	2

Pre-requisites: Nil

Course Educational Objective: To improve English language proficiency of the students on various aspects like vocabulary, grammar, communication skills, listening skills, Reading & Writing skills.

Course Outcomes: At the end of the course, the student will be able to

- **CO1:** Produce a coherent paragraph interpreting a figure/graph/chart/table. **(Understand – L2)**
- **CO2:** Comprehend the given texts thoroughly by guessing the meanings of the words contextually. **(Understand – L2)**
- **CO3:** Use language appropriately for describing/comparing/contrasting/giving directions & suggestions. **(Remember – L1)**
- **CO4:** Write formal/informal dialogues with an understanding of verbal/non-verbal features of communication. Guess meanings of the words from the context. **(Understand – L2)**
- **CO5:** Write well-structured essays; Reports & Résumé. **(Apply – L3)**

UNIT - I

Fabric of Change- 'H.G. Wells and the Uncertainties of Progress – Peter J. Bowler'; Reading: Studying the use of Graphic elements in texts; Grammar & Vocabulary**:** Quantifying Expressions; Adjectives and adverbs; Comparing and Contrasting; Degrees of Comparison, Writing: Information Transfer

UNIT - II

Tools for Life - 'Leaves from the Mental Portfolio of a Eurasian – Sui Sin Far'; Reading: Global Comprehension; Detailed Comprehension; Grammar & Vocabulary**:** Active & Passive Voice; Idioms & Phrases; Writing: Structured Essays using suitable claims and evidence.

UNIT - III

'Homi Jahangir Bhabha';
Grammar & Vocabulary: Words often confused; Common Errors; Writing**:** Incident & Investigation Reports.

UNIT - IV

'Jagadish Chandra Bose'; Grammar & Vocabulary: Use of antonyms; Correction of Sentences; Writing**:** Dialogue Writing.

UNIT - V

'**Prafulla Chandra Ray'**; Grammar & Vocabulary: Analogy; Sentence Completion; Writing**:** Writing a Résumé

TEXT BOOKS:

1. Prabhavati. Y & et al, "English All Round – Communication Skills for Undergraduate Learners", Orient Black Swan, Hyderabad, 2019.
2 "The Great Indian Scientists" published by Cengage Learning India Pvt. Ltd., Delhi, 2017

REFERENCE BOOKS:

1. Swan,M., "Practical English Usage", Oxford University Press, 2016.
2. Kumar,S and Latha, P, "Communication Skills", Oxford University Press, 2018.
3. Rizvi Ashraf M., "Effective Technical Communication", Tata Mc Graw Hill, New Delhi, 2008.
4. BaradwajKumkum, "Professional Communication", I.K.International Publishing House Pvt.Lt., New Delhi, 2008.
5. Wood,F.T., "Remedial English Grammar", Macmillan, 2007.

B.Tech. (II Sem.)	20FE04 - LINEAR ALGEBRA AND TRANSFORMATION TECHNIQUES	L	T	P	Cr.
		2	1	0	3

Pre-requisites: Nil

Course Educational Objective: In this course, students learn Matrix Algebra and introduced with transformation techniques such as Laplace Transforms and Z – Transforms.

Course Outcomes: At the end of the course, the student will be able to
CO1: Investigate the consistency of the system of equations and solve them. **(Apply – L3)**
CO2: Determine the eigen vectors and inverse, powers of a matrix using Cayley-Hamilton theorem. **(Apply – L3)**
CO3: Use the concepts of Laplace Transforms to various forms of functions. **(Understand – L2)**
CO4: Solve ordinary differential equations by using Laplace Transforms. **(Apply – L3)**
CO5: Apply Z - Transforms to solve difference equations. **(Apply – L3)**

UNIT – I
System of Linear Equations
Matrices - Rank- Echelon form, Normal form, PAQ form– Solution of Linear Systems – Homogeneous system of equations and Non-Homogeneous system of equations.

UNIT – II
Eigen Values and Eigen Vectors
Eigen values – Eigen Vectors – Properties – Cayley-Hamilton Theorem – Inverse and Powers of a matrix by using Cayley-Hamilton Theorem.

UNIT – III
Laplace Transforms
Laplace transforms of standard functions –Linear Property - Shifting Theorems, Change of Scale Property
Multiplication and Division by 't' - Transforms of derivatives and integrals – Unit step function –Dirac's delta function.

UNIT – IV
Inverse Laplace Transforms
Inverse Laplace transforms– Linear Property - Shifting Properties - Convolution theorem, Applications of Laplace transforms to ordinary differential equations.

UNIT – V
Z-Transforms
Z-transform – properties – Damping rule – Shifting rule – Initial and final value theorems - Inverse Z –transform - Convolution theorem – Solution of difference equation by Z-transforms.

Text Books:

1. B.S. Grewal, "*Higher Engineering Mathematics*", 42nd Edition, Khanna Publishers, New Delhi, 2012.
2. B. V. Ramana, "*Higher Engineering Mathematics*", 1st Edition, TMH Publications, New Delhi, 2010.

Reference Books:

1. M. D. Greenberg, "*Advanced Engineering Mathematics*", 2nd Edition, TMH Publications, New Delhi, 2011.
2. Erwin Kreyszig, *"Advanced Engineering Mathematics"*, 8th Edition, John Wiley & sons, New Delhi, 2011.
3. W.E. Boyce and R. C. Diprima, "Elementary *Differential Equations"*, 7th Edition, John Wiley & sons, New Delhi, 2011

B.Tech. (II Sem.) **20FE06 - ENGINEERING CHEMISTRY**

L	T	P	Cr.
3	0	0	3

Pre-requisites: Nil

Course Educational Objectives: It enables the students to understand the fundamental concepts of chemistry and to provide them with the knowledge of industrial problems and finding the solutions. It helps to strengthen the basic concepts of electrochemistry, corrosion, nanotechnology, polymers, liquid crystals and analytical techniques.

Course Outcomes: At the end of the course, students will be able to,

- **CO1:** Apply Nernst Equation for calculating electrode cell potentials and compare batteries for different applications. **(Apply – L3)**
- **CO2:** Apply principles of corrosion for design and effective maintenance of various equipment. **(Apply – L3)**
- **CO3:** Analyse the suitability of advanced materials like nano materials in electronics and medicine. **(Understand – L2)**
- **CO4:** Identify the importance of liquid crystals, polymers in advanced technologies. **(Understand – L2)**
- **CO5:** Apply the principles of analytical techniques in chemical analysis. **(Apply – L3)**

UNIT – I

Electro Chemistry & Batteries

Types of Electrodes -Calomel Electrode, Glass Electrode, Calculation of EMF of Cell, Applications of Nernst Equation & Electro chemical Series, Batteries -Lead-acid Battery, Lithium ion Battery, H_2 – O_2 Fuel Cell, Mg - Cu reserve battery.

UNIT – II

Science of Corrosion

Dry Corrosion (Direct Chemical corrosion) - Types of dry corrosion-oxidative corrosion, Pilling Bed worth rule, corrosion by other gases and liquid metal corrosion; Wet Corrosion (Electro Chemical corrosion) - Mechanism- oxygen absorption, hydrogen evolution, types of wet corrosion, Galvanic Corrosion, Concentration Cell Corrosion, passivity and Galvanic series; Factors Influencing Corrosion - Nature of metal (Purity, position in galvanic series, relative area of cathode & anode, nature of surface film) and nature of environment (temperature, humidity, atmospheric pollution and nature of ions in the medium); Control of Corrosion: Cathodic Protection - Sacrificial anode and impressed current methods, electro plating and metal cladding.

UNIT – III

Chemistry of Engineering Materials

Nano Materials - Extraordinary changes observed at nano size of materials and reasons, types of nano-materials, Gas-Phase Synthesis of nanomaterials, Applications; Materials in Electronic devices: Very brief note on raw materials that make IC units of CPU, GPU, RAM, PCBs, hard disks and other electronic devices with special reference to polymers;

Molecular Switches - Characteristics of Molecular motors and machines, Rotaxanes and Catenanes as artificial molecular machines, prototypes – linear motions in rotaxanes, an acid-base controlled molecular shuttle, molecular elevator, automated light-powered molecular motor.

UNIT – IV

Liquid Crystals & Polymers

Liquid crystals -Identification and structural aspects of molecules to form liquid crystals; Classification of liquid crystals - Thermo tropic liquid crystals and types, lyotropic liquid crystals. Mechanism of working of liquid crystals and applications; Polymers - Differences between thermoplasts and thermosets, Types of polymerization with examples; Plastics - Preparation properties and engineering applications of P.M.M.A, Teflon, Polycarbonate; Rubbers - Structure of raw rubber and vulcanized rubber, Preparation properties and engineering applications of Polyurethane, Buna-S, conducting polymers; Bio-degradable polymers - PLA & PGA (Polylactic Acid and Polyglycolic Acid).

UNIT – V

Analytical Techniques

Types of analysis; Physical analysis: Analysis of physical characteristics; Chemical analysis: Gravimetric and volumetric analysis (basic concept only);Instrumental analysis: Electro analytical techniques – Introduction; Conductometric techniques: strong acid-strong base and strong acid-weak base, weak acid -strong base and weak acid -weak base & advantages; Potentiometric techniques: Acid-base and oxidation-reduction titrations-advantages; Colorimetric techniques: Principle and determination of iron by using thiocynate as a reagent.

TEXT BOOKS

1. Shikha Agarwal, "A Text book of Engineering Chemistry", Cambridge University Press, New Delhi, 1st Edition, 2015.
2. Jain, Jain, "A textbook of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 16th Edition, 2015.

REFERENCEBOOKS

1. Shashi Chawla, "A Text book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 3rd Edition, 2003.
2. S.S. Dara, S.S. Umare, "A Text book of Engineering Chemistry", S. Chand Publications, New Delhi, 12th Edition, 2010.
3. PrasantaRath, B. Rama Devi, Ch. VenkataRamana Reddy, SubhenduChakroborty, "Engineering Chemistry", Cengage Learning India, 1st Edition, 2019.

20CS01 - PROGRAMMING FOR PROBLEM SOLVING USING C

B.Tech. (II Sem.)

L	T	P	Cr.
3	0	0	3

Pre-requisites: Nil

Course Educational Objective: The Objective of the course is to make learn the basic elements of C programming, control structures, derived data types, Modular programming, user defined structures, basics of files and its I/O operations.

Course Outcomes: At the end of the course, the student will be able to

CO1: Familiar with syntax and semantics of the basic programming language constructs. **(Understand - L2)**

CO2: Construct derived data types like arrays in solving a problem. **(Apply - L3)**

CO3: Decompose a problem into modules and reconstruct it using various ways of user-defined functions. **(Apply - L3)**

CO4: Define user-defined data types like structures and unions and its applications to solve problems. **(Apply - L3)**

CO5: Discuss various file I/O operations and its application. **(Understand - L2)**

UNIT – I

Introduction to Problem solving through C-Programming: Problem Specification, Algorithm / pseudo code, flowchart, examples.

C-Programming: Structure of C program, identifiers, basic data types and sizes, Constants, variables, Input-output statements, A sample c program, operators, expressions, type conversions, conditional expressions, precedence of operators and order of evaluation.

Control statements: if, if else, else if ladder and switch statements, while, do-while and for statements, break, continue, goto and labels.

UNIT – II

Arrays- concept, declaration, definition, accessing elements, storing elements, two dimensional and multi-dimensional arrays.

Character Arrays: declaration, initialization, reading, writing strings, string handling functions, Pre-processor Directives, and macros.

Applications of Arrays: Linear search, Binary search, Bubble Sort.

UNIT – III

Pointers- concepts, declaring and initialization of pointer variables, pointer expressions, pointer arithmetic, pointers and arrays, pointers and character arrays, pointers to pointers.

Functions: basics, category of functions, parameter passing techniques, recursive functions-comparison with Iteration, Functions with arrays, Standard library functions, dynamic memory management functions, command line arguments.

Storage classes - auto, register, static and extern,

UNIT – IV

Derived types- structures- declaration, definition, and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, typedef.

UNIT – V

Files – concept of a file, text files and binary files, streams, standard I/O, Formatted I/O, file I/O operations, error handling.

TEXT BOOKS

1. ReemaThareja, Programming in C, Oxford University Press, 2nd Edition, 2015.

REFERENCE

1. Jeri R.Hanly, Elliot B.Koffman, Problem Solving and Program Design in C, Pearson Publishers, 7th Edition, 2013.
2. E Balagurusamy, Computer Programming, McGraw Hill Education, 8th Edition.
3. C: The Complete Reference, McGraw Hall Education, 4th Edition.
4. PradeepDey, Manas Ghosh, Programming in C, Oxford University Press, 2nd Edition, 2011.
5. Stephen G.Kochan, Programming in C, Pearson Education, 3rd Edition, 2005.

B.Tech. (II Sem.) **20EC02 - DIGITAL LOGIC CIRCUITS**

L	T	P	Cr.
3	0	0	3

Pre-requisites: **N**il

Course Educational Objective: In this course student will learn about the basic concepts of number systems and Boolean algebra, logic gates and realization of Boolean expressions using logic gates, realization of combinational and sequential circuits and concepts of Finite State Machines and ASM Charts

Course Outcomes: At the end of the course, the student will be able to

CO1: Summarize the key differences between number systems and their usage in Digital electronics circuits. **(Understand – L2)**

CO2: Identify the minimization techniques of Boolean expressions to implement digital circuits using basic logic gates and logic circuits. **(Apply – L3)**

CO3: Apply the minimization and realization methods for design of Combinational and Sequential logic circuits. **(Apply – L3)**

CO4: Analyze the Combinational, Sequential, Finite state machines and Algorithmic State Machines for implementation of digital logic circuits. **(Analyze – L4)**

UNIT – I

Number Systems: Number systems (binary, Octal, Hexadecimal) 1's and 2's complement of binary numbers, Signed Binary numbers, Binary codes –BCD, Excess-3 code, Gray code, Error detecting and correcting codes – Hamming code.

UNIT – II

Boolean Algebra: Boolean postulates, De-Morgan's Theorem, Principle of Duality, Minimization of Boolean expressions – Sum of Products (SOP), Product of Sums (POS), minterm and maxterm, implementation of Boolean functions using Karnaugh map, minimization (up to 4 variables), K-map with don't care conditions, minimization of Boolean expressions using Quine-Mc Cluskey Tabular Method (5 variable).

Logic Gates: basic logic gates, realization of Boolean functions using logic gates, Multi-level gate implementations.

UNIT – III

Combinational Logic Circuits: Design procedure, Adders and Subtractors, Parallel adder/ Subtractor- Carry look ahead adder, BCD adder, Magnitude Comparator, Decoder, Encoder, Multiplexer, Demultiplexer, Parity generator/checker, code converters- binary to gray, gray to binary, BCD to Excess-3 codes.

UNIT – IV

Sequential Logic Circuits: Latches, Flip flops-SR, JK, T, D – Characteristic and excitation tables, Realization of one flip flop using other flip flops, Shift Registers, Universal Shift Register, Counters- Synchronous and Asynchronous counters. Implementation of 4-bit Counters.

UNIT – V

Finite state machines: Introduction to Mealy and Moore machines, Difference between Mealy and Moore machines, Conversion between Mealy and Moore machines.

Algorithmic State Machines: Features of ASM chart, System design using data path and control subsystems, control implementations.

TEXT BOOK

1. Morris Mano, "Digital Design", PHI Publishers, 4th Edition.
2. Ananda Kumar, "Switching Theory and Logic Design", PHI Publishers.

REFERENCES

1. ZviKohavi, Switching and Finite Automata Theory, TMH Publishers, 2nd Edition.
2. Charles H. Roth, "Fundamentals of Logic Design", Cengage learning Publishers.
3. M. Subramanyam, "Switching Theory and Logic Design", University Science Press Publishers.
4. John M. Yarbrough, "Digital Logic: Applications and Design", Thomson Publications.

B.Tech. (II Sem.) **20MC01 - CONSTITUTION OF INDIA**

L	T	P	Cr.
2	0	0	0

Pre-requisites: Nil

Course Educational Objectives

• To enable the student to understand the importance of constitution.

• To understand the structure of Executive, Legislature and Judiciary.

• To understand Philosophy of fundamental rights and duties.

• To understand the autonomous nature of constitution bodies like Supreme Court and High Court Controller and Auditor General of India and Election Commission of India.

• To understand the Central and State relation, financial and administrative.

Course Outcomes: *At the end of the course, the student shall be able to*

CO1: Understand history and philosophy of constitution with reference to Preamble, Fundamental Rights and Duties (**Understand – L2**).

CO2: Understand the concept of Unitary and Federal Government along with the role of President, Prime Minister and Judicial System (**Understand – L2**).

CO3: Understand the structure of the state government, Secretariat, Governor and Chief Minister and their functions (**Understand – L2**).

CO4: learn local administration viz. Panchayat, Block, Municipality and Corporation (**Understand – L2**).

CO5: learn about Election Commission and the process and about SC, ST, OBC and women (**Understand – L2**).

UNIT – I:

Introduction to Indian Constitution: 'Constitution' meaning of the term, Indian Constitution – Sources and Constitutional History, Features – Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT – II:

Union Government and its Administration Structure of the Indian Union: Federalism Centre – State relationship, President: Role, Power and Position. Prime Minister (PM) and Council of Ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha. The Supreme Court and High Court: Powers and Functions.

UNIT – III:

State Government and its Administration Governor – Role and Position – Chief Minister (CM) and Council of Ministers. State Secretariat: Organization, Structure and Functions.

UNIT – IV:

A Local Administration -- Role and Importance, Municipalities – Mayor and Role of Elected Representative, Panchayati Raj: Functions of Panchayati Raj Institution, Zilla Panchayat, Elected Officials and their roles, Village level – Role of Elected and Appointed officials.

UNIT – V:

Election Commission: Election Commission – Role of Chief Election Commissioner and Election Commissionerate State Election Commission: Functions and Commissions for the welfare of SC/ST/OBC and Women.

Reference Books

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt.Ltd., New Delhi.
2. Subash Kashyap, Indian Constitution, National Book Trust.
3. J.A. Siwach, Dynamics of Indian Government and Politics.
4. D.C. Gupta, Indian Government and Politics.
5. H.M.Sreevai. Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication).
6. J.C. Johari, Indian Government and Politics Hans.
7. J.Raj, Indian Government and Politics.
8. M.V. Pylee, Indian Constitution, Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd., New Delhi.
9. Noorani, A.G. (South Asia Human Rights Documentation Centre), Challenges to Civil Right). Challenges to Civil Rights Guarantees in India, Oxford University Press 2012.

E-Resources:

1. nptel.ac.in/courses/109104074/8.
2. nptel.ac.in/courses/109104045.
3. nptel.ac.in/courses/101104065.
4. www.hss.iitb.ac.in/en/lecture-details.
5. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indianconstitution.

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B.Tech. (II Sem.) **20FE53 - ENGINEERING CHEMISTRY LAB**

L	T	P	Cr.
0	0	3	1.5

Pre-requisites: Nil

Course Educational Objectives: This course enables the students to analyze water samples and perform different types of volumetric titrations. It provides them with an overview of preparation of polymers and analytical techniques.

Course Outcomes: At the end of the course, the students will be able to,

CO1: Assess alkalinity of water based on the procedure given. **(Understand – L2)**

CO2: Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus. **(Understand – L2)**

CO3: Acquire practical knowledge related to preparation of polymers. **(Understand – L2)**

CO4: Exhibit skills in performing experiments based on theoretical fundamentals. **(Understand – L2)**

List of Experiments

(Any of the 10 experiments are required to be conducted)

Model Experiment

1. Determination of HCl using standard Na_2CO_3 solution.

Water Analysis

2. Determination of alkalinity of water sample.

Complexometric Titrations

3. Estimation of $Mg^{+2}/Zn^{+2}/Ca^{+2}$ in given solution by using standard EDTA solution.

Preparation of Polymers (only demonstration)

4. Nylon Fibers
5. Bakelite

Redox Titrations

6. Estimation of Mohr's salt by using potassium permanganate.
7. Estimation of Mohr's salt by using potassium dichromate.
8. Estimation of copper(II) ion using standard hypo solution.

Conductometric Measurements

9. Estimation of amount of HCl conductometrically using standard NaOH solution.
10. Estimation of amount of HCl conductometrically using NH_4OH solution.

Potentiometric Measurements

11. Estimation of amount of HCl potentiometrically using NaOH solution.

Estimations

12. Measuring pH of the given sample solution using pH meter (demonstration only).
13. Estimation of Vitamin C in a given sample.

Colorimetric Analysis

14. Determination of Iron(III) by colorimetric method.

REFERENCES

Lab manual

B.Tech. (II Sem.)	20CS51 - PROGRAMMING FOR PROBLEM SOLVING USING C LAB	L	T	P	Cr.
		0	0	3	1.5

Pre-requisite : NIL

Course Educational Objective: The objective of the course is to learn the basic elements of C Programming Structures like Data Types, Expressions, Control Statements, and Various I/O Functions and to solve simple mathematical problems using control structures. Design and implementation of various software components, which solve real world problems.

Course Outcomes (CO): *At the end of this course, the student will be able to:*

CO1: Apply control structures of C in solving computational problems. **(Apply – L3)**

CO2: Implement derived data types & use modular programming in problem solving. **(Apply – L3)**

CO3: Implement user defined data types and perform file operations. **(Apply – L3)**

CO 4: Improve individual / teamwork skills, communication & report writing skills with ethical values. **(Apply – L3)**

# of modules at most 10can be taught and all the modules should be in line with theory.

Module 1: Introduction to Raptor Tool.

Module 2: Problem solving using Raptor Tool

Module 3: Exercise Programs on Basics of C-Program.

Module 4: Exercise Programs on Control Structures.

Module 5: Exercise Programs on Loops & nesting of Loops.

Module 6: Exercise Programs on Arrays & Strings.

Module 7: Exercise Programs on Pointers.

Module 8: Exercise Programs on Functions.

Module 9: Exercise Programs on user defined data types.

Module 10: Exercise Programs on Files.

L	T	P	Cr.
0	0	2	1

B.Tech. (II Sem.) **20EC52 - DIGITAL LOGIC CIRCUITS LAB**

Pre-requisites : Nil

Course Educational Objective: This course gives the ability to design and verify digital logic circuits like; logic gates, combinational and sequential logic circuits using discrete components and Integrated Circuits.

Course Outcomes: At the end of the course, the student will be able to:

CO1: Demonstrate the functionality of Logic gates, Flip-flops, Shift registers and Counters. **(Understand – L2)**

CO2: Apply the Boolean minimization methods to implement Combinational and Sequential logic circuits using logic gates. **(Apply – L3)**

CO3: Analyze the behavior of Combinational and Sequential logic circuits. **(Analyze – L4)**

CO4: Adapt effective Communication, presentation and report writing skills. **(Apply – L3)**

List of Experiments

(Any of the 10 experiments are required to be conducted)

1. Realization of logic gates using universal logic gates.
2. Realization of Adder and Subtractor circuits using basic / universal gates.
3. Implementation of Binary to Gray and Gray to Binary code converters.
4. Realization of Boolean expressions using Decoder.
5. Implementation of 8×1 Multiplexer and Demultiplexer.
6. Realization of Boolean Expressions using Multiplexers.
7. Verification of flip-flops.
8. Conversion of SR to D flip-flop and SR to T flip-flop.
9. Implementation of shift register.
10. Implementation of Universal shift register.
11. Implementation of Up/Down counter.
12. Implementation of Synchronous /Asynchronous counter.

B.Tech. (II Sem.) **20ME51 - ENGINEERING WORKSHOP**

L	T	P	Cr.
0	0	3	1.5

Pre-requisites : Nil

Course Educational Objective: The objective of this course is to get familiarized with various trades used in Engineering Workshop and learn the safety precautions to be followed in the workshops while working with the different tools.

Course Outcomes: At the end of the course, the student will be able to:

CO1: Develop different prototypes in the carpentry section. **(Understand – L2)**
CO2: Fabricate various basic prototypes in fitting trade. **(Understand – L2)**
CO3: Demonstrate various operations related to plumbing, tin smithy and black smithy. **(Understand – L2)**
CO4: Perform various basic house wiring techniques. **(Apply – L3)**

List of Experiments

(Conduct at least 4 Trades with 2 exercises from each Trade and demonstrate about 2 Trades)

Trade –1: CARPENTRY SHOP

Introduction to various types of wood such as Teak, Sal, Oak, Beach, Neam, Wallnut Mango, Shisham, Deodar, Babul. Demonstration, function and use of carpentry hand-tools and their safety precautions. Introduction to various types of wooden joints, their relative advantages and uses.

Job I - Marking, sawing, plaining and chiselling operations.
Job II - Preparation of half lap-joint
Job III – Preparation of Mortise and Tenon Joint

Trade –2: FITTING SHOP

Introduction to fitting shop tools, common materials used in fitting shop, description, demonstration, care, use of tools and safety precautions.

Job I- Making a L-Fit from a rectangular piece of Mild Steel (MS).
Job II-Making a T-Fit from a rectangular piece of MS.
Job III-Making a V-Fit from a rectangular piece of MS
Job IV-Making a Half round fit from a rectangular piece of MS.

Trade -3: TIN- SMITHY SHOP

Introduction to tin-smithy, specification and use of hand tools, accessories and the safety precautions.

Job I - Preparation of a rectangular tray.
Job II- Preparation of an open scoop/ funnel.
Job III - Preparation of a Single Seam Joint and Double Seam Joint.
Job IV - Preparation of a Corner Seam Joint.

Trade –4: PLUMBING SHOP

Introduction to plumbing – demonstration, use of hand tools, accessories and safety precautions.

Job I – preparation of pipe layout.
Job II – Pipe threading.

Trade -5: BLACK SMITHY

Introduction–demonstration of tools, equipment and safety precautions.

Job I – Preparation of S–Hook.

Job II – Preparation of Chisel

Trade -6: HOUSE WIRING

Demonstration and identification of common electrical materials such as wires, cables, switches, fuses, PVC Conduits. Study of electrical safety measures and demonstration about use of protective devices such as fuses, and relays including earthling.

Job I – One lamp controlled by one one-way switch.

Job II – Two lamps in series and parallel connection with one-way switch.

Job III- Florescent lamp and calling bell circuit.

Job IV - One lamp connection with two 2- way switches (stair case connection).

Job V -- House wiring circuit.

REFERENCES

1. LBRCE Workshop Lab Manual.
2. S.K.Hajra Choudary and A.K.Choudary, –Workshop Technology-I, Media Promoters and Publishers Pvt.Ltd., Mumbai,2012.
3. B.S.Raghuvamsi, –Workshop Technology-I, Dhanpatrai and company, New Delhi, 2014.
4. P.Khannaiah,K.L.Narayana,–WorkshopManual,ScitechPublicationsIndiaPvt.Ltd, 2015.