Sunrise University

Approved by Govt. of Rajasthan vide Sunrise University Act, 2011
Recognized by UGC Act, 1956 u/s 2 (f)

TEACHING AND EXAMINATION SCHEME AND SYLLABUS

ELECTRONICS ENGINEERING

(EL)

Sunrise University

SEMESTER -1

Subject Code	Subject	Hrs. /Week			Exam Hrs.	Maximum Marks				
		L	T	P		MS1	MS2	IA	Th.	Total
Personality Development Programme for First 15th Days										
THEORY										
1D01	English &Communication Skills	2	0	0	3	10	10	20	60	100
1D02	Applied Chemistry-I	3	1	0	3	10	10	20	60	100
1D03	Applied Physics-I	3	1	0	3	10	10	20	60	100
1D04	Applied Mathematics-I	4	1	0	3	10	10	20	60	100
1D05	Computer Fundamental & Information Technology	3	1	0	3	10	10	20	60	100
Code	**Subject**	**Hrs. /Week**			**Exam Hrs.**	**IA (60%)**		**EA (40%)**		**Total**
		L	**T**	**P**		**MP1 (30 %)**	**MP2 (30 %)**			
1D06	Applied Chemistry Lab-I	0	0	2	2	30	30	40		100
1D07	Applied Physics Lab-I	0	0	2	2	30	30	40		100
1D08	Computer Fundamental & IT Lab I	0	0	2	2	30	30	40		100
1D09	Engineering Drawing	0	0	3	3	30	30	40		100
1D10	Workshop Practice – I	0	0	3	3	30	30	40		100
	TOTAL	**15**	**04**	**12**						**1000**

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SEMESTER -2

Subject Code	Subject	Hrs. /Week			Exam Hrs.	Maximum Marks				
		L	T	P		MS1	MS2	IA	Th.	Total
THEORY										
2D01	Applied Chemistry-II	3	1	0	3	10	10	20	60	100
2D02	Applied Physics-II	3	1	0	3	10	10	20	60	100
2D03	Applied Mathematics-II	4	1	0	3	10	10	20	60	100
2D04	Electrical & Electronics Technology	3	1	0	3	10	10	20	60	100
2D05	Applied Mechanics	3	1	0	3	10	10	20	60	100
Code	**Subject**	**Hrs. /Week**			**Exam Hrs.**	**IA (60%)**		**EA (40%)**		**Total**
		L	**T**	**P**		**MP1 (30%)**	**MP2 (30%)**			
2D06	Applied Chemistry Lab-II	0	0	2	2	30	30	40		100
2D07	Applied Physics Lab-II	0	0	2	2	30	30	40		100
2D08	Electrical & Electronics Workshop	0	0	2	2	30	30	40		100
2D09	Workshop Practices-II	0	0	2	3	30	30	40		100
2D10	Computer Fundamental & IT Lab-II	0	0	2	2	30	30	40		100
	TOTAL	**16**	**05**	**10**						**1000**

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SEMESTER III

Code	Subject	Hrs. /Week			Exam Hrs.	Maximum Marks				
		L	T	P		MS1	MS2	IA	Th.	Total
THEORY										
3DE01	Principles of Electronic Communication	3	1	0	3	10	10	20	60	100
3DE02	Electronic Devices and Circuits	3	1	0	3	10	10	20	60	100
3DE03	Digital Electronics	3	1	0	3	10	10	20	60	100
3DE04	Electronic Measurements and Instrumentation	3	1	0	3	10	10	20	60	100
3DE05	Electric Circuits and Network	3	1	0	3	10	10	20	60	100

Code		Hrs. /Week			Exam Hrs.	IA(60%)		EA(60%)	Total
		L	T	P		MP1 (30%)	MP2 (30%)		
3DE06	Principles of Electronic Communication Lab	0	0	2	3	30	30	40	100
3DE07	Electronic Devices and Circuits Lab	0	0	2	3	30	30	40	100
3DE08	Digital Electronics Lab	0	0	2	3	30	30	40	100
3DE09	Electronic Measurements and Instrumentation Lab	0	0	2	3	30	30	40	100
3DE10	Summer Internship-I(4 weeks after II Sem)	0	0	2	3	30	30	40	100
	GRAND TOTAL	**15**	**05**	**10**					**1000**

Industrial Training - After examination of 3rd Semester, the students shall go for training in a relevant industry/field organization for a minimum period of 6 weeks and shall prepare a diary. It shall be evaluated during 5th semester by his/her teacher. The students shall also prepare a report at the end of training and shall present it in a seminar, which will be evaluated. This evaluation will be done by HOD and lecturer in charge – training in the presence of one representative from training organizations

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SEMESTER IV

Code	Subject	Hrs. /Week			Exam Hrs.	Maximum Marks				
		L	T	P		MS1	MS2	IA	Th.	Total
THEORY										
4DE01	Microcontroller and Applications	3	1	0	3	10	10	20	60	100
4DE02	Consumer Electronics	3	1	0	3	10	10	20	60	100
4DE03	Digital Communication Systems	3	1	0	3	10	10	20	60	100
4DE04	**Programme Elective- I** ****EL40041**- Electronic Equipment Maintenance *****EL40042**- Simulation Software	3	1	0	3	10	10	20	60	100
4DE05	**Programme Elective II** *****EL40051**- Linear Integrated Circuits ***EL40052**- Power Electronics	3	1	0	3	10	10	20	60	100

Code		Hrs. /Week			Exam Hrs.	IA(60%)		EA(40%)	Total
		L	T	P		MP1 (30%)	MP2 (30%)		
4DE06	Microcontroller and Applications Lab	0	0	2	3	30	30	40	100
4DE07	Digital Communication Systems Lab	0	0	2	3	30	30	40	100
4DE08	**Programme Elective- I Lab** ****EL40081**- Electronic Equipment Maintenance Lab *****EL40082**- Simulation Software Lab	0	0	2	3	30	30	40	100
4DE09	**Programme Elective II Lab** *****EL40091**- Linear Integrated Circuits Lab ***EL40092-** Power Electronics Lab	0	0	2	3	30	30	40	100
4DE10	Summer Internship-II (4 weeks after III Sem)	0	0	2	3	30	30	40	100
	GRAND TOTAL	**15**	**5**	**8**					**1000**

Industrial Training - After examination of 4th Semester, the students shall go for training in a relevant industry/field organization for a minimum period of 6 weeks and shall prepare a diary. It shall be evaluated during 5th semester by his/her teacher. The students shall also prepare a report at the end of training and shall present it in a seminar, which will be evaluated. This evaluation will be done by HOD and lecturer in charge – training in the presence of one representative from training organizations

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SEMESTER V

Code	Subject	Hrs. /Week			Exam Hrs.	Maximum Marks				
		L	T	P		MS1	MS2	IA	Th.	Total
THEORY										
5DE01	Embedded Systems	3	1	0	3	10	10	20	60	100
5DE02	Mobile and Wireless Communication	3	1	0	3	10	10	20	60	100
5DE03	**Open Elective-I** **+EL 51001**- Economic Policies in India **+EL 51002**- Engineering Economics & Accountancy	3	1	0	3	10	10	20	60	100
5DE04	**Programme Elective III** *EL50031- Industrial Automation *EL50032- Control System And PLC	3	1	0	3	10	10	20	60	100
5DE05	**Programme Elective IV** **EL50041- Microwave and RADAR EL50042- Optical Communication and networking	3	1	0	3	10	10	20	60	100

Code		Hrs. /Week			Exam Hrs.	IA (60%)		EA(40%)	Total
		L	T	P		MP1 (30%)	MP2 (30%)		
5DE06	Embedded Systems Lab	0	0	2	3	30	30	40	100
5DE07	Mobile and Wireless Communication Lab	0	0	2	3	30	30	40	100
5DE08	**Programme Elective III Lab** *EL50071- Industrial AutomationLab *EL50072- Control System And PLC Lab	0	0	2	3	30	30	40	100
5DE09	**Programme Elective IV Lab** **EL50081- Microwave and RADAR Lab EL50082- Optical Communication and networking Lab	0	0	2	3	30	30	40	100
5DE10	Minor Project	0	0	2	3	30	30	40	100
	GRAND TOTAL	**15**	**5**	**10**					**1000**

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SEMESTER VI

Code	Subject	Hrs. /Week			Exam Hrs.	Maximum Marks				
		L	T	P		MS1	MS2	IA	Th.	Total
THEORY										
6DE01	Entrepreneurship and Startups	3	1	0	3	10	10	20	60	100
6DE02	**Open Elective-II** +EL 62001- Project Management +EL 62002- Renewable EnergyTechnologies	3	1	0	3	10	10	20	60	100
6DE03	**Open Elective-III** +EL 63001- Product Design +**EL 63002**- Disaster Management	3	1	0	3	10	10	20	60	100
6DE04	Indian Constitution	3	1	0	3	10	10	20	60	100
6DE05	Computer Networking andData Communication	3	1	0	3	10	10	20	60	100

Code		Hrs. /Week			Exam Hrs.	IA (60%)		EA(40%)	Total
		L	T	P		MP1 (30%)	MP2 (30%)		
6DE06	Computer Networking andData Communication Lab	0	0	2	3	30	30	40	100
6DE07	Seminar	0	0	2	3	60	60	80	200
6DE08	Major Project	0	0	2	3	60	60	80	200
	GRAND TOTAL	**15**	**5**	**6**					**1000**

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Semester-I

1D01: English Communication &Skils-I

Objective: English communication encompasses written, oral, visual and digital communication within a workplace context. This discipline blends together pedagogical principles of rhetoric, technology, and software to improve communication in a variety of settings ranging from technical writing to usability and digital media design.

Unit	Topic	35hrs
Unit – I	Narration, Voice, Basic Sentence Patterns. (Nine basic sentence patterns) Tenses, Common errors (Noun, Pronoun, Articles, Adverb, Punctuation, Preposition etc.) Transformation of Sentences, Determiners, Preposition	**5**
Unit – II	Modals in Conversational Usage, Prefix, Suffix, Idioms & Phrasal verbs : **Modals** Can, Could, Should,Will, Would, May, Might, Must, Need not, Dare not, Ought to, Used to. **Phrases** At all; Instead of; In Spite of; As well as; Set up; Upset; Look up; Call off; Call out; Come across; Set right; Look other. **Idioms** Work up (excite); Break down; Stand up for; Turn down; Pass away; Pass on; Back up; Back out; Carry out; Done for (ruined); Bring about; Go through; Ran over; Look up (improve); Pick out (selected).	**8**
Unit – III	Composition - . Unseen Passage, Précis Writing Letter Writing : Letter to the editor of a magazine, newspaper, business letters, letters to relatives, friends, government officers. Report Writing Paragraph Writing, Essay Writing - Essays on general and local topics related to environmental problems	**6**
Unit – IV	**Listening:** For improving listening skills the following steps arerecommended, Listen to Prerecorded Tapes, Reproduce Vocally what has been heard, Reproduce in Written form. Summaries the text heard, Suggest Substitution of Words and Sentences, Answer Questions related to the taped text, Summaries in Writing **Vocabulary:** Synonyms. Homonyms. Antonyms and Homophones**,** Words often confused, as for example, I-me; your-yours; its-it's; comprehensible-comprehensive; complement-compliment] Context-based meanings of the words, for example, man[N] man[vb]; step[|N| ,step[vb] conflict _____Israel Palestinian conflict Emotional conflict, Ideas conflict learn ——— learn at this school I learnt from the morning news **Group Discussion :** Developing skill to initiate a discussion [How to open] Snatching initiative from others [Watch for weak points, etc.]	**8**
Unit – V	**Speaking:** Introducing English consonant-sounds and vowel-sounds.**,** Remedial exercises where necessary**,** Knowing Word stress**,** Shifting word stress in poly-syllabic words[For pronunciation practice read aloud a Para or page regularlywhile others monitor] **Delivering Short Discourses:** About one selfDescribing a Place, Person, ObjectDescribing a Picture, Photo.	**8**

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	Expand a topic-sentence into 4-5 sentence narrative. **Note :** 1. The Medium of teaching and examination will be English. 2. The Question on Essay Writing (Unit-7) will be compulsory. The student will have to attempt one essay out of two, touching the given points on general/ local topic related to environmental problems. 3. At least on question will be set from each unit. 4. No theory question will be set from syllabus of practicals.	
	Text Books : 1. Intermediate English Grammar Raymond Murphy,Pub: Foundation Books,New Delhi 2. Eng. Grammar, usage & Composition Tickoo& Subramanian Pub: S.Chand and Co. 3. Living Eng. Structure Stannard Alien. Pub: Longman 4. A Practical Eng. Grammar Thomson and Martinet. (and its Exercise Books) Pub : ELBS 5. High School English Grammar Wren & Martin. and Composition **Reference Book :** 1. Communicative Skills for Engineers and Scientists by Sangita Sharma and Binod Sharma, New Delhi : Pearson. 2. English for Engineers by Abidi&Ritu, New Delhi : Cengage Learning.	

1D02: Applied Chemistry-I

Objective	**Chemistry** is the science of matter, especially its chemical reactions, but also its composition, structure and properties. Chemistry is concerned with atoms and their interactions with other atoms, and particularly with the properties of chemical bonds.	
	Topic	**38 Hours**
Unit – I	**Atomic Structure**: Constituents of the Atom, Bohr's Model of the Atom, Quantum Number and Electronic Energy Levels , Aufbau's Principle, Pauli's Exclusion Principle, Hund's Rule, $n + l$ Rule ,Electronic Configuration of Elements (s,p,d Block Elements) **Development of Periodic Table:** Modern Periodic Law, Long form of Periodic Table. Study of Periodicity in Physical and Chemical Properties with, special reference to Atomic and Ionic Radii, Ionisation, Potential. Electron Affinity. Electro negativity. Variation of Effective Nuclear Charge in a Period. Metallic Character.	**8**
Unit – II	**Electro Chemistry:** Ionization, Degree of Ionization, Factors which Influence Degree of Ionization . Hydrolysis – Degree of Hydrolysis, Hydrolysis Constant., pH Value, Buffer Solution Electrolysis, Faraday's Laws of Electrolysis	**8**
Unit – III	**Kinetic Theory of Gases:** Postulates of kinetic Theory**,** Ideal Gas Equation, Pressure and Volume Corrections, Vender**.** Walls Equations**,** Liquefaction of Gases, Critical Pressure and Critical Temperature**,** for Liquefaction.**,** Liquefaction of Gases by Joule – Thomson Effect,Claude's Method and Linde's Method **Carbon Chemistry:** Definition of Organic Chemistry. Difference between Organic and Inorganic Compounds. Classification and Nomenclature - Open Chain and Closed Chain Compounds, IUPAC System of Nomenclature. (upto C5).	**8**
Unit – IV	**Metals and Alloys:** General Principles and Terms listed in Metallurgy, Metallurgy of Iron and Steel, Different forms of Iron, Effect of Impurities on Iron and Steel 6.5 Effect of Alloying Elements in Steel **Pollution:** Water Pollution, Causes and Effects, Treatment of Industrial Water Discharges -	

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	Screening, Skimming and Sedimentation Tanks, Coagulation, Reductions, Chlorination, Biological Methods. Air Pollution Causes and Effects Control Methods – Electrostatic Precipitator, Scrubbers, Gravitational Setting Methods, by Plants. Awareness on	**8**
Unit – V	**Water:** Sources of Water**,** Hardness of Water.**,** Degree of Hardness, Estimation of Hardness by EDTA method,Problems on Calculation of Hardness**,**Disadvantages of Hardness**,** Softening Methods**,** Lime-Soda Method**,** Permutite Method**,** Ion -Exchange Method Problems on Softening of Water**,** Drinking Water, its Requisites, Purification and Sterilization ofWater.	**6**
	Text Books: **1.**Engineering Chemistry II (Hindi) Mathur and Agarwal 2. Chemistry of Engineering Materials C.V. Agarwal 3. Engineering Chemistry P.C. Jain and Monika 4. Chemistry M.M. Uppal 5.Applied Chemistry (Hndi) V.P.Mehta Jain Bros. Jodhpur **Reference Books:** 1 Instrumental methods of Chemical analysis, MERITT & WILLARD (EAST – WEST press) 2 Physical Chemistry , P.W Atkin (ELBS, OXFORD Press) 3 Physical Chemistry W.J.Moore (Orient Longman)	

1D03: Applied Physics-I

Objective: physics employs mathematical models and abstractions of physics to rationalize, explain and predict natural phenomena. This is in contrast to experimental physics, which uses experimental tools to probe these phenomena.

Unit	Topic	36 Hours
Unit – I	**Units and Dimensions :** Idea of various systems of units, SI units Basic, Supplementary and Derived Units, Prefixes & Symbols, Dimensions and Dimensional Formulae**,** Principle of Homogeneity of Dimensions**,** Dimensional Analysis**,** Applications and Limitations **Elasticity :** Elasticity**,** Stress and Strain**,** Elastic Limit & Hooke's law**,** Young's Modulus,Bulk Modules & Modulus of Rigidity,Poisson's Ratio	**8**
Unit – II	**Properties of Liquids:** Surface Tension & Surface Energy**,** Cohesive & Adhesive Force,Angle of Contact**,** Capillarity & Expression for Surface Tension **,** Streamline & Turbulent Flow**,** Reynold Number,Viscosity& Coefficient of Viscosity. Stoke's law & Terminal Velocity	**8**
Unit – III	**Sound Waves:** Velocity of Sound Waves: Newton's Formula , Laplace Correction ,Factors affecting Velocity of Sound Waves Propagation of Progressive Wave, Displacement, Velocity and ,Acceleration of a particle during propagation of wave Superposition of Waves: Stationary Waves (without mathematical analysis) Resonance tube	**8**
Unit – IV	**Gravitation & Satellites:** Newton's law of Gravitation, Acceleration due to Gravity Kepler's laws of Planetary Motion (statement only), Artificial Satellite (simple idea), Geo-Stationary Satellites, Escape Velocity.Velocity& Time Period of an Artificial Satellite. **Transfer of Heat:** Modes of Transmission of Heat - Idea of Conduction, Convection & Radiation, Thermal Conductivity & Coefficient of Thermal Conductivity Black Body,Kirchoff's Laws & Stefan Boltzmann Law (statement only), Newton's Law of Cooling & its Derivation from Stefan's Law	**6**
Unit – V	**Electrostatics:** Coulomb's Law**,** Intensity of Electric Field, Intensity due to a Point Charge**,** Electric Lines of Forces & Electric Flux**,** Electric Potential, Electric Potential due to a Point Charge **D.C. Circuits :** Resistivity, Effect of Temperature on Resistance , Ohm's Law, Resistance in Series and Parallel and their Combination Kirchoff's Law Wheatstone Bridge Meter Bridge Principle of Potentiometer	**6**
	Suggested Text Books:	

Bhartiya University

	1.Engineering Physics Gaur & Gupta (hindi) 2. Applied Physics Vol.-I Hari Harlal, NITTTR 3. Applied Physics Vol.-II Hari Harlal, NITTTR 4,Modern Engineering Physics – A.S. Vasudeva (S. Chand) 5,Solid State Physics : Kittel **Suggested Reference Book:** **1** Solid State Physics: S. O. Pillai, Wiley Eastern Ltd. **2.**Physics Vol-I & II – Resnick & Halliday (Wiley Eastern) 3.A Text Book of Optics – Brij Lal &Subramanyam	

1D04: Applied Mathematics-I

Objective: We can use of abstraction and logicalreasoning, mathematics developed from counting, calculation, measurement, and the systematic study of the shapes and motions of physical objects. Practical mathematics has been a human activity for as far back as written records exist.

Unit	Topic	35 Hours
Unit – I	**Matrices and Determinants:** Definition and Properties of Determinants**,** Definition and Types of Matrix**,** Transpose of a Matrix, Symmetric, Skew Symmetric Matrices, Orthogonal matrices, Hermitian and Skew Hermitian, Minors and Cofactors, Adjoint and Inverse of a Matrix, Cramer's Rule,Solution of Simultaneous Linear Equations by Inverse Matrix Method.,Characteristic Matrix, Characteristic Equation, Eigen Values & Vectors, Cayley Hamilton Theorem (verification only)	6
Unit – II	**Trigonometry:** Allied Angle(sin (180±A), sin (90±A) etc., Sum and Difference Formula (without proof) and their Application, Product Formula and C-D Formula, T-Ratios of Multiple and Sub-Multiple Angles (2A, 3A, A/2), Solution of Trigonometric Equations : sin X = 0, tan X = 0, cos X = 0, sin X=A, cos X =A & tan x = A	6
Unit – III	**Introduction to Different Types of Expansion:** Factorial Notation, Meaning of C(n, r), P(n, r), Binomial Theorem for Positive Index, any Index, Exponential Theorem, Logarithm Theorem **Complex Number:** Definition of Complex Number**,** Operations on Complex Number (Add., Sub ,Multiplication, Division)**,** Conjugate Complex Number**,** Modulus and Amplitude of a Complex Number, Polar form of a Complex Number	8
Unit – IV	**Two Dimensional Coordinate Geometry:** General Introduction**,** Distance Formula and Ratio Formula ,Co-ordinate of Centroid, In-Centre, Ortho-Centre and Ex-Centre of a Triangle, Area of Triangle, Straight Line, Slope form, Intercept form, Perpendicular form, One Point Slope form, Two Point form & General form, Angle between Two Lines Perpendicular Distance of a Line from a Point	7
Unit-V	**Conic: Circle :** Definition and Standard Equations**,** Equations of Tangent and Normal at a Point(simple problems) **Parabola :** Definition and Standard Equations**,** Equations of Tangent and Normal at a Point(Simple problems) **Ellipse and Hyperbola :** Definition and Standard Equations**,** Equations of Tangent and Normal at a Point(simple problems)	8

Uttarakhand University

	Text Books: 1. Mathematics XI & XII NCERT, New Delhi 2. Mathematics XI & XII Rajasthan Board, Ajmer(Hindi) 3. Polytechnic Mathematics H. K. Dass 4. Text Book on Differential Calculus Chandrika Prasad **Reference Books:** 1:Advanced Engineering Mathematics, Erwin Kreyszig, Wiley 9th Edition. 2:Higher Engineering Mathematics, B.V.Ramana, Tata McGraw Hill. 3: Thomas Calculus, Maurice D. Weir, Joel Hass and others, Pearson, 11th Edition.	

1D05: Computer Fundamental & Information Technology

Objective: Computer programming (often shortened to programming or coding) is the process of designing, writing, testing, debugging, and maintaining the source code of computer programs. This source code is written in one or more programming languages.

Unit	Topic	40 Hours
Unit – I	**Introduction:** Computer: An Introduction**,** Generation of Computers &Types : PC, PC/XT, PC/AT, Main Frame, Super, LapTop, Pam Top**,** Central Processing Unit (CPU) Memory Unit, Input/ Out Devices : Keyboard, Mouse (Optical), Digitizer, Scanner, Web Camera, Monitor (CRT, TFT) , Printers, Plotters, Bar Code Reader, Secondary Storage Devices : Floppy, Hard Disk, CD, DVD, Flash, Drive, Block Diagram Showing Interconnection of Computer Parts, **Data Representation:** Bit, Nibble, Byte, Word**,Number System** : Decimal, Binary, Hexadecimal & their Conversions, Arithmetic Operations (Addition, Subtraction using Binary Number System) 1s , 2s Compliment, Coding Technique : BCD, EBCDIC, ASCII ,Idea of: Hardware ,Software, Firmware, Free ware, Human ware, Computer Languages and Translators Machine, Assembly, High Level Language, Scripting Language, Object Oriented Language, Platform Independent Language, Translators: Assembler, Interpreter, Compiler	**8**
Unit – II	**Operating System :** Definition of Operating System (OS)**,** Types of OS**,** Single user, Multi user**,** Multi Programming**,** Time Sharing**,** Multi Processing, **Introduction to Windows XP:** Introduction to Windows Environment**,** Parts of Windows Screen**,** Icon, Menu, Start Menu**,** Minimizing , Maximizing , Closing Windows**,** Windows Explorer, Recycle Bin, Clipboard, My Computer, MyNetwork PlacesControl Panel : Adding New Hardware and Software, Display,Font, Multimedia, Mouse, International SystemAccessories: Paint, Media Player, Scan disk, System Information.	**8**
Unit – III	**Information Concepts and Processing:** Definition of Data, Information**,** Need of Information**,** Quality of Information**,** Concepts of Data Security, Privacy, Protection**,** Computer Virus and their types**,** Scanning & Removing Virus **Computer and Communication:** Need of Data Transmission**,** Data Transmission Media**,** Baud rate and Bandwidth, Digital and Analog TransmissionSerial and Parallel Data Transfer, Protocols, MODEM. Networking of Computers : LAN, WAN, MAN, Blue tooth 6.6 LAN Topologies: Bus, Star, Ring, HybridIntroduction to Ports : RS232, IEEE 488, PS2, USB, UTP	**8**
Unit – IV	**Information Processing:** Word processor**,** Introduction to MS-Word**,** Starting MS-Word Special Features of MS-Word**,** Using Help**,** Opening Document, Typing and Editing**,** Copying, Inserting, Moving, Deleting**,** Copying from One Document to Others , Undo, Redo, Spell Check, Find and Replace**,** Formatting**,** Characters and Fonts **,**Spacing Removing Characters Formatting**,** Inserting Symbols**,** Paragraphs, Page Setting**,** Header and Footer**,** Page Breaks**,** Borders and Shading**,** Print Preview and Printing**,** Tables and Columns**,** Mail Merge**.** Auto Text and Auto correct**,** Introduction to Macro**,** Electronic Spread Sheet**,** Introduction to MS-Excel**,** Working with Spread Sheet**,** Editing the Worksheet**,** Worksheet Formatting**,** Formula Entering**,** Function Wizard**,** Saving and Printing Work Book**,** Analysis Tools **Data Tools** Charts Linking Work Sheets**,** Report Wizard**,** Data Base Application**,** Data Base Components**,** Working with Database**,** Creating Excel Database**,** Adding Records using Data	**8**

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	Form, Deleting Records using Menu Command, Deleting Records using Data Form, Editing Records, Finding Records based on Criteria	
Unit – V	**Internet:** Introduction to Internet, Bridges, Routers, Switch, Gate way, www, Web Site, URL, e-mail, e-Commerce, Web browsing, Web page, Introduction to Hyper text& HTML, Introduction to http & ftp Protocol. **Power Point:** Introduction to Power Point, Creating a Presentation/Slide, Adding Animation in Slide, Running a Slide Show	**8**
	Suggested Text Books: 1. Computer Fundamental V.K. Jain, Standard Pub.& Distributors 2. PC Software for Windows made simple R.K. Taxali, TMH 3. Mastering Windows XP TMH 4. BPB Computer Course BPB Editorial Board, 5.**1.** Computer Fundamental V.K. Jain, (hindi Edition) **Suggested Reference Books:** 1. Introduction to Networking NANCE, PHI 2. First Course in Computer Science Sanjeev Saxena, Vikas Publishing House First Look Microsoft Office 2003 Murray, Phi 3.Web Based Application Development Ivan Beyross, TMHusing HTML, DHTML, Java script Pearl/ CGI	

1D06: Applied Chemistry Lab-I

Objective: Develop the ability of students to carry out experiments, collect and interpret data, and critically report results through "hands-on" laboratory experiences.

	List of Experiments	
	1. Identification of Acid and Basic Radicals in a Salt (Total Numbers = 5) 2. Analysis of a Mixture Containing Two Salts (Not Containing Interfacing Radicals). (Total Numbers = 5) 3. Determination of Percentage Purity of an Acid by Titration With Standard Acid. 4. Determination of Percentage Purity of a Base by Titration With Standard Alkali Solution. 5. Determination of the Strength of Ferrous Sulphate using Standard Ferrous Ammonium Sulphate and Potassium Dichromate as Intermediate Solution 6. Determination of the Strength of Farrous Sulfate Solution using Standard 7.Solution of Thiosulphate.To determine the strength of NaOH and Na_2CO_3 in a given alkali mixture 8.Estimation of percentage of iron in plain carbon steel. 9.To find the eutectic point for a two component system by using method of cooling curve. 10.Determine the reaction rate constant for the Ist order reaction	

Text Books:

1.Engineering Chemistry ,Mathur and Aggarwal

2. A text Book of Engineering Chemistry , S.K. Jain & K.D. Gupta

Reference Books:

1.Practical Chemistry For Engineers , Dr. Renu Gupta & Dr. Sapna Dubey

1D07: Applied Physics Lab-I

Objective: : An experiment or test can be carried out using the scientific method to answer a question or investigate a problem. he results are analyzed, a conclusion is drawn, sometimes a theory is formed, and results are communicated through research papers.

	List of Experiments	
	1. To Measure Internal Dia, External Dia and Depth of a Calorimeter using Vernier Callipers. 2. To Measure Density of a Wire using Screwgauge 3. To Measure Radius of Curvature of a Lens, Mirror using Spherometer.	

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	4. To Determine Refractive Index of Glass using Prism. 5. To Determine the Refractive Index of Glass using Travelling Microscope 6. To Determine Focal Length of a Convex Lens by Displacement Method. 7. To Determine the Velocity of Sound at O0c using Resonance Tube. 8. To Determine Young's Modulus of Elasticity using Searle's Apparatus.9. To Determine Acceleration due to Gravity using simple pendulum. 10. To verify Newton's law of cooling.	
	Text Book: 1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH) 2. Practical Physics – S.L.Gupta&V.Kumar (PragatiPrakashan). **Reference Books:** 1.. Advanced Practical Physics Vol.I& II – Chauhan& Singh (PragatiPrakashan)	

1D08: Computer Fundamental & IT Lab- I

Objective: The choice of language used is subject to many considerations, such as company policy, suitability to task, availability of third-party packages, or individual preference. Ideally, the programming language best suited for the task at hand will be selected.

	List of Experiments	
	1. Study of Computer Components 2. Practice of Computer Booting Process in XP 3. Demonstration of Windows Environment 4. Practice of using My Computer, Windows Explorer 5. Practice of using Control Panel 6. Practice of My Network Places 7. Practice of CD and DVD Writing 8. Practice of Paint 9. Installation of Windows XP by using NTFS File System. 10. Demonstration of Network	
	Suggested Text Books: 1. Yadav DS, Foundations of IT, New Age, Delhi. 2. Curtin, Information Technology: Breaking News, Tata Mo Grew Hill. **Suggested Reference Books:** 1. Nelson, Data Compression, BPB.	

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1D09: Engineering Drawing

Objective: In order to produce a good product, a neat drawing is a must. Therefore students must be well acquainted with the knowledge of Engineering drawing. Engineering drawing is the universal language of engineers and student must be made familiar with all the relevant aspect topics of machine drawing.

List of Experiments

1. Preparation of following on Imperial Size Drawing Sheet :-
1.1 Lines, Letters and Scales
1.2 Geometrical Constructions and Engineering Curves.
1.3 Projection of Lines
1.4 Projection of Planes
1.5 Projection of Solids
1.6 Orthographic Projections of Simple objects
1.7 Section and Development of Surfaces of Solids
i.e. Cone, Cylinder, Sphere etc.
1.8 Section and Development of Surfaces of Prism and
Pyramids
1.9 Isometric Projections
1.10 Riveted Joints.
1.11 Screw Threads and Fasteners
1.12 Pulleys
1.13 Couplings
1.14 Bearing
1.15 Building Drawing
2. Preparation of following Drawings in Sketch Book (Home Assignment)
2.1 Lettering (On Graph Sheet)
2.2 Projection of Points In Different Quadrants
2.3 Isometric Projection of Various Planes
2.4 Various Types of Rivet Heads
2.5 Section and Conventions
2.6 Set Screws
2.7 Machine Screws
2.8 Foundation Bolts, Keys

Text Books:

1. Engineering Drawing N D Bhatt
2. Machine Drawing N D Bhatt
3. Engineering Graphics V. Laxmi Narayan
4. Machine Drawing V. Laxmi Narayan
5. Engineering Drawing P S Gill
6. Machine Drawing M L Mathur

Reference Books:

1. A Text Book of Machine Drawing Laxmi Narayana and Mathur, M/s. Jain Brothers, New Delhi.

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2D10: Workshop Practice – I

Objective: This subject is designed to give basic knowledge of carpentry shop , fitting shop , welding shop & sheet metal shop with practical exposer

	List of Experiments	
	Carpentry Shop 1. Preparation of Cross-Half Lap Joint. 2. Preparation of Dovetail Joint 3. Preparation of Bridle Joint 4. Preparation of Mortise and Tenon Joint 5. Preparation of Mitre Joint 6. Demonstration of Job on Wooden Polishing Work **Welding** 7. Preparation of a Butt Joint by Gas Welding. 8. Preparation of Lap Joint by Electric arc Welding. 9. Preparation of T-Joint by Electric arc Welding. 10. Demonstration on Brazing by the Instructor. 11. Demonstration on Soldering. 12. Demonstration on Gas Cutting.	

Suggested Text Books :

1. Workshop Technology Gupta &Malani
2. Workshop Technology Kumar & Mittal
3. Workshop Technology Hajra, Chaudhary

Suggested Reference Books:

1 Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.

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Semester-II

2D01: Applied Chemistry-II **(Cr, L:T:P:-3,3:1:0)**

Objective: The reactions & synthesis procedures of materials like water analysis, chemical kinetics, corrosion and basic chemistry (IUPAC) behind them will makes interesting the topic & improve the research ability with their wide ideas.

Unit	Topic	40Hours
Unit – I	**Fuels:** Definition, Classification, Calorific Value (HCV and LCV) and Numerical Problems on Calorific Value, Combustion of Fuels, Numerical Problems on Combustion **Solid Fuels:** Coal and Coke **Liquid Fuels:** Petroleum and its DistillationCracking, Octane and Cetane Values of Liquid Fuels Synthetic Petrol, Power AlcoholBio-Gas, Nuclear Fuels – Introduction to Fission and Fusion Reactions.	**8**
Unit – II	**Corrosion:** Definition **Theories ff Corrosion:** Acid Theory (Rusting) **,** Direct Chemical Corrosion or Dry Corrosion**,** Wet Corrosion or Electro-Chemical Corrosion(Galvanic and Concentration Cell Corrosion)Various Methods for Protection from Corrosion	**8**
Unit – III	**Polymers:** Definition **Plastics:** Classification, Constituents**,** Preparation, Properties and Uses of Polythene, BakeliteTerylene and Nylon. **Rubber:** Natural Rubber, Vulcanisalion **,**Synthetic Rubbers - Buna - N, Buna-S, Butyl and Neoprene	**8**
Unit – IV	**Cement and Glass:** Manufacturing of Portland Cement**,** Chemistry of Setting and Hardening of Cement**,** Glass : Preparation, Varieties and Uses. **Lubricants:** Definition, ClassificationProperties of Lubricants : Viscosity, Oiliness, Flash Point, FirePoint, Acid Value, Saponificatin, Emulsification, Cloud and Pour Point.,Artificial Lubricants	**8**
Unit-V	**Miscellaneous Materials:** Refractories : Definition, Classification and Properties Abrasives : Natural and Synthetic Abrasives**,** Paint and Varnish : Definition and Function of Constituents**,** Soap and Detergents : Definition, Properties and Uses**15. _ew Engineering Materials: (Brief Idea of Following)** Superconductors, Organic Electronic Materials Fullerences Optical Fibres	**8**

Text Books1. Practical Chemistry for Engineers Virendra Singh (Hindi)

2. Hand book of Technical Analysis Bannerji Jain Bros.Jodhpur

3. Engineering Chemistry-I(Hindi) Mathur& Agrawal.
4.. Inorganic Chemistry Shivhare&Lavania

Suggested Reference Books:

1. Engineering Chemistry, Jain & Jain, Dhanpat Rai
2. Engineering Chemistry, M.M. Uppal

2D02:Applied Physics-II

Objective:physics is combined with problem solving and engineering skills, which then has broad applications. Career paths for Engineering physics is usually (broadly) "engineering, applied science or applied physics through research, teaching or entrepreneurial engineering".

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Unit	Topics	38 Hours
Unit – I	**A.C. Circuits:** Faraday's Laws of Electro Magnetic Induction, Lenz's Law Self and Mutual Inductance Alternating Current, Phase & Phase Difference, Instantaneous, Average and rms value of AC, Behaviour of Resistance, Capacitance and Inductance in an AC Circuit, AC Circuits Containing, R-L, R-C and LCR in Series ,Power in AC Circuit and Power Factor,Choke Coil	**8**
Unit – II	**Semi Conductor Physics:** Energy Bands in Conductor, Semi Conductor& Insulator, Chemical Bonds in Semiconductor, Intrinsic and Extrinsic Semiconductors,PN-Junction Diode, Working, Biasing and Characteristics Curves,Zener Diode and Voltage Regulation using it, Half Wave & Full Wave Rectifiers (only working, noderivations),Junction Transistors, Working, Biasing and Characteristic Curves, Brief Idea of Using Transistors as an Amplifier (without mathematical analysis)	**10**
Unit – III	**Modern Physics:** Photo Electric Effect, Einstein's Equation, Photo Cells, **Lasers:** Stimulated Emission and Population Inversion, Types of Laser - Helium Neon and Ruby Laser, Application of Lasers (brief idea only),Material Processing, Lasers in Communication Medical Applications	**8**
Unit – IV	**Nuclear Physics:** Idea of Nuclear Force, Mass - Defect and Binding Energy, Nuclear Reactions, Natural and Artificial Radioactivity , Law of Radioactive Disintegration Half Life & Mean Life, Idea of Nuclear Fission and Fusion. Chain Reaction,Nuclear Reactor	**8**
Unit -V	**Pollution and its control:** Introduction to Pollution – Water, Air, Soil , Noise, Nuclear and mental pollution, Types of Pollution , Brief idea about Noise Pollution and its Control, Nuclear Hazards, Nuclear Waste Management	**4**

Suggested Text :

1.A Text Book of Applied Physics N.S. Kumar (Hindi)

2.Principles of Physics Brijlal, Subhramanyam

3.Applied Physics Vol.-II Hari Harlal, NITTTR

Reference Books:

1. A Text Book of Applied Physics N.S. Kumar
2. Principles of Physics Brijlal, Subhramanyam

2D03: Applied Mathematics-II

Objective: Engineering mathematics is a branch of mathematics that concerns itself with mathematical methods that are typically used in science, engineering, business, and industry. Thus, "applied mathematics" is a mathematical science with specialized knowledge.

Unit	Topics	40 Hours
Unit – I	**Limits:** Concept of Limit, L.H.L., R.H.L., Limit of Standard Functions , Concept of Continuity and Differentiability at a Point (simple Problems) **Function:** Definition of Function, Range and Domain of Function, Types of Function, Absolute Value Function, Exponential value Function, Identity Function, Reciprocal Function, Rational and Irrational Function, Increasing and decreasing Function	**8**
Unit – II	**Differential Calculus :**Standard Formulae (Except Hyperbolic Function), Derivative of Sum, difference, Multiplication andDivision of two Functions, Differentiation of Function of a Function, Logarithmic Differentiation, Differentiation of Implicit Functions, Differentiation of Parametric Functions, Differentiation by Trigonometric Transformations, Differentiation of a Function w.r.t. Another Function, Second Order Derivative **Applications of Differential Calculus:** Geometrical meaning of dy / dx . Tangents and Normals , Angle of Intersection between two Curves, Derivative as a Rate Measurer, Errors and Approximations, Maxima and Minima of Function with one Variable	**10**

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Unit – III	**Integral Calculus:** General Introduction of Integral Calculus**,** Integration of Sum and difference of Functions, Integration by Simplification**,** Integration by Substitution Integration by Parts, Integration of Rational and Irrational Functions, Additional standard **C**formulae, Integration of Trigonometric Functions, Definite Integral and its Properties.	**10**
Unit – IV	C**OORDINATE GEOMETRY Straight Lines: Differential Equations:** Definition of differential Equation. Order, Degree and Solutionof a differential Equation. Solution of a differential Equation of First Order and FirstDegree using, Variable Separable Method**,** Homogenous Form**,** Reducible to Homogenous Form**,** Linear differential Equation Bernoulli's Equation**,** Exact differential Equation**,** Substitution Method**,** Solution of Linear Differential Equation of Higher order withConstant Coefficients Applications of Differential Equations to L-R, L-C, L-C-R ,Circuits of Standard Forms	**8**
Unit-V	**Vector Algebra:** Definition, Addition and Subtraction of Vectors Scalar and Vector Product of two VectorsScalar Triple Product and Vector Triple Product , Applications of Vectors in Engineering Problems **Numerical Integration :** Trapezoidal Rule, Simpson's 1/3 Rule, Simpson's 3/8 Rule, Newton - Raphson Rule	**4**

Suggested Text

1. Text Book on Differential Calculus Chandrika Prasad (Hindi)
2. Text Book on Integral Calculus Chandrika Prasad
3. Differential Calculus M. Ray, S. S. Seth, & G. C. Sharma
4. Integral Calculus M. Ray, S. S. Seth, & G. C. Sharma

Reference Books:

1.Integral Calculus, M.Ray, S.S.Seth&G.C.sharma.

2.Vector Calculus, R.Kumar.

2D04:Electrical & Electronics Technology

Objective: At the end of the course the student will be able to gauge various fundamentals aspects of Basic Electrical and Electronics engineering covering networks theory, single and three phase circuits, transformers and dc machines. Also it will impart knowledge about transistors and thyristor.

Unit	Topic	36 Hours
Unit – I	**DC Networks :**Resistance, inductance, capacitance, current, voltage, power, Ohms law**,** Kirchhoff's Laws, Node Voltage and Mesh Current Analysis; Delta-Star and Star-Delta Transformation, Source Conversion. Classification of Network Elements, Superposition Theorem, Thevenin's Theorem.	**10**
Unit – II	**Single Phase AC Circuits :**Generation of Single Phase AC Voltage, EMF Equation, Average, RMS and Effective Values. RLC Series, Parallel and Series- Parallel Circuits, Complex Representation of Impedances. Phasor Diagram, Power and Power Factor. **Three Phase A.C. Circuits :** Generation of Three-Phase AC Voltage, Delta and Star-Connection, Line & Phase Quantities, 3-Phase Balanced Circuits, Measurement of Power in Three Phase Balanced Circuits.	**10**
Unit – III	**Transformer :**Faraday's Law of Electromagnetic Induction, Construction and Operation of Single Phase Transformer, EMF Equation, Voltage & Current Relationship and Phasor Diagram of Ideal Transformer.	**8**
Unit – IV	**tor:** Bipolar Junction Transistor, Transistor Current Components, Characteristics of CE, CB and CC Transistor Amplifiers. **ors:** Diode and VI characteristic,four layer diode, Bi-directional thyristors.	**8**

Suggested Text /:

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1. Sahdev – Basic Electrical and ElectonicsEngg.

J.B.Gupta – Basic Electrical and Electronics Engg.(Hindi)

2.

3. B.L. Thareja- Electrical Technology-Vol I

Reference Readings

1.H.P. Tiwari – Electrical and Electronics Engg.

2. Basic Electrical and ElectonicsEngg, Tata Mcgraw Hill

2D05:Applied Mechanics

Objective: This subject is design to give the basic knowledge of equilibrium of forces, center of gravity, centroid, moment of inertia and concept and application of work power energy**.**

Unit	TopicS	40 Hours
Unit – I	**Force:** Definition**,** Units**,** Different Types of Forces. **Coplanar Forces:** Resolution of Forces**,** Law of Parallelogram of Forces**,** Resultant of two or more Forces**,** Basic Conditions of Equilibrium**,** Lami's Theorem (No Proof)**,** Jib Crane**,** Law of Polygon of Forces (Only Statement)**Moment:** Definition, Units & Sign Convention., Principle of Moments, Application of Equilibrium Conditions for non-concurrent Forces	**8**
Unit – II	**Application of Principles of Forces & Moments:** Levers & their Types.**,** Reactions of Simply Supported Beams (Graphical &Analytical Method)**,** Steel Yard .**,**Lever Safety Valve Foundry Crane **Centre of Gravity:** Concept**,** Centroid**,** Calculation of C.G. of Regular Bodies**,** Calculation of C.G. of Plain Geometrical Figures **Friction:** Types of Friction**,** Laws of Friction**,** Angle of Friction**,** Angle of Repose**,** Friction on Horizontal and Inclined Plains**,** Application of.	**10**
Unit – III	**Simple Machines:** Basic Concepts**,** Loss in Friction**,** Inclined Plane**,** Simple & Differential Wheel and Axle(Neglecting Rope thickness)Screw JackLifting CrabsSystems of Pulleys**,** Worm and Worm Wheel **Rectilinear Motion:** Concept**,** Motion under Constant Velocity**,** Motion under Constant Acceleration**,** Velocity-time graph and its uses **Motion under Gravity:** Concept**,** Vertical Motion**,** Smooth Inclined Plane **Projectiles:** Concept	**10**
Unit – IV	**Simple Machines:** Basic Concepts**,** Loss in Friction**,** Inclined Plane**,** Simple & Differential Wheel and Axle(Neglecting Rope thickness)**,** Screw Jack**,** Lifting Crabs Systems of Pulleys, Worm and Worm Wheel **Rectilinear Motion:** Concept**,** Motion under Constant Velocity**,** Motion under Constant Acceleration**,** Velocity-time graph and its uses	**8**
Unit-V	**Motion under Gravity:** Concept**,** Vertical Motion**,** Smooth Inclined Plane **Projectiles:** Concept, Range, Maximum Height and Time of Flight, Equation of Trajectory Calculation of Velocity of Projectile at Certain Height, And at Certain instant **Newton's Laws of Motion:** Definitions**,** Momentum and it's Unit**,**Application of Second Law of Motion	**4**

Suggested Text Books

1. Engineering Mechanics by, RK Rajpoot(Hindi)
2. Engineering Mechanics by, RS Khurmi
3. Engineering Mechanics ByChitranjan Aggarwal

Suggested Reference Books

1. **Engineering Mechanics by Nelson , Tata Mcgraw Hill**
2. **Engineering Mechanics by Shailesh Kumar**

2D06:Applied Chemistry Lab-II

Objective: Develop the ability of students to carry out experiments, collect and interpret data, and critically

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report results through "hands-on" laboratory experiences.

	List of Experiments	
	1. Determination of the Strength of Copper Sulphate Solution using a Standard Solution of thioSulphate. 2. Determination of pH Values of Given Samples. 3.Determination of Hardness of Water by EDTA Method. 4. Estimation of Free Chlorine in Water. 5.Determination of Acid Value of an Oil. 6. Preparation of Soap. 7.To determine the Viscosity & Viscosity Index of a given lubricating oil by Redwood Viscometer No. 1	

Text Books:

1.Engineering Chemistry ,Mathur and Aggarwal

2. A text Book of Engineering Chemistry , S.K. Jain & K.D. Gupta

Reference Books:

1.Practical Chemistry For Engineers , Dr. Renu Gupta & Dr. Sapna Dubey

2D07: Applied Physics Lab-II

Objective: This lab is to help the student to understand the concept of Diode, PN junctions, Half deflection method and the concept of cells **.**

	List of Experiments	
	1. To Determine Acceleration due to Gravity using Simple Pendulum. 2. To Verify Newton's Law of Cooling. 3.. To Verify Law of Resistances. 4. To Determine Specific Resistance of Material using Meter Bridge. 5. To Determine Internal Resistance of a Primary Cell using Potentiometer. 6. To Compare emf of two Primary Cells using a Potentiometer. 7. To Draw Characteristic Curves of PN Diode and Determine its Static and Dynamic Resistance. 8. To Draw Characteristic Curves of a PNP/NPN Transistor in CB/CE Configuration. 9.. To Measure Resistance of a Galvanometer by Half-Deflection Metho	

Text Book:
1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
2. Practical Physics – S.L.Gupta&V.Kumar (PragatiPrakashan).

Reference Books:
1.. Advanced Practical Physics Vol.I& II – Chauhan& Singh (PragatiPrakashan)

2D08: Electrical & Electronics Workshop

Objective:this lab will help the students learn about key and basic electrical devices and apparatus used in day-to-day life. Also this will be useful in gaining knowledge about house hold electrical circuits.

	List of Experiments	
	1. Study of Symbol, Specification and Approximate Cost of Common Electrical Accessories, Tools and Wires & CablesRequired for Domestic Installation. Study of : 2.1 Basic Electricity Rules for a Domestic Consumer 2.2 Safety Precautions & use of Fire Fighting Equipments 3. Use of series of Phase Tester, Series Test Lamp, Tong Tester and Megger in Testing of Electrical Installation. 4. 4.1 Prepare a Potential Divider and Measure Resistance of a Filament Lamp Using Voltmeter and Ammeter. 4.2 Measurement of Power and Energy Consumption by an Electric Heater using Watt Meter and Energy Meter.	

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5. Preparation of Wiring Diagram, Wiring, Testing, Fault Finding & Costing for :
5.1 Control of one Lamp by one Switch (using Batten and Tumbler Switch)
5.2 Control of Stair Case Wiring (using Casing Capping, CFL and Flush Type Switches)
5.3 Control of one Bell Buzzer and Indicator by one Switch
(using Conduit and Flush type Switch)
6. Prepare one Switch Board as per Institutional Requirement (using Flush type Switches, Sockets, MCB, ELCB, Etc.)
7. Study, Connecting, Testing and Fault Finding of

7.1 Fluorescent Tube and its Accessories
7.2 Ceiling Fan with resistance type and Electronic Regulator
8. Study, Functioning, Fault Finding & Repairing of following Domestic Appliances -
8.1 Automatic Electric Iron
8.2 Air Cooler
8.3 Electric Water Pump
9. Design, Draw and Estimate the Material required for Installation For a small Residential Building/ Office/ Hall.

Identification of following Resistors and finding their Values:
1.1 Carbon and Metal Film
1.2 Variable Resistance Log and Linear
1.3 Semi Variable Preset of One Turn &Multiturn

2. Identification of following Capacitor and finding their Values:
2.1 Mica
2.2 Ceramic
2.3 Polysterene
2.4 Electrolytic
2.5 Tantalum

3. Identification of following Switches and Study of their Working Mechanism:
3.1 Toggel
3.2 Bandswiteh
3.3 Rotary
3.4 Push to on and off
3.5 Press to on and off

4. Identification and Testing of following type of Connectors:
4.1 Rack and Panel
4.2 Printed Circuit Edge
4.3 Coaxial
4.4 Tape & Ribbon
4.5 Plate

5. Study of Different Relays and their Contacts.

6. Study of following Tools used in Electronic Workshop:
6.1 Component Lead Cutter
6.2 Wire Strippers
6.3 Soldering Iron & Soldering Station
6.4 De-Solder Pump

7. Measurement of Voltage, Current and Resistance using Analog & Digital Millimeter.

8. Testing of Electronic, Component such as Capacitor, Inductor, Diode and Transistor.

9. Measurement of Amplitude & Frequency of a Signal using CRO.

10. Verification of Ohm's law using Resistive Circuit and Analog Meters.

11. Soldering of different passive component combination on general purpose PCB.

12. Sketching of different Electronic Components Symbol on Drawing

Text Books :

Electrical Workshop M.L. Gupta
2. Domestic Devices & Appliances K.B. Bhatia
3. Electrical Workshop S.L. Uppal
4. Electrical Component & Shop Practice K.R. Nahar
5. Maintenance of Electrical Equipments K. S. Janwal
6. Hand Book of Philips Component

Reference Books:

1.Electrical Components and Shop Practice ,K.R. Nahar

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2D09: Workshop Practice -II

Objective: This Lab is design to give practical exposure of engineering workshop in different shop like smithy shop, machine shop, foundry shop, and student should be able to understand different types of tool, material and measuring instrument and their application.

	List of Experiments	
	eet Metal Shop: Preparation of following utility Jobs Involving Various Sheet MetalJoints (Single and Double Hem Joints, Wired Edge, Lap Joint Grooved Seam Joint, Single and Double Seam Joint) and Exercises (Soldering and Riveting Joints) 1 Preparation of a Soap Tray &Mug 2. Preparation of Funnel **Fitting and Plumbing Shop** 1. Marking Filing & Hack Sawing Practice. 2. Production of Utility Job involving Marking, Filling and Hack Sawing. 3. Production of Utility Job involving Marking, FillingandHack Sawing Drilling and Tapping. 4. Cutting and Threading on G.I. Pipe 5. Exercise on PVC Pipe Fitting. 6. Repair of Taps and Cocks.	

Suggested Text Books :

1 Workshop Technology B.S. Raghhuwanshi
2. Workshop Technology (Hindi) TahilMaghnani
3. Workshop Technology (Hindi) Vinay Kumar
4. Domestic Devices and Appliances K.B. Bhatia

Suggested Reference Books:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers

2D10 : Computer Fundamental & IT Lab-II

Objective: This lab is designed so that the better presentations and documents could be made by the students. It comprises the M.S. Excel, M.S. and powerpoint presentations.

	List of Experiments	
	1. Visit to Internet Site 2. Creating e-mail Account , Sending and Receiving e-mails. 3. Sending e-mail with Attachment & Signature 4. Searching Web Page/ Site using Search Engine (eg. google.com, yahoo.com, altavista.com etc.) 5. Exercise Based on MS-Word: 5.1 Document Preparation 5.2 Printing Document 5.3 Mail Merge usage 5.4 Draw Table 6. Exercise Based on Ms-Excel : 6.1 Work Book Preparation 6.2 Printing Workbook 6.3 Data-base usage 6.4 Draw Charts 7. Exercise Based on Power Point : 7.1 Creating Slide 7.2 Adding, Animations in Slide 7.3 Running Slide 8. Creating Simple Web Page using HTML.	

Suggested Text Books:

1. Yadav DS, Foundations of IT, New Age, Delhi.
2. Curtin, Information Technology: Breaking News, Tata Mo Grew Hill.

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Suggested Reference Books:

1.Nelson, Data Compression, BPB.

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PRINCIPLES OF ELECTRONIC COMMUNICATION

Course Code	EL-3001 (Same as EF 3001)
Course Title	Principles of Electronic Communication
Number of Credits	4 (L-4,T-0, P-0)
Prerequisites	NIL
Course Category	PC

COURSE OUTCOMES:

- Use of different modulation and demodulation techniques
- used in analog communication.
- Identify and solve basic communication problems.
- Analyse transmitter and receiver circuits.
- Compare and contrast design issues, advantages, disadvantages and limitations of analog communication systems.

COURSE CONTENTS:

UNIT-1 ANALOG MODULATION:

Concept of frequency translation.
Amplitude Modulation:
Description of full AM, DSBSC, SSB and VSB in time and frequency domains
Methods of generation & demodulation
Descriptions of FM signal in time and frequency domains

UNIT-2 PULSE ANALOG MODULATION:

Ideal sampling,
Sampling theorem, aliasing, interpolation
Natural and flat top sampling in time and frequency domains

UNIT-3 PCM & DELTA MODULATION SYSTEMS:

Uniform and Non-uniform quantization
PCM and delta modulation
Signal to quantization noise ratio in PCM and delta modulation

UNIT-4 DIGITAL MODULATION:

Baseband transmission: Line coding (RZ, NRZ), inter symbol interference (ISI), pulse shaping
Nyquist criterion for distortion free base band transmission, raised cosine spectrum.
Pass band transmission: Geometric interpretation of signals, orthogonalization

UNIT-5 SPREAD-SPECTRUM MODULATION:

Introduction
Pseudo-Noise sequences
Direct sequence spread spectrum (DSSS) with coherent BPSK, processing gain, probability of error,
Frequency-hop spread spectrum (FHSS)
Application of spread spectrum:
CDMA

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Principles of communication systems By Taub Schilling, T.M.H.
2. Fundamentals of communication systems By Proakis & Salehi, Pearson education
3. Communication Systems by Simon Haykin, John Wiley
4. Communication Systems (Analog and Digital) By R.P. Singh, S.D. Sapre, T.M.H.
5. Modern Digital & Analog Communication By B.P. Lathi, Oxford Publications
6. Digital & Analog Communication Systems By K.S. Shanmugam, John Wiley

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(SEMESTER SCHEME 2019-21)

ELECTRONICS DEVICES AND CIRCUITS

Course Code	EL 3002(Same as EF/ER/RA 3002)
Course Title	Electronic Devices And Circuits
Number of Credits	3 (L-3,T-0, P-0)
Prerequisites	NIL
Course Category	PC

COURSE CONTENTS:

UNIT 1 – SEMICONDUCTOR AND DIODES

Definition, Extrinsic/Intrinsic, N-type & p-type
PN Junction Diode – Forward and Reverse Bias Characteristics
Zener Diode – Principle, characteristics, construction, working
Diode Rectifiers – Half Wave and Full Wave
Filters – C, LC and PI Filters

UNIT 2 – BIPOLAR JUNCTION TRANSISTOR (BJT)

NPN and PNP Transistor – Operation and characteristics
Common Base Configuration – characteristics and working
Common Emitter Configuration – characteristics and working
Common Collector Configuration – characteristics and working
High frequency model of BJT
Classification of amplifiers
negative feedback

UNIT 3 – FIELD EFFECT TRANSISTORS

FET – Working Principle, Classification
MOSFET Small Signal model
N-Channel/ P-Channel MOSFETs – characteristics
Enhancement and depletion mode
MOS- FET as a Switch
Common Source Amplifiers
Uni-Junction Transistor – equivalent circuit and operation

UNIT 4 – SCR DIAC & TRIAC

SCR – Construction, operation, working, characteristics
DIAC - Construction, operation, working, characteristics
TRIAC - Construction, operation, working
characteristics SCR and MOSFET as a Switch
DIAC as bidirectional switch
Comparison of SCR, DIAC, TRIAC, MOSFET

UNIT 5 – AMPLIFIERS AND OSCILLATORS

Feedback Amplifiers – Properties of negative Feedback, impact of feedback on different parameters
Basic Feedback Amplifier Topologies: Voltage Series, Voltage Shunt Current Series, Current Shunt
Oscillator – Basic Principles, Crystal Oscillator, Non-linear/ Pulse Oscillator

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Analog Circuits By AK Maini Khanna Publishing House Ed. 2018 (ISBN: 978-93-86173-584)
1. Electronic Devices and Circuits S. Salivahanan and N. Suresh Kumar McGraw Hill Education; Fourth edition (1 July 2017) ISBN: 978-9339219505
2. Electronics Devices and circuit theory Boyestad & Nashelsky Pearson Education India; 11 edition (2015) ISBN: 978-9332542600
3. Electronic Principles Albert Malvino & David Bates Tata McGraw Hill Publication 2010 ISBN: 978-0070634244
4. Electronics Devices & Circuits Jacob Millman McGraw Hill Education; 4 edition (2015)ISBN: 978-9339219543

SUGGESTED SOFTWARE/LEARNING WEBSITES:

1. https://www.electronics-tutorials.ws/
2. https://www.youtube.com/watch?v=Rx43l-QpeWQ
3. https://electronicsforu.com/resources/electronic-devices-and-circuit-theory

(SEMESTER SCHEME 2020-21)

DIGITAL ELECTRONICS

Course Code	EL 3003(Same as EF/ER/RA/MT 3003)
Course Title	Digital Electronics
Number of Credits	3 (L-3,T-0, P-0)
Prerequisites	NIL
Course Category	PC

COURSE CONTENTS:

UNIT 1 – NUMBER SYSTEMS & BOOLEAN ALGEBRA

Introduction to different number systems – Binary, Octal, Decimal, Hexadecimal
Conversion from one number system to another.
Boolean variables – Rules and laws of Boolean algebra
De-Morgan's Theorem
Karnaugh Maps and their use for simplification of Boolean expressions

UNIT 2 – LOGIC GATES

Logic Gates – AND, OR, NOT, NAND, NOR, XOR, XNOR: Symbolic representation and truth table
Implementation of Boolean expressions and Logic Functions using gates
Simplification of expressions

UNIT 3 – COMBINATIONAL LOGIC CIRCUITS

Arithmetic Circuits – Addition, Subtraction, 1's 2's Complement, Half Adder, Full Adder, Half Subtractor, Full Subtractor, Parallel and Series Adders
Encoder, Decoder
Multiplexer – 2 to 1 MUX, 4 to 1 MUX, 8 to 1 MUX. Applications
Demultiplexer – 1 to 2 DEMUX, 1- 4 DEMUX, 1- 8 DEMUX

UNIT 4 – SEQUENTIAL LOGIC CIRCUITS

Flip Flops – SR, JK, T, D, FF, JK-MS, Triggering
Counters – 4 bit Up – Down Counters, Asynchronous/ Ripple Counter, Decade Counter- Mod 3, Mod 7 Counter, Johnson Counter, Ring Counter
Registers – 4bit Shift Register: Serial in Serial Out, Serial in Parallel Out, Parallel in Serial Out, and Parallel inParallel Out

UNIT 5 – MEMORY DEVICES

Classification of Memories – RAM Organization, Address Lines and Memory Sixe,
Static RAM, Bipolar RAM, cell Dynamic RAM, D RAM, DDR RAM
Read only memory – ROM organization, Expanding memory, PROM, EPROM, EEPROM, Flash memory
Data Converters – Digital to Analog converters, Analog to Digital Converters

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Digital principles & Applications Albert Paul Malvino & Donald P. Leach McGraw Hill Education; Eighth edition ISBN: 978-9339203405
2. Digital Electronics Roger L. Tokheim Macmillian McGraw-Hill Education (ISE Editions); International 2 Revised edition ISBN: 978-0071167963
3. Digital Electronics – an introduction to theory and practice William H. Gothmann Prentice Hall India Learning Private Limited; 2 edition ISBN: 978-8120303485
4. Fundamentals of Logic Design Charles H. Roth Jr. Jaico Publishing House; First edition ISBN: 978-8172247744
5. Digital Electronics R. Anand Khanna Publications, New Delhi (Edition 2018) ISBN: 978-93-82609445

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(SEMESTER SCHEME 2020-21)

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Course Code	EL 3004
Course Title	Electronic Measurements and Instrumentation
Number of Credits	3 (L-3,T-0, P-0)
Prerequisites	NIL
Course Category	PC

COURSE CONTENTS:

UNIT – I BASICS OF MEASUREMENTS AND BRIDGES

Accuracy & precision, Resolution
Types of Errors
DC Bridges – Wheatstone and Kelvin Double Bridge
AC Bridges - Maxwell's Bridge, Hay's Bridge, Anderson Bridge, De-Sauty's Bridge

UNIT- II POTENTIOMETER

Basic DC slide wire Potentiometer
Crompton's DC Potentiometer
Applications of DC Potentiometer
AC Potentiometers
Applications of AC Potentiometers

UNIT– III MEASURING INSTRUMENTS

Permanent Magnet Moving Coil Instruments (PMMC)
Moving Iron type Instruments (MI)
Electro Dynamo Type
Instruments Single Phase Energy Meter

UNIT– IV ELECTRONIC INSTRUMENTS

Electronic Voltmeter and Digital Voltmeter
Electronic Multimeters
Q – Meter
Vector Impedance Meter

UNIT– V OSCILLOSCOPES

Cathode ray tube: construction, operation, screens, graticules
Vertical deflection system, Horizontal deflection system, Delay line,
Measurement of frequency, time delay, phase angle and modulation index (trapezoidal method)
Oscilloscope probe: Structure of 1:1 and 10:1 probe
MultipleTraceCRO

UNIT- VI TRANSDUCERS

Classification, Selection Criteria, Characteristics, Construction, Working Principles and Application of following Transducers:

RTD, Thermocouple, Thermistor
LVDT, Strain Gauge
Load Cell
Piezoelectric Transducers

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Electrical & Electronic Measurement & Instruments A.K. Sawhney Dhanpat Rai & Sons, India
2. Electronic Instrument and Measurement Technique W.D. Cooper Prentice Hall International, India.
3. Electronic Measurement & Instrumentation J.G. Joshi Khanna Publishing House, Delhi
4. Measurement systems application and design E.O. Doebelin and D. N. Manik the Mcgraw-Hill
5. Electronic Measurements and Instrumentation Oliver and Cage the Mcgraw-Hill
6. Basic Electrical Measurement M.B. Stout Prentice hall of India, India
7. Electronic Instrumentation H. S. Kalsi the Mcgraw-Hill
8. Electrical and Electronics Measurement and Instrumentation Prithwiraj Pukrait, Budhaditya Biswas, Santanu Das, Chiranjib Koley The Mcgraw-Hill

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(SEMESTER SCHEME 2020-21)

ELECTRIC CIRCUITS & NETWORK

Course Code	EL 3005(Same as EF/ER 3005)
Course Title	Electric Circuits & Network
Number of Credits	3 (L-2,T-1, P-0)
Prerequisites	NIL
Course Category	PC

COURSE CONTENTS:

UNIT – 1 BASIC OF NETWORK AND NETWORK THEOREM

Node and Mesh
Analysis Superposition Theorem
Thevenin Theorem
Norton Theorem
Maximum Power transfer theorem
Reciprocity Theorem

UNIT– 2 GRAPH THEORY

Graph of network, tree, and incidence matrix
F- Tie Set Analysis
F-Cut Set Analysis
Analysis of resistive network using cut-set and tie-set Duality

UNIT– 3 TIME DOMAIN AND FREQUENCY DOMAIN ANALYSIS

Solution of first and second order differential equations for Series and parallel R-L, R-C, R-L-Ccircuits
Initial and Final conditions in network elements
Forced and Free response, time constants Steady State and Transient State Response
Analysis of electrical circuits using Laplace Transform for standard inputs (unit, Ramp, Step)

UNIT– 4 TRIGONOMETRIC AND EXPONENTIAL FOURIER SERIES

Discrete spectra and symmetry of waveform
Steady state response of a network to non-sinusoidal periodic inputs
power factor, effective values
Fourier transform and continuous spectra

UNIT- 5 TWO PORT NETWORK

Two Port Network
Open Circuit Impedance Parameters
Short Circuit Admittance Parameters
Transmission Parameters
Hybrid Parameters
Interrelationship of Two Port Network
Inter Connection of Two Port Network

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Networks and Systems Ashfaq Husain Khanna Publishing House
2. Network Analysis M. E. Van Valkenburg Prentice Hall of India
3. Engineering Circuit Analysis W. H. Hayt, J. E. Kemmerly and S. M. Durbin McGraw Hill
4. Electrical Circuits Joseph Edminister Schaum's Outline, Tata McGraw Hill
5. Basic Circuit Theory Lawrence P. Huelsma Prentice Hall of India
6. Network & Systems D. Roy Choudhury Wiley Eastern Ltd
7. Linear Circuit Analysis De Carlo and Lin Oxford Press

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(SEMESTER SCHEME Effective from 2020-21)

PRINCIPLES OF ELECTRONIC COMMUNICATIONS LAB

Course Code	EL 3006(Same as EF 3006)
Course Title	Principles of Electronic Communications Lab
Number of Credits	1 (L-0,T-0, P-2)
Prerequisites	NIL
Course Category	PC

PRACTICAL OUTCOMES (PROs)

1. Understanding the different techniques of signal modulation and demodulation.
2. Understanding the variation in amplitude of controllers.

PRACTICALS:

1. Harmonic analysis of a square wave of modulated waveform: measures modulation index.
2. To modulate a high frequency carrier with sinusoidal signal to obtain FM signal.
3. To study and observe the operation of a super heterodyne receiver
4. To modulate a pulse carrier with sinusoidal signal to obtain PWM signal and demodulate it.
5. To modulate a pulse carrier with sinusoidal signal to obtain PPM signal and demodulate it.
6. To observe pulse amplitude modulated waveform and its demodulation.
7. To observe the operation of a PCM encoder and decoder. To consider reason for using digitalsignal x-missions of analog signals.
8. To study & observe the amplitude response of automatic gain controller (AGC).

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(SEMESTER SCHEME 2020-21)

ELECTRONIC DEVICES AND CIRCUITS LAB

Course Code	EL 3007(Same as EF/ER/RA 3007)
Course Title	Electronic Devices and Circuits Lab
Number of Credits	1 (L-0,T-0, P-2)
Prerequisites	NIL
Course Category	PC

PRACTICAL OUTCOMES (PROs)

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:

1. Construct the circuit and plot the VI characteristics of the PN Junction Diode ,find the cut in voltage
2. Construct the circuit and plot the characteristics of a Zener Diode. Find thebreakdown voltage
3. Construct a Half Wave Rectifier and obtain regulation characteristics –WithoutFilters and with Filters Compare the results
4. Construct a Full Wave Rectifier and obtain regulation characteristics –WithoutFilters and with Filters Compare theresults
5. Construct a Bridge Rectifier and obtain regulation characteristics – Without Filters and with Filters
6. Obtain the characteristics of DIAC and TRIAC
7. Simulate half wave, full wave and bridge rectifier using simulation tool likePSpice/ Orcad/ Multisim.
8. Develop a simulation model for Voltage Series and Voltage Shunt Feedback Amplifiers
9. Develop circuits for Voltage Series and Voltage Shunt Feedback Amplifiers andObtain output plots. Compare the results with the simulation model.
10. Develop a simulation model for Current Series and Current Shunt Feedback Amplifiers
11. Develop circuits for Current Series and Current Shunt Feedback Amplifiers andObtain output plots. Compare the results with the simulation model

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Analog Circuits By AK Maini Khanna Publishing House Ed. 2018 (ISBN: 978-93-86173-584)
2. Electronic Devices and Circuits S. Salivahanan and N. Suresh Kumar McGraw Hill Education; Fourth edition (1 July 2017) ISBN: 978-9339219505
3. Electronics Devices and circuit theory Boyestad & Nashelsky Pearson Education India; 11 edition (2015)ISBN: 978-9332542600
4. Electronic Principles Albert Malvino & David Bates Tata McGraw Hill Publication 2010 ISBN: 978-0070634244
5. Electronics Devices & Circuits Jacob Millman McGraw Hill Education; 4 edition (2015)ISBN: 978-9339219543

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(SEMESTER SCHEME 2020-21)

DIGITAL ELECTRONICS LAB

Course Code	EL 3008(Same as EF/ER/RA 3008)
Course Title	Digital Electronics Lab
Number of Credits	1 (L-0,T-0, P-2)
Prerequisites	NIL
Course Category	PC

PRACTICAL OUTCOMES (PROs)

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:

1. To verify the truth tables for all logic fates – NOT OR AND NAND NORXOR XNOR using CMOS Logic gates and TTL Logic Gates
2. Implement and realize Boolean Expressions with Logic Gates
3. Implement Half Adder, Full Adder, Half Subtractor, Full subtractor using ICs
4. Implement parallel and serial full-adder using ICs
5. Design and development of Multiplexer and De-multiplexer using multiplexer ICs
6. Verification of the function of SR,D, JK and T Flip Flops
7. Design controlled shift registers
8. Construct a Single digit Decade Counter (0-9) with 7 segment display
9. To design a programmable Up-Down Counter with a 7 segment display
10. Study of different memory ICs
11. Study Digital- to – Analog and Analog to Digital Converters
12. Simulate in Software (such as PSpice) an Analog to Digital Converter
13. Simulate in Software (such as PSpice) an Analog to Digital Converter

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Digital principles & Applications Albert Paul Malvino & Donald P. Leach McGraw Hill Education; Eighth edition ISBN: 978-9339203405
2. Digital Electronics Roger L. Tokheim Macmillian McGraw-Hill Education (ISE Editions); International 2 Revised edition ISBN: 978-0071167963
3. Digital Electronics – an introduction to theory and practice William H. Gothmann Prentice Hall India Learning Private Limited; 2 edition ISBN: 978-8120303485
4. Fundamentals of Logic Design Charles H. Roth Jr. Jaico Publishing House; First edition ISBN: 978-8172247744
5. Digital Electronics R. Anand Khanna Publications, New Delhi (Edition 2018) ISBN: 978-93-82609445

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(SEMESTER SCHEME 2020-21)

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION LAB

Course Code	EL 3009
Course Title	Digital Electronics Lab
Number of Credits	1 (L-0,T-0, P-2)
Prerequisites	NIL
Course Category	PC

PRACTICAL OUTCOMES (PROs)

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:

1. Measure unknown inductance using following bridges (a) Anderson Bridge (b) Maxwell Bridge
2. Measure Low resistance by Kelvin's Double Bridge
3. Calibrate an ammeter using DC slide wire potentiometer
4. Calibrate a voltmeter using Crompton potentiometer
5. Measure low resistance by Crompton potentiometer
6. Calibrate a single-phase energy meter by phantom loading
7. Study the working of Q-meter and measure Q of coils
8. Study working and applications of (i) C.R.O. (ii) Digital StorageC.R.O. & (ii) C.R.O. Probes
9. Measurement of displacement with the help of LVDT
10. Draw the characteristics of the following temperature transducers (a) RTD (Pt-100) (b) Thermistor
11. Measurement of strain/force with the help of strain gauge load cell

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Electrical & Electronic Measurement & Instruments A.K. Sawhney Dhanpat Rai & Sons, India
2. Electronic Instrument and Measurement Technique W.D. Cooper Prentice Hall International, India.
3. Electronic Measurement & Instrumentation J.G. Joshi Khanna Publishing House, Delhi
4. Measurement systems application and design E.O. Doebelin and D. N. Manik the Mcgraw-Hill
5. Electronic Measurements and Instrumentation Oliver and Cage the Mcgraw-Hill
6. Basic Electrical Measurement M.B. Stout Prentice hall of India, India
7. Electronic Instrumentation H. S. Kalsi the Mcgraw-Hill
8. Electrical and Electronics Measurement and Instrumentation Prithwiraj Pukrait, Budhaditya Biswas, Santanu Das, Chiranjib Koley The Mcgraw-Hill

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(SEMESTER SCHEME 2020-21)

GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR

SEMESTER SCHEME-2020-21

IV SEMESTER

(SESSION 2021-2022 & ONWARDS)

Sunrise University

MICROCONTROLLER AND APPLICATIONS

Course Code	EL 4001(Same as EF/ER 4001)
Course Title	Microcontroller and Applications
Number of Credits	3(L-3,T-0, P-0)
Prerequisites	NIL
Course Category	PC

COURSE CONTENTS:

UNIT I INTRODUCTION

Introduction to Microprocessors and Microcontrollers
Architectures [8085,8086]
Intel MCS- 51 family features
8051 -organization and architecture

UNIT II PROGRAMMING WITH 8051

8051 instruction set
addressing modes
conditional instructions
I/O Programming
Arithmetic logic instructions
single bit instructions
interrupt handling
programming counters, timers and Stack

UNIT III

MCS51 and external Interfaces
User interface – keyboard, LCD, LED
Real world interface -ADC, DAC
SENSORS Communication interface

UNIT IV C PROGRAMMING WITH 8051

I/O Programming
Timers/counters
Serial Communication
Interrupt
User Interfaces- LCD, Keypad, LED and communication interfaces [RS232]

UNIT V ARM PROCESSOR CORE BASED MICROCONTROLLERS

Need for RISC Processor-ARM processor fundamentals
ARM core based controller [LPC214X]
IO ports, ADC/DAC, Timers

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. The 8051 Micro Controller and Embedded Systems Muhammad Ali Mazidi& Janice Gilli Mazidi, R.D.Kinely PHI Pearson Education, 5th Indian reprint
2. Microprocessor and Microcontrollers Krishna Kant Eastern Company Edition, Prentice Hall of India, New Delhi
3. Microprocessor & Microcontroller Architecture: Programming & Interfacing using 8085,8086,8051 Soumitra Kumar Mandal McGraw Hill Edu,
4. Microcontrollers: Architecture implementation and Programming Tabak Daniel, Hintz Kenneth j Tata McGraw Hill, 2007
5. ARM Developer's Guide.UM10139 LPC214X User manual – Rev.4 Andrew N.Sloss,Dominic Symes, Chris Wright User manual – Rev.4
6. Microprocessors and interfacing: programming and hardware Douglas V. Hall Tata McGraw Hill, 2editon, 2000
7. "Microcontroller – Fundamentals and Applications with Pic Valder – Perez YeesDE Publishers, Tayler & Francis

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(SEMESTER SCHEME-2020-21)

CONSUMER ELECTRONICS

Course Code	EL 4002
Course Title	Consumer Electronics
Number of Credits	3 (L-3,T-0, P-0)
Prerequisites	NIL
Course Category	PC

COURSE CONTENTS:

UNIT-I AUDIO FUNDAMENTALS AND DEVICES

Basic characteristics of sound signal
Audio level metering, decibel level in acoustic measurement
Microphone & Types
speaker types & working principle
Sound recording principle & types

UNIT-II AUDIO SYSTEMS

CD player
home theatre sound system, surround sound
Digital console block diagram, working principle, applications
FM tuner, ICs used in FM tuner TDA 7021T
PA address system

UNIT-III TELEVISION SYSTEMS-

Monochrome TV standards,
scanning process, aspect ratio, persistence of vision and flicker, interlace scanning, picture resolution,
Composite video signal
Colour TV standards
colour theory, hue, brightness, saturation, luminance and chrominance,
Different types of TV camera
Transmission standards

UNIT-IV TELEVISION RECEIVERS AND VIDEO SYSTEMS-

PAL-D colour TV receiver
Digital TVs: - LCD, LED, PLASMA, HDTV, 3-D TV, projection TV
DTH receiver
Video interface, Digital Video, SDI, HDMI Multimedia Interface
Digital Video Interface, 4.6CD and DVD player

UNIT-V HOME / OFFICE APPLIANCES

Diagrams, operating principles and controller for
FAX
Photocopier
Microwave Oven
Washing Machine
Air conditioner
Refrigerators
Digital camera
cam coder

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Consumer Electronics Bali S.P Pearson Education India,2010 , latest edition
2. Audio video systems: principle practices & troubleshooting Bali R and Bali S.P Khanna Book Publishing Co. (P) Ltd., 2010Delhi, India, latest edition
3. Modern Television practices Gulati R.R. New Age International Publication (P) Ltd. New Delhi Year 2011, latest edition
4. Audio video systems Gupta R.G. Tata Mcgraw Hill, New Delhi, India 2010, latest edition
5. Mastering Digital Television Whitaker Jerry & Benson Blair McGraw-Hill Professional, 2010, latest edition
6. Standard handbook of Audio engineering Whitaker Jerry & Benson Blair McGraw-Hill Professional, 2010, latest edition

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(SEMESTER SCHEME-2020-21)

DIGITAL COMMUNICATION SYSTEMS

Course Code	EL 4003
Course Title	Digital Communication Systems
Number of Credits	3 (L-3,T-0, P-0)
Prerequisites	NIL
Course Category	PC

COURSE CONTENTS:

UNIT1

1.1 Block diagram and sub-system description of a digital communication system
1.2 Sampling of low-pass and band-pass signals
1.3 PAM, PCM,
1.4 Signal to quantization noise ratio analysis of linear and nonlinear quantizers
1.5 Line codes and bandwidth considerations
1.6 PCM TDM hierarchies
1.7 frame structures, frame synchronization and bit stuffing

UNIT 2

2.1 Quantization noise analysis of DM and ADM; DPCM and ADPCM
2.2 Low bit rate coding of speech and video signals
2.3 Baseband transmission
2.4 matched filter, performance in additive Gaussian noise
2.5 Inter-symbol interference (ISI), Nyquist criterion for zero ISI
2.6 sinusoidal roll-off filtering
2.7 correlative coding
2.8 equalizers and adaptive equalizers; Digital subscriber lines

UNIT 3

3.1 Geometric representation of signals,
3.2 maximum likelihood decoding
3.3 Correlation receiver, equivalence with matched filter
3.4 Generation, detection and probability of error analysis of OOK, BPSK, coherent and non-coherent FSK, QPSK and DPSK
3.5 QAM, MSK and multicarrier modulation
3.6 Comparison of bandwidth and bit rate of digital modulation schemes

UNIT 4

4.1 Introduction to Information and Coding Theories
4.2 Information Theory: information measures, Shannon entropy, differential entropy, mutual information
4.3 capacity theorem for point-to-point channels with discrete and continuous alphabets
4.4 Coding Theory: linear block codes – definitions, properties, bounds on minimum distance (singleton, Hamming, GV, MRRW)
4.5 Soft versus hard decision decoding, some specific codes (Hamming, RS, and Concatenated)
4.6 Convolutional codes – structure, decoding (the Viterbi and BCJR algorithms)
4.7 Turbo codes
4.8 LDPC codes

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Communication Systems Haykin, S 4th Ed., John Wiley & Sons
2. Modern Digital and Analog Communication Systems Lathi, B.P. and Ding, Z Intl. 4th Ed., Oxford University Press.
3. Digital Communications Proakis, J.G. and Saheli, M 5th Ed., McGraw-Hill
4. Digital Communication: Fundamentals and Applications Sklar, B., and Ray, P.K 2nd Ed., Dorling Kindersley
5. ElementsofInformation Theory T. Cover and J. Thomas 2/e, Wiley.
6. Principles of Digital Communication R. G. Gallager Cambridge Univ. Press
7. A Foundation in Digital Communication A. Lapidoth Cambridge Univ. Press
8. Error Control Coding S. Lin and D. Costello 2/e, Prentice Hall.

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(SEMESTER SCHEME-2020-21)

ELECTRONIC EQUIPMENT MAINTENANCE

Course Code	EL 40041 (Same as EF 40041)
Course Title	Electronic Equipment Maintenance
Number of Credits	3 (L-3,T-0, P-0)
Prerequisites	NIL
Course Category	PE

COURSE CONTENTS:

UNIT 1:

Fundamental Troubleshooting Procedures inside Electronic Equipment:
Reading Drawings And Diagrams – Block Diagram, Circuit Diagram, Wiring Diagram;
Dis-assembly and re-assembly of equipment,
Equipment Failures and causes such as poor design, production deficiencies, careless storage and transport,
inappropriate operating conditions
Nature of faults, Fault location procedure, Fault finding aids – Service and maintenance manuals and instruction manuals
Test and Measuring instruments, special tools Troubleshooting techniques
Approaching components for tests, Grounding systems in Electronic Equipment,
Temperature sensitive Intermittent problems Corrective actions, Situations where repairs should not be attempted

UNIT 2:

Passive Components and Their Testing Passive Components- Resistors, Capacitors, Inductors
Failures in fixed resistors, testing of resistors, variable resistors, variable resistors as potentiometers, failures in
potentiometers, testing of potentiometers, servicing potentiometers, LDRs and Thermistors
Types of capacitors and their performance, Failures in capacitors, testing of capacitors and precautionsTherein, variable capacitor types,
Testing of inductors and inductance measurement

UNIT 3:

Testing of Semiconductor Devices Types of semiconductor devices,
Causes of failure in Semiconductor Devices
Types of failure Test procedures for
Diodes
Special types of Diodes
Bipolar Junction Transistors
Field Effect Transistors
Thyristors
Operational Amplifiers, Fault diagnosis in op-amp circuits

UNIT 4:

Logic IC families, Packages in Digital ICs,
IC identification, IC pin-outs, Handling ICs,
Digital troubleshooting methods – typical faults, testing digital ICs with pulse generators Logic clip,Logic Probe, Logic Pulser, Logic Current Tracer, Logic Comparator
Special consideration for fault diagnosis in digital circuits
Handling precautions for ICs sensitive to static electricity
Testing flip-flops, counters, registers, multiplexers and demultiplexers, encoders and decoders; Tri-statelogic

UNIT 5:

Rework and Repair of Surface Mount Assemblies
Surface Mount Technology and surface mount devices Surface Mount Semiconductor packages – SOIC, SOT, LCCC, LGA, BGA, COB, Flat packs and Quad Packs,
Cylindrical Diode Packages, Packaging of Passive Components as SMDs
Repairing Surface Mount PCBs, Rework Stations.

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Modern Electronic Equipment: Trouble- shooting, Repair and Maintenance Khandpur TMH 2006
2. Electronic Instruments and Systems: Principles, Maintenance and Troubleshooting R. G. Gupta TMH 2001
3. Student Reference Manual for Electronic Instrumentation Laboratories David L Terrell Butterworth-Heinemann
4. Electronic Testing and Fault Diagnosis G. C. Loveday, A. H Wheeler Publishing

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(SEMESTER SCHEME-2020-21)

SIMULATION SOFTWARE

Course Code	EL 40042(Same as EF/ER 40042)
Course Title	Simulation Software
Number of Credits	3 (L-3,T-0, P-0)
Prerequisites	NIL
Course Category	PE

Course Contents:

UNIT I

1.1 Introduction to PSpice software
1.2 General purpose circuit simulation using Schematic Editor,
1.3 Introduction to netlist command based SPICE simulation,
1.4 Basic netlist commands. Basic circuit analyses: DC, AC Transient

UNIT II

2.1 Introduction to PCB Design software Schematic Entry, Netlist Creation, Working with component libraries,
2.2 Design of Boards, Layout of Parts, Optimizing Parts Placements, Pads and Via, Manual and Auto Routing,
2.3 Handling Multiple Layers

UNIT III

Introduction to SCILAB,
use SCILAB functions.
Writing simple programs using SCILAB, handling arrays, files, plotting of functions etc.
Writing SCI files for Creation of analog & discrete signals, plotting of signals etc.
Simulation of electronic circuits using SCILAB

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. NGspice, LTSpice, MULTISIM, Orcad, Proteus or other open source PCB design tools, SCILAB
2. Website: http://www.scilab.org/ (To download SCILAB open source software)
3. http://www.linear.com/,
4. http://www.expresspcb.com/
5. http://ngspice.sourceforge.net/

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(SEMESTER SCHEME-2020-21)

LINEAR INTEGRATED CIRCUITS

Course Code	EL 40051(Same as EF/ER 40051)
Course Title	Linear Integrated Circuits
Number of Credits	3 (L-3,T-0, P-0)
Prerequisites	NIL
Course Category	PE

COURSE CONTENTS:

UNIT I - IC FABRICATION AND CIRCUIT CONFIGURATION FOR LINEAR IC

Advantages of ICs over discrete components –
Manufacturing process of monolithic Ics
Construction of monolithic bipolar transistor – Monolithic diodes – Integrated Resistors Monolithic Capacitors, Inductors. Current mirror and current sources, Current sources as active loads, Voltage sources, Voltage References, BJT Differential amplifier with active loads, General operational amplifier stages and internal circuit diagrams of IC 741, DC and AC performance characteristics, slew rate, Open and closed loop
configurations.

UNIT II APPLICATIONS OF OPERATIONAL AMPLIFIERS

Sign Changer
Scale Changer
Phase Shift Circuits
Voltage Follower,
V-to-I and I-to-V converters
Adder, subtractor
Instrumentation amplifier
Integrator, Differentiator
Logarithmic amplifier, Antilogarithmic amplifier
Comparators, Schmitt trigger
Precision rectifier, peak detector
Clipper and clamper
Low-pass, high-pass and band-pass Butterworth filters

UNIT III ANALOG MULTIPLIER AND PLL

Analog Multiplier using Emitter Coupled Transistor Pair - Gilbert Multiplier cell – Variable transconductance technique,
analog multiplier ICs and their applications,
Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator,
Monolithic PLL IC 565, application of PLL for AM detection, FM detection, FSK modulation and demodulation and Frequency synthesizing.

UNIT IV ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS

Analog and Digital Data Conversions,
D/A converter – specifications –
weighted resistor type, R-2R Ladder type, Voltage Mode and Current-Mode R2R Ladder types switches for
D/A converters, high speed sample-and-hold circuits
A/D Converters specifications - Flash type - Successive Approximation type - Single Slope type – Dualtype - Slope
A/D Converter using Voltage-to-Time Conversion - Over-sampling A/D Converters.

UNIT V WAVEFORM GENERATORS AND SPECIAL FUNCTION ICS

Sine-wave generators, Multi-vibrators and Triangular wave generator, Saw-tooth wave generator,
ICL8038 function generator,
Timer IC 555,
IC Voltage regulators – Three terminals fixed and adjust- able voltage regulators - IC 723 general purpose
regulator Monolithic switching regulator,
Switched capacitor filter IC MF10,
Frequency to Voltage and Voltage to Frequency converters,

(SEMESTER SCHEME-2020-21)

Audio Power amplifier, Video Amplifier, Isolation Amplifier,
Opto-couplers and fibre optic IC.

REFERENCES /SUGGESTED LEARNING RESOURCES

1. Design with operational amplifiers and analog integrated circuits, 3rd Edition Sergio Franco Tata McGraw-Hill, 2007
2. Linear Integrated Circuits, D.Roy Choudhry, Shail Jain New Age International Pvt. Ltd
3. System design using Integrated Circuits B.S.Sonde New Age Pub, 2nd Edition, 2001
4. Analysis and Design of Ana- log Integrated Circuits Gray and Meyer Wiley International, 2005.
5. OP-AMP and Linear Ics Ramakant A.Gayakwad Prentice Hall / Pearson Education, 4th Edition, 2001
6. Operational Amplifier and Linear Integrated Circuits K Lal Kishore Pearson Education, 2006

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(SEMESTER SCHEME-2020-21)

POWER ELECTRONICS

Course Code	EL 40052(Same as EF/ER/RA 40052)
Course Title	POWER ELECTRONICS
Number of Credits	3 (L-3T-0, P-0)
Prerequisites	NIL
Course Category	PE

COURSE CONTENTS:

UNIT I POWER SEMI CONDUCTOR DEVICES AND CONTROLLED RECTIFIER

Classification of Thyristor family
Working, of SCR, IGBT, GTO, DIAC and TRIAC

UNIT II SCR PROTECTION AND COMMUTATING CIRCUITS

Need of SCR protections: Over voltage and over current protection
Snubber circuit, freewheeling diode, Thermistor, heat sink
Turn off (commutation) method and types-Natural commutation, Forced commutation, Series resonance/ current commutation, Voltage commutation

UNIT III CHOPPERS

Function and working of choppers
Types of chopper circuits: A type to E-type
Jone's chopper circuit

UNIT IV INVERTERS AND CYCLOCONVERTER

Working principle of inverter
Classification of inverter-
Phase and 3-phase inverters
Line commutated and forcedcommutated inverters
Series, Parallel and bridge inverter
Operating principle of cyclo converter.
Types of cyclo-converters:
Single phase to single phase cyclo converter
Single phase to bridge cyclo converter

UNIT V OTHER INDUSTRIAL APPLICATIONS OF POWER ELECTRONIC DEVICES

Speed control of D.C. Motor using armature voltage control.
Speed control of D.C. Motor using SCR chopper circuit.
Speed control of D.C. drive using PLL method.

REFERENCES /SUGGESTED LEARNING RESOURCES

1. Power Electronics Rashid, Muhammad H. PHI Learning, and New Delhi latest edition
2. Power Electronics Gupta, B. R., Singhal V. S.K. Kataria and sons, New Delhi

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(SEMESTER SCHEME-2020-21)
Submitted

MICROCONTROLLER AND APPLICATIONS LAB

Course Code	EL 4006(Same as EF/ER 4006)
Course Title	Microcontroller and Applications Lab
Number of Credits	1 (L-0,T-0, P-2)
Prerequisites	NIL
Course Category	PC

PRACTICALS:

1. Programming 8051 Micro controller using ASM and C, and implementation in flash 8051microcontroller.
2. Programming with Arithmetic logic instructions [Assembly]
3. Program using constructs (Sorting an array) [Assembly]
4. Programming using Ports [Assembly and C]
5. Delay generation using Timer [Assembly and C]
6. Programming Interrupts [Assembly and C]
7. Implementation of standard UART communication (using hyper terminal) [Assembly and C].
8. Interfacing LCD Display. [Assembly and C]
9. Interfacing with Keypad [Assembly and C]
10. Programming ADC/DAC [Assembly and C]
11. Interfacing with stepper motor. [Assembly and C]
12. Pulse Width Modulation. [Assembly and C] Programming ARM Micro controller using ASM and C using simulator.
13. Programming with Arithmetic logic instructions [Assembly]
14. GPIO programming in ARM microcontroller. [C Programming].
15. Timers programming in ARM Microcontroller. [C Programming].

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. The 8051 Micro Controller and Embedded Systems Muhammad Ali Mazidi& Janice Gilli Mazidi, R.D.Kinely PHI Pearson Education, 5th Indian reprint
2. Microprocessor and Microcontrollers Krishna Kant Eastern Company Edition, Prentice Hall of India, New Delhi
3. Microprocessor & Microcontroller Architecture: Programming & Interfacing using 8085,8086,8051 Soumitra Kumar Mandal McGraw Hill Edu,
4. Microcontrollers: Architecture implementation and Programming Tabak Daniel, Hintz Kenneth j Tata McGraw Hill, 2007
5. ARM Developer's Guide.UM10139 LPC214X User manual – Rev.4 Andrew N.Sloss,Dominic Symes, Chris Wright User manual – Rev.4
6. Microprocessors and interfacing: programming and hardware Douglas V. Hall Tata McGraw Hill, 2editon, 2000
7. "Microcontroller – Fundamentals and Applications with Pic Valder – Perez YeesDE Publishers, Tayler & Francis

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(SEMESTER SCHEME-2020-21)
Subject to

DIGITAL COMMUNICATION SYSTEMS LAB

Course Code	EL 4007
Course Title	Digital Communication SystemsLab
Number of Credits	1 (L-0,T-0, P-2)
Prerequisites	NIL
Course Category	PC

PRACTICALS:

1. Pulse Code Modulation and Differential Pulse Code Modulation.
2. Delta Modulation and Adaptive Delta modulation.
3. Simulation of Band Pass Signal Transmission and Reception • Amplitude Shift Keying • Frequency Shift Keying • Phase Shift Keying.
4. Performance Analysis of Band Pass Signal Transmission and Reception • Amplitude Shift Keying • Frequency Shift Keying • Phase Shift Keying.
5. Implementation of Amplitude Shift Keying
6. Implementation of Frequency Shift Keying
7. Implementation of Phase Shift Keying.
8. Time Division Multiplexing: PLL (CD 4046) based synch, clock and data extraction

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Communication Systems Haykin, S 4th Ed., John Wiley & Sons
2. Modern Digital and Analog Communication Systems Lathi, B.P. and Ding, Z Intl. 4th Ed., Oxford University Press.
3. Digital Communications Proakis, J.G. and Saheli, M 5th Ed., McGraw-Hill
4. Digital Communication: Fundamentals and Applications Sklar, B., and Ray, P.K 2nd Ed., Dorling Kindersley
5. ElementsofInformation Theory T. Cover and J. Thomas 2/e, Wiley.
6. Principles of Digital Communication R. G. Gallager Cambridge Univ. Press
7. A Foundation in Digital Communication A. Lapidoth Cambridge Univ. Press
8. Error Control Coding S. Lin and D. Costello 2/e, Prentice Hall.

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(SEMESTER SCHEME-2020-21)

ELECTRONIC EQUIPMENT MAINTENANCE LAB

Course Code	EL 40081(Same as EF 40081)
Course Title	Electronic Equipment MaintenanceLab
Number of Credits	1 (L-0,T-0, P-2)
Prerequisites	NIL
Course Category	PE

PRACTICALS:

1. Demonstrate use of various hand held tools.
2. Test the performance of different passive electronic components (fixed/variable)
3. Test the performance of active electronic components like general purpose transistor/FET
4. Verify the functionality of TTL and CMOS Digital IC's using IC tester
5. Explore datasheet of minimum any five electronics components and analog/ Digital IC's

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Modern Electronic Equipment: Trouble- shooting, Repair and Maintenance Khandpur TMH 2006
2. Electronic Instruments and Systems: Principles, Maintenance and Troubleshooting R. G. Gupta TMH 2001
3. Student Reference Manual for Electronic Instrumentation Laboratories David L Terrell Butterworth-Heinemann
4. Electronic Testing and Fault Diagnosis G. C. Loveday, A. H Wheeler Publishing

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(SEMESTER SCHEME-2020-21)

SIMULATION SOFTWARE LAB

Course Code	EL 40082(Same as EF/ER 40082)
Course Title	Simulation Software Lab
Number of Credits	1 (L-0,T-0, P-2)
Prerequisites	NIL
Course Category	PE

Course Outcomes: After successful completion of the course students should be able to:

1. Design the electronics circuits using software tools like NGspice/LTSpice/Multisim.
2. Simulate various analog and digital circuits using NGspice/LTSpice/Multisim
3. Able to design PCB for given circuit using PCB Software like EAGLE, ExpressPCB, and OrCAD.
4. Use open source SCILAB tool and write simple programs
5. Plot various waveforms using SCILAB.
6. Simulate basic electronic system blocks using SCILAB

PRACTICALS:-

1. Simulation of one rectifier circuit and one clipper/clamper circuit.
2. Simulation of any one transistor biasing circuit.
3. Simulation of CE single/double stage amplifier circuit.
4. Simulation of any one power amplifier circuit.
5. Simulation of any one JFET/MOSFET amplifier circuit.
6. Simulation of any one negative feedback circuit.
7. Simulation of encoder/multiplexer circuit.
8. Simulation of decoder/de multiplexer circuit.
9. Simulation of any one flip-flop circuit using gates.
10. Simulation of any one register/counter circuit.
11. Design of PCB for any one circuit from experiment 1 to 6.
12. Design of PCB for any one circuit from experiment 7 to 10.
13. Plot the sine, cosine, triangle and exponential waveform using SCILAB.
14. Plot sampled sine, cosine, triangle and exponential waveform using SCILAB.
15. Study of Simulink. (Only source and sink available in Simulink library).

REFERENCES /SUGGESTED LEARNING RESOURCES:

NGspice, LTSpice,MULTISIM, Orcad, Proteus or other open source PCB design tools, SCILAB
Website: http://www.scilab.org/ (To download SCILAB open source software)
http://www.linear.com/,
http://www.expresspcb.com/
http://ngspice.sourceforge.net/

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(SEMESTER SCHEME-2020-21)
Syllabus

LINEAR INTEGRATED CIRCUITS LAB

Course Code	EL 40091(Same as EF/ER 40091)
Course Title	Linear Integrated Circuits Lab
Number of Credits	1 (L-0,T-0, P-2)
Prerequisites	NIL
Course Category	PE

PRACTICAL OUTCOMES (PROs)

PRACTICALS:

1. Operational Amplifiers (IC741)-Characteristics and Application.
2. Waveform Generation using Op-Amp (IC741).
3. Applications of Timer IC555.
4. Design of Active filters.
5. Study and application of PLL IC's
6. Design of binary adder and subtractor.
7. Design of counters.
8. Study of multiplexer and Demultiplexer /decoders.
9. Implementation of combinational logic circuits.
10. Study of DAC and ADC
11. Op-Amp voltage Regulator- IC 723

REFERENCES /SUGGESTED LEARNING RESOURCES

1. Design with operational amplifiers and analog integrated circuits, 3rd Edition Sergio Franco Tata McGraw-Hill, 2007
2. Linear Integrated Circuits, D.Roy Choudhry, Shail Jain New Age International Pvt. Ltd
3. System design using Integrated Circuits B.S.Sonde New Age Pub, 2nd Edition, 2001
4. Analysis and Design of Ana- log Integrated Circuits Gray and Meyer Wiley International, 2005.
5. OP-AMP and Linear Ics Ramakant A.Gayakwad Prentice Hall / Pearson Education, 4th Edition, 2001
6. Operational Amplifier and Linear Integrated Circuits K Lal Kishore Pearson Education, 2006

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(SEMESTER SCHEME-2020-21)

POWER ELECTRONICS LAB

Course Code	EL 40092(Same as EF/ER/RA 40092)
Course Title	Power Electronics Lab
Number of Credits	1 (L-0,T-0, P-2)
Prerequisites	NIL
Course Category	PE

PRACTICAL OUTCOMES (PROs)

PRACTICALS:

1. Test the performance of IGBT
2. Test the performance of GTO
3. Test the performance of TRIAC for AC load control
4. Troubleshoot Snubber circuits
5. Troubleshoot SCR commutating circuits.
6. Simulate chopper circuit, observe and print the various wave forms.
7. Test the Speed control of DC motor using chopper circuits
8. Test the Speed control of motor using PLL method.

REFERENCES /SUGGESTED LEARNING RESOURCES

1. Power Electronics Rashid, Muhammad H. PHI Learning, and New Delhi latest edition
2. Power Electronics Gupta, B. R., Singhal V. S.K. Kataria and sons, New Delhi

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(SEMESTER SCHEME-2020-21)

ESSENCE OF INDIAN KNOWLEDGE AND TRADITION

Course Code	EL 4222(Common in all branches of Engg.)
Course Title	Essence of Indian Knowledge and Tradition
Number of Credits	0(L-2,T-0, P-0)
Prerequisites	None
Course Category	AU

COURSE CONTENTS:

Basic Structure of Indian Knowledge System:

(i)वेद,

(ii)उनवेद (आयुवेद,धनुवेद,गाधवेद,थानयआदद)

(iii)वेदथाथांग (िश³था, कलन, ननत, थाकरण, sयोनतषछथांद), (iv)उनथाइग (धमशथाą रु थाथ ांसथा, नुरथाण, तकशरथाą)

- Modern Science and Indian Knowledge System
- Yoga and Holistic Health care
- Case Studies.

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. V. Sivarama Krishna, " Cultural Heritage of India- Course Material", Bhartiya Vidya Bhavan, Mumbai, fifth Edition, 2014.
2. Swami Jitatmanand, " Modern Physics and Vedant", Bhartiya Vidya Bhavan.
3. Fritz of Capra, " The wave of Life".
4. Fritz of Capra, " Tao of Physics".
5. V N Jha, " Tarka sangraha of Annam Bhatta, International" Cinmay Foundation, Velliarnad, Amakuam.
6. R N Jha, " Science of Consciousness Psychotheraphy and Yoga Practices" Vidya nidhi Prakasham, Delhi, 2016.

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(SEMESTER SCHEME-2020-21)

GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR

SEMESTER SCHEME-2020-21

V SEMESTER

(SESSION 2021-2022 & ONWARDS)

Sunrise University

EMBEDDED SYSTEMS

Course Code	EL 5001(Same as EF/ER 5001)
Course Title	Embedded Systems
Number of Credits	4 (L-4, T-0, P-0)
Prerequisites	NIL
Course Category	PC

COURSE CONTENTS:

UNIT I –

Embedded C basics operators for Arduino
Familiarizing with the Arduino IDE
Sketch designing for Arduino Communication interfaces using serial port
Basic understanding of the code with Boolean operations, pointer access operations, bitwise operations, compounded operations.

UNIT II –

Embedded C control structure blocks
looping mechanism – for, do and while
The branching operations based on conditions expression

UNIT III

Introduction to Arduino Mega
Arduino Mega specifications including power ratings, digital and analog peripherals.
Difference between the C language and Embedded C language
Arduino Mega Ports, Pins, Digital and Analog Peripherals

UNIT IV

Communication with Arduino
Different communication modules available with their real-life application Communication interface

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Arduino Projects For Dummies (For Dummies Series) Kennedy George; Davis Bernard; Prasanna SRM Wiley (5 July 2013) ISBN: 978-1118551479

2. Make: Getting Started With Arduino - The Open Source Electronics Prototyping Platform Massimo Banzi and Michael Shiloh Shroff/Maker Media; Third edition (27 December 2014) ISBN : 978-9351109075

SUGGESTED SOFTWARE/LEARNING WEBSITES:

https://www.arduino.cc/reference/en/
https://learn.adafruit.com/category/learn-arduino

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(SEMESTER SCHEME-2020-21)
SUBJECT SYLLABUS

MOBILE AND WIRELESS COMMUNICATION

Course Code	EL 5002(Same as EF 5002)
Course Title	Mobile and Wireless Communication
Number of Credits	3 (L-3, T-0, P-0)
Prerequisites	NIL
Course Category	PC

COURSE CONTENTS:

UNIT I –

Overview of Cellular Systems
Evolution 2g/3G/4G/5G
Cellular Concepts – Frequency reuse, Co channel and Adjacent channel Interference

UNIT II –

Wireless propagation
Link budget, Free-space path loss, Noise figure of receiver
Multipath fading, Shadowing, Fading margin, shadowing margin

UNIT III

Antenna diversity,
wireless channel capacity
MIMO

UNIT IV

Overview of
CDMA
OFDM
LTE

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Wireless Communications – Principles and Practice T. S. Rappaport, (2nd edition) Pearson ISBN 9788131731864
2. Modern Wireless Communications Haykin & Moher Pearson 2011 (Indian Edition) ISBN: 978-8131704431

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(SEMESTER SCHEME-2020-21)
SUBJECT TO REVISION

ECONOMIC POLICIES IN INDIA

Course Code	EL 51001(Common in all branches of Engg.)
Course Title	Economic Policies in India
Number of Credits	3 (L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES:

The objective of this course is to familiarize the students of different streams with the basic concepts, structure, problems and issues concerning Indian economy.

CO1	Understand Indian economics policy, planning strategies
CO2	It will enable to students to comprehend theoretical and empirical development across countries and region for policy purposes
CO3	Development Economics as a discipline encompasses different approach estotheproblemsofunemployment,poverty,incomegeneration,industrializationfromdifferentperspec-tives
CO4	Abletoidentifytheproblemsandcapabletodecidetheapplicationforfuturedevelopment
CO5	Analyzeeconomicissuesandfindsolutionstocomplexeconomicproblemsandtakecor-recteconomicjudgment

COURSE CONTENTS:

1. **BASIC FEATURES AND PROBLEMS OF INDIAN ECONOMY:**
   Economic History of India;
   Nature of Indian Economy
   Demographic features and Human Development Index,
   Problems of Poverty, Unemploy-ment, Inflation, income inequality, Blackmoney in India.

2. **SECTORAL COMPOSITION OF INDIAN ECONOMY:**
   Issues in Agriculture sector in India,
   land reforms
   Green Revolution
   agriculture policies of India,
   2.5.

3. **INDUSTRIAL DEVELOPMENT,**
   Small scale and cottage industries,
   Industrial Policy,
   Public sector in India,
   Service sector in India.

4. **ECONOMIC POLICIES:**
   Economic Planning in India,
   Planning commission v/s NITI Aayog,
   Five Year Plans,
   Monetary policy in India,
   Fiscal Policy in India,
   Centre state Finance Relations,
   Finance commission in India
   LPG policy in India

5. **EXTERNAL SECTOR IN INDIA**

(SEMESTER SCHEME 2020-21)

India’s foreign trade value composition and direction,
India Balance of payment since 1991,
FDI in India,
Impact of Globalization on Indian Economy,
WTO and India.

REFERENCE BOOKS:

1. Dutt Rudder and K.P.M Sunderam (2017). Indian Economy .S Chand & Co.Ltd. New Delhi.
2. Mishra S. K & V. K Puri (2017). Indian Economy and Its Development Experience. Himalaya Publishing House.
3. Singh, Ramesh, (2016): Indian Economy, Tata-McGraw Hill Publications, New Delhi.
4. Dhingra, I.C., (2017): March of the Indian Economy, Heed Publications Pvt. Ltd.
5. Karam Singh Gill, (1978): Evolution of the Indian Economy, NCERT, NewDelhi
6. Kaushik Basu (2007): The Oxford Companion to Economics of India ,Oxford University Press.

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(SEMESTER SCHEME-2020-21)
Sunrise University

ENGINEERING ECONOMICS & ACCOUNTANCY

Course Code	EL 51002(Common in all branches of Engg.)
Course Title	Engineering Economics & Accountancy
Number of Credits	3 (L:3,T:0,P:0)
Prerequisites	NIL
Course Category	OE

COURSE OBJECTIVES

•To acquire knowledge of basic economicst of a cilitate the process of economic decision making.
•To acquire knowledge on basic financial management aspects.
•To develop the basic skills to analyze financial statements.

COURSE OUTCOMES:

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

CO1	Understand the macro-economic environment of the business and its impact on enterprise
CO2	Understand cost elements of the product and its effect on decision making
CO3	Prepare accounting records and summarize and interpret the accounting datafor managerial decisions
CO4	Understand accounting systems and analyze financial statements using ratio analysis
CO5	Understand the concepts of financial management and investment

COURSE CONTENTS

1. INTRODUCTION:

Managerial Economics;
Relationship with other disciplines;
Firms: Types, objectives and goals;
Managerial decisions;
Decision analysis.

2. DEMAND & SUPPLY ANALYSIS:

Demand;
Types of demand;
Determinants of demand;
Demand function;
Demand elasticity;
Demand forecasting;
Supply;
Determinants of supply;
Supply function;
Supply elasticity.

3. PRODUCTION AND COST ANALYSIS:

Production function;
Returns to scale;
Production optimization;
Least cost input; Iso quants;
Managerial uses of production function;
Cost Concepts;
Cost function;

(SEMESTER SCHEME-2020-21)

Types of Cost;
Determinants of cost;
Short run and Long run cost curves;
Cost Output Decision;
Estimation of Cost.

4. PRICING:

Determinants of Price;
Pricing under different objectives and different market structures;
Price discrimination;
Pricing methods in practice;
Role of Government in pricing control.

5. FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT):

Balance sheet and related concepts;
Profit & Loss Statement and related concepts;
Financial Ratio Analysis;
Cash flow analysis;
Funds flow analysis;
Comparative financial statements;
Analysis & Interpretation of financial statements;
Investments;
Risks and return evaluation of investment decision;
Average rate of return;
Payback Period;
Net Present Value;
Internal rate of return,

REFERENCE BOOKS:

1. Mc Guigan, Moyer and Harris,' Managerial Economics; Applications, Strategy and Tactics', Thomson South Western, 10th Edition, 2005.

2. Prasanna Chandra. 'Fundamentals of Financial Management', Tata Mcgraw Hill Publishing Ltd., 4th edition,2005.

3. Samuelson. Paul A and Nordhaus W. D., 'Economics', Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2004.

4. Paresh Shah, 'Basic Financial Accounting for Management', Oxford University Press, NewDelhi, 2007.

5. Salvatore Dominick, 'Managerial Economics in a global economy'. Thomson SouthWestern, 4th Edition, 2001.

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(SEMESTER SCHEME-2020-21)
Sumitsc University

INDUSTRIAL AUTOMATION

Course Code	EL 50031(Same as EF/ER/RA 50031)
Course Title	Industrial Automation
Number of Credits	3 (L-3, T-0, P-0)
Prerequisites	NIL
Course Category	PE

COURSE CONTENTS:

UNIT I -

Industrial automation overview and data acquisition
Architecture of Industrial Automation Systems.
Measurement Systems Characteristics
Data Acquisition Systems

UNIT II -

Control Generation
Introduction to Automatic Control
P-I-D Control
Feed-forward Control Ratio Control
The branching operations based on conditions expression

UNIT III

Sequential control and PLC
Introduction to Sequence Control, PLC, RLL
PLC Hardware Environment

UNIT IV

Industrial control application
Hydraulic Control Systems
Pneumatic Control Systems
Energy Savings with Variable Speed Drives
Introduction to CNC Machines

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Industrial Instrumentation, Control and Automation S.Mukhopadhyay, S. Sen and A. K. Deb Jaico Publishing House, 2013 ISBN: 978-8184954098
2. Electric Motor Drives, Modelling, Analysis and Control R. Krishnan Prentice Hall India, 2002 ISBN: 978-0130910141

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(SEMESTER SCHEME-2020-21)
SUTHES University

CONTROL SYSTEM AND PLC

Course Code	EL 50032(Same as EF/ER/RA 50032)
Course Title	Control System And PLC
Number of Credits	3 (L-3, T-0, P-0)
Prerequisites	NIL
Course Category	PE

COURSE CONTENTS:

UNIT I BASICS OF CONTROL SYSTEM

Basics of control system diagram and practical examples
Classification of control systems:-
Open loop and closed loop systems
Linear and non-linear systems
transfer function

UNIT II TIME DOMAIN STABILITY ANALYSIS

Transient and steady state response
standard test inputs: Step, Ramp, Parabolic, Impulse and their corresponding Laplace transform
analysis of second order control system: analysis for unit step input, concept, definition, effect of damping.
steady state analysis: type 0, 1, 2 systems, steady state error and error constants, numerical problems

UNIT III PROCESS CONTROLLERS

Process control system: block diagram, functions of each block
control actions: discontinuous mode, continuous mode
composite controllers: PI, PD, PID controllers- output equation, response

UNIT IV FUNDAMENTALS OF PLC

PLC: block diagram, classification, needs and benefits of PLCs in automation
descriptions of different parts of PLC: CPU function, scanning cycle, speed of execution, memory, i/o modules
PLC installation

UNIT V PLC HARDWARE AND PROGRAMMING

Discrete input modules: block diagram, specifications of AC input modules and DC input module. Sinking and Sourcing concept in DC input modules
discrete output modules: block diagram, description, specifications of AC output module and DC output modules
analog input and output modules: block diagram and specifications
I/O addressing of PLC: addressing data files, format of logical address, different addressing types
PLC programs using Ladder programming language.

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Modern control engineering Ogata K. PHI 5th edition New Delhi
2. Programmable Logic Controllers Petruzella F.D. TMH 3rd edition New Delhi

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(SEMESTER SCHEME-2020-21)

MICROWAVE AND RADAR

Course Code	EL 50041(Same as EF 50041)
Course Title	Microwave And Radar
Number of Credits	3 (L-3, T-0, P-0)
Prerequisites	NIL
Course Category	PE

COURSE CONTENTS:

UNIT I –

Introduction to Microwaves, History and applications of Microwaves
Mathematical Model of Microwave Transmission-Microwave transmission modes, wave- guides and transmission lines, Impedance Matching
Microwave Network Analysis

UNIT II –

Passive and Active Microwave Devices
Directional Coupler, Power Divider, Attenuator, Resonator.
Microwave active components: Diodes, Transistors, Microwave Tubes

UNIT III –

Microwave Design Principles
Microwave Filter Design
Microwave Amplifier Design
Microwave Mixer Design
Microwave Oscillator Design
Microwave Antennas

UNIT IV –

Microwave Measurements,
Microwave Systems,
Effect of Microwaves on human body

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Microwave Engineering D.M. Pozar Wiley; Fourth edition (2013) ISBN 978-8126541904
2. Foundation for Microwave Engineering R.E. Collins Wiley; Second edition (2007) ISBN : 978-8126515288

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(SEMESTER SCHEME-2020-21)
SUNRISE UNIVERSITY

OPTICAL COMMUNICATION AND NETWORKING

Course Code	EL 50042
Course Title	Optical Communication And Networking
Number of Credits	3 (L-3, T-0, P-0)
Prerequisites	NIL
Course Category	PE

UNIT I INTRODUCTION TO OPTICAL FIBERS

Element of an Optical Fiber Transmission link—
Total internal reflection-Acceptance angle –Numerical aperture
Optical Fiber Modes and Configurations
Single Mode Fibers-Graded Index fiber structure.

UNIT II SIGNAL DEGRADATION OPTICAL FIBERS

Attenuation - Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses,
Signal Distortion in Optical Wave guides-Information Capacity determination -Group Delay-Material Dispersion, Wave guide Dispersion,
Signal distortion in SM fibers-Polarization Mode dispersion, Intermodal dispersion, Pulse Broadening in GI fibers- Mode Coupling -Design Optimization of SM fibers-RI profile and cut-off wavelength.

UNIT III FIBER OPTICAL SOURCES AND COUPLING

LED structures -Light source materials -Quantum efficiency and LED power, Modulation of a LED, lasers Diodes-Modes and Threshold condition -Rate equations -External Quantum efficiency -Resonant frequencies -Laser Diodes, Temperature effects,
Fiber -to- Fiber joints, Fiber splicing-Signal to Noise ratio , Detector response time.

UNIT IV FIBER OPTIC RECEIVER AND MEASUREMENTS

Fundamental receiver operation, Pre amplifiers, Error sources – Receiver Configuration– Probability of . Error– Quantum limit
Fiber Attenuation measurements- Dispersion measurements – Fiber Refractive index profile measurements

UNIT V OPTICAL NETWORKS AND SYSTEM TRANSMISSION

Basic Networks – SONET / SDH – Broadcast – and –select WDM Networks –Wavelength Routed . . Networks
Non linear effects on Network performance –-
Link Power budget -Rise time budget- Noise Effects on System Performance-Operational Principles of . WDM Performance of WDM + EDFA system – Solutions – Optical CDMA – Ultra High Capacity . . . . Networks

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Govind P. Agrawal, “Fiber Optic Communication Systems”, John Wiley, 3rd Edition, 2004
2. Joseph C. Plais, “Fiber Optic Communication”, Pearson Education, 4th Ed, 2004.

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(SEMESTER SCHEME-2020-21)
SUBJECT COPY

EMBEDDED SYSTEMS LAB

Course Code	EL 5005(Same as EF/ER 5005)
Course Title	Embedded Systems Lab
Number of Credits	1 (L-0, T-0, P-2)
Prerequisites	NIL
Course Category	PC

PRACTICALS:-

1. Built-in LED state control by push button sketch implementation
2. Built-in LED blinking sketch implementation
3. Built-in LED blinking by toggling states based on binary operation
4. Built-in LED state control by user interface through serial port
5. User interface for Boolean operation and bit wise operation through serial port
6. User interface for compounded operation through serial port
7. Looping mechanism to check the state of pin and if change print its status on serial port
8. Controlling multiple LEDs with a loop and an array
9. Use a potentiometer to control the blinking of an LED
10. Uses an analog output (PWM pin) to fade an LED.
11. Servo Motor Control using PWM
12. Temperature sensor interfacing and sending its reading over serial port
13. I2C light sensor interfacing and sending its reading over serial port

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Arduino Projects for Dummies (For Dummies Series) Kennedy George; Davis Bernard; Prasanna SRM Wiley (5 July 2013) ISBN: 978-1118551479

2. Make: Getting Started With Arduino - The Open Source Electronics Prototyping Platform Massimo Banzi and Michael Shiloh Shroff/Maker Media; Third edition (27 December 2014) ISBN : 978-9351109075

SUGGESTED SOFTWARE/LEARNING WEBSITES:

https://www.arduino.cc/reference/en/
https://learn.adafruit.com/category/learn-arduino

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(SEMESTER SCHEME 2020-21)

MOBILE AND WIRELESS COMMUNICATION LAB

Course Code	EL 5006(Same as EF 5006)
Course Title	Mobile And Wireless Communication Lab
Number of Credits	1 (L-0, T-0, P-2)
Prerequisites	NIL
Course Category	PC

SUGGESTED PRACTICALS/ EXERCISES

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:-

1. To understand the cellular frequency reuse concept to find the co-channel cells for a particular cell.
2. To understand the path loss
3. Understand the path loss with shadowing
4. Understanding the Flat fading
5. Understanding the Frequency selective fading
6. Understanding the Multipath channel for the following objectives
   No Fading
   Flat Fading
   Dispersive Fading
7. To simulate a dipole antenna (λ, $\lambda/4$, $\lambda/2$, $3\lambda/2$) for a particular frequency using 4NEC2
8. Perform following experiments using CDMA trainer kit
   PSK modulation and demodulation experiment
   Bit synchronization extraction experiment
   Error correction encoding experiment

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Wireless Communications – Principles and Practice T. S. Rappaport, (2nd edition) Pearson ISBN 9788131731864
2. Modern Wireless Communications Haykin & Moher Pearson 2011 (Indian Edition) ISBN: 978-8131704431

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(SEMESTER SCHEME-2020-21)
SUBJECT SYLLABUS

INDUSTRIAL AUTOMATION LAB

Course Code	EL 50071(Same as EF/ER/RA 50071)
Course Title	Industrial Automation Lab
Number of Credits	1 (L-0, T-0, P-2)
Prerequisites	NIL
Course Category	PE

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:-

1. Develop a data acquisition system using Arduino
2. Temperature control system using PID
3. Level control system based on error feedback
4. PLC programming using Relay ladder Logic for AND , OR XOR and NOR gate
5. PLC, RLL programming using CASCADE method
6. PLC timer, counter, registers and analog input/output functions
7. Variable Speed drive of an induction motor
8. PLC/ microcontroller based computer numerical control machine job completion

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Industrial Instrumentation, Control and Automation S.Mukhopadhyay,S, S. Sen and A. K. Deb Jaico Publishing House, 2013 ISBN: 978-8184954098
2. Electric Motor Drives, Modelling, Analysis and Control R. Krishnan Prentice Hall India, 2002 ISBN: 978-0130910141

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(SEMESTER SCHEME-2020-21)
SUBJECT SCHEME-2020-21

CONTROL SYSTEM AND PLC LAB

Course Code	EL 50072(Same as EF/ER/RA 50072)
Course Title	Control System And PLC Lab
Number of Credits	1 (L-0, T-0, P-2)
Prerequisites	NIL
Course Category	PE

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:-

1. Different Toolboxes in MATLAB, Introduction to Control Systems Toolbox or its equivalent open source freeware Software like Scilab using Spoken Tutorial MOOCs.
2. Determine the transfer function for given closed loop system in block diagram representation.
3. Plot unit step response of given transfer function and find delay time, rise time, peak time and peak overshoot
4. Using MATLAB/SCILAB
   a) Simulation of a typical second order system and determination of step response and evaluation of time domain specifications
   b) Evaluation of the effect of additional poles and zeroes on time response of second order system
   c) Evaluation of effect of pole location on stability d) Effect of loop gain of a negative feedback . . system on stability
5. To study the effect of P, PI, PD and PID controller on step response of a feedback control system (Using control engineering trainer/process control simulator). Verify the same by simulation
6. Components/sub-components of a PLC, Learning functions of different modules of a PLC system
7. Practical steps in programming a PLC (a) using a Hand held programmer (b) using computer interface
8. Introduction to step 5 programming language, ladder diagram concepts, instruction list syntax
9. Basic logic operations, AND, OR, NOT functions
10. Logic control systems with time response as applied to clamping operation

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Modern control engineering Ogata K. PHI 5th edition New Delhi
2. Programmable Logic Controllers Petruzella F.D. TMH 3rd edition New Delhi

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(SEMESTER SCHEME 2020-21)

MICROWAVE AND RADAR LAB

Course Code	EL 50081(Same as EF 50081)
Course Title	Microwave And Radar Lab
Number of Credits	1 (L-0, T-0, P-2)
Prerequisites	NIL
Course Category	PE

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:-

1. To study wave guide components.
2. To study the characteristics of Gunn oscillator Gun diode as modulated source.
3. Introduction to Smith chart and its application for the unknown impedance measurement.
4. Study the behaviour of impedance matching for passive networks using Smith chart.
5. To study loss and attenuation measurement of attenuator
6. Construct a cavity resonator in waveguide and study its characteristics using the network analyzer and a frequency Counter.
7. To determine the frequency and wavelength in a rectangular wave- guide working in TE10 mode

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Microwave Engineering D.M. Pozar Wiley; Fourth edition (2013) ISBN 978-8126541904
2. Foundation for Microwave Engineering R.E. Collins Wiley; Second edition (2007) ISBN : 978-8126515288

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(SEMESTER SCHEME-2020-21)
SCHEME 2020-21

OPTICAL COMMUNICATION AND NETWORKING LAB

Course Code	EL 50082
Course Title	Optical Communication And Networking Lab
Number of Credits	1 (L-0, T-0, P-2)
Prerequisites	NIL
Course Category	PE

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:-

1. To study the different types of optical fibres.
2. Study of optical sources: LED & LASER
3. measurement of the numerical aperture
4. dc characteristics of led and laser diodes
5. propagation loss and bending loss in single mode optical glass fiber
6. data communication system usinga fiber- optic system
7. mode characteristics of single mode fiber

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Govind P. Agrawal, "Fiber Optic Communication Systems", John Wiley, 3rd Edition, 2004
2. Joseph C. Plais, "Fiber Optic Communication", Pearson Education, 4th Ed, 2004.

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(SEMESTER SCHEME-2020-21)

GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR

SEMESTER SCHEME-2020-21

VI SEMESTER

(SESSION 2021-2022 & ONWARDS)

Sunrise University

ENTREPRENEURSHIP AND START-UPS

Course Code	EL 6111(Common in all branches of Engg.)
Course Title	Entrepreneurship and Start-ups
Number of Credits	4 (L-3,T-1, P-0)
Prerequisites (Course code)	None
Course Category	HS

COURSE LEARNING OBJECTIVES:

1. Acquiring Entrepreneurial spirit and resourcefulness.
2. Familiarization with varioususes ofhuman resource for earning dignified means of living.
3. Understanding the concept and process of entrepreneurship-its contribution and role in the growth and development of individual and the nation.
4. Acquiring entrepreneurial quality, competency, and motivation.
5. Learning the process and skills of creation and management of entrepreneurial venture.

LEARNING OUTCOME:

Upon completion of the course, these student will be able to demonstrate knowledge of the following topics:

1. Understanding the dynamic role of entrepreneurship and small businesses
2. Organizing and Managing a Small Business
3. Financial Planning and Control
4. Forms of Ownership for Small Business
5. StrategicMarketing Planning
6. New Productor Service Development
7. Business Plan Creation

COURSE CONTENTS:

1. INTRODUCTION TO ENTREPRENEURSHIP AND START–UPS

Definitions, Traits of an entrepreneur, Intrapreneurship, Motivation
Types of Business Structures,
Similarities / differences between entrepreneurs and managers.

2. BUSINESS IDEAS AND THEIR IMPLEMENTATION

Discovering ideas and visualizing the business
Activity map
Business Plan

3. IDEA TO START-UP

Market Analysis– Identifying the target market,
Competition evaluation and Strategy Development,
Marketing and accounting,
Risk analysis

4. MANAGEMENT

Company's Organization Structure,
Recruitment and management of talent.
Financial organization and management

5. FINANCING AND PROTECTION OF IDEAS

Financing methods available for start-ups in India
Communication of Ideas to potential investors– Investor Pitch

(SEMESTER SCHEME 2020-21)
SGBAU University

Patenting and Licenses

6. EXIT STRATEGIES FOR ENTREPRENEURS ,BANKRUPTCY, AND SUCCESSION AND HARVESTING STRATEGY

SUGGESTED LEARNING RESOURCES:

S.No.	Title of Book	Author	Publication
1.	The Startup Owner's Manual: The Step by-Step Guide for Building a Great Company	Steve Blank and Bob Dorf	K & S Ranch ISBN–978-0984999392
2.	The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses	Eric Ries	Penguin UK ISBN–978-0670921607
3.	Demand: Creating What People Love Before They Know They Want It	Adrian J. Slywotzky with Karl Weber	Headline Book Publishing ISBN–978-0755388974
4.	The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business	Clayton M. Chris Tensen	Harvard business ISBN:978-142219602

SUGGESTEDSOFTWARE/LEARNINGWEBSITES:

a. https://www.fundable.com/learn/resources/guides/startup
b. https://corporatefinanceinstitute.com/resources/knowledge/finance/corporatehstructure/
c .https://www.finder.com/small-business-finance-tips
d. https://www.profitbooks.net/funding-options-to-raise-startup-capital-for-your-business/

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(SEMESTER SCHEME 2020-21)
SUBJECT ONLY

PROJECT MANAGEMENT

CourseCode	EL 62001(Common in all branches of Engg.)
CourseTitle	Project Management
NumberofCredits	3(L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES

•To develop the idea of project plan, from defining and confirming the project goals and objectives, identifying tasks and how goals will be achieved.

•To develop an understanding of key project management skills and strategies.

COURSE OUTCOMES

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

CO1	Understand the importance of projects and its phases.
CO2	Analyze projects from marketing, operational and financial perspectives.
CO3	Evaluate projects based on discount and non-discount methods.
CO4	Develop network diagrams for planning and execution of a given project.
CO5	Apply crashing procedures for time and cost optimization.

COURSE CONTENTS

1. CONCEPT OF A PROJECT:
Classification of projects
Importance of project management
The project Life cycle
Establishing project priorities (scope-cost-time)
Project priority matrix
Work break down structure.

2. CAPITAL BUDGETING PROCESS:
Planning -Analysis-Selection-Financing-Implementation-Review.
Generation and screening of project ideas
Market and demand analysis
Demand forecasting techniques.
Market planning and marketing research process
Technical analysis

3. FINANCIAL ESTIMATES AND PROJECTIONS:
Cost of projects
Means of financing
Estimates of sales and production-cost of production
Working capital requirement and its financing
Profitability project , cash flow statement and balance sheet.

(SEMESTER SCHEME-2020-21)
Rajiv Gandhi University

Breakeven analysis.

4. BASIC TECHNIQUES IN CAPITAL BUDGETING:

Non discounting and discounting methods
pay-back period
Accounting rate of return
Net present value
Benefit cost ratio
Internal rate of return.
Project risk.
Social cost benefit analysis andeconomic rate of return.
Non-financial justification of projects**.**

5. PROJECT ADMINISTRATION:

Progress payments,
Expenditure planning,
Project scheduling and network planning,
Use of Critical Path Method(CPM),
Schedule of payments and physical progress,
time-cost trade off.
Concepts and uses of PERT
Cost as a function of time,
Project Evaluation and Review Techniques
Cost mechanisms.
Determination of least cost duration.
Post project evaluation.
Introduction to various Project management softwares.

REFERENCE BOOKS

1.Project planning, analysis, selection, implementation and review –Prasannachandra–Tata McGraw Hill
2.Project Management – the Managerial Process– Clifford F. Gray & Erik W. Larson-McGrawHill
3.Project management- David I Cleland- Mcgraw Hill International Edition, 1999
4.Project Management– Gopala krishnan– Mcmillan India Ltd.
5.Project Management- Harry – Maylor – Peason Publication

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(SEMESTER SCHEME-2020-21)
Suthisc University

RENEWABLE ENERGY TECHNOLOGIES

CourseCode	EL 62002(Common in all branches of Engg.)
CourseTitle	Renewable Energy Technologies
NumberofCredits	3 (L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES

•To understand present and future scenario of world energy use.
•To understand fundamentals of solar energy systems.
•To understand basics of wind energy.
•To understand bio energy and its usage in different ways.
•To identify different available non-conventional energy sources.

COURSE OUTCOMES

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

CO1	Understand present and future energy scenario of the world.
CO2	Understand various methods of solar energy harvesting.
CO3	Identify various wind energy systems.
CO4	Evaluate appropriate methods for Bio energy generations from various Bio wastes.
CO5	Identify suitable energy sources for a location.

COURSE CONTENTS

1. INTRODUCTION:

World Energy Use;
Reserves of Energy Resources;
Environmental Aspects OF Energy Utilisation;
Renewable Energy Scenario in India and around the World;
Potentials; Achievements/ Applications;
Economics of renewable energy systems.

2. SOLAR ENERGY:

Solar Radiation;
Measurements of Solar Radiation;
Flat Plate and Concentrating Collectors;
Solar direct Thermal Applications;
Solar thermal Power Generation
Fundamentals of Solar Photo Voltaic Conversion;
Solar Cells;
Solar PV Power Generation;
Solar PV Applications.

3. WIND ENERGY:

Wind Data and Energy Estimation;

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Subject to University

Types of Wind Energy Systems;
Performance; Site Selection;
Details of Wind Turbine Generator;
Safety and Environmental Aspects.

4. BIO-ENERGY:

Bio mass direct combustion;
Bio mass gasifiers;
Bio gas plants;
Digesters;
Ethanol production;
Bio diesel;
Cogeneration;
Bio mass Applications.

5. OTHER RENEWABLE ENERGY SOURCES:

Tidal energy;
Wave Energy;
Open and Closed OTEC Cycles;
Small Hydro Geothermal Energy;
Hydrogen and Storage;
Fuel Cell Systems;
Hybrid Systems.

REFERENCE BOOKS

1. Non-Conventional Energy Sources, Rai. G. D., Khanna Publishers, New Delhi, 2011.
2. Renewable Energy Sources, Twidell, J.W. & Weir, A., EFN SponLtd.,UK,2 006.
3. Solar Energy, Sukhatme. S. P., Tata Mc Graw Hill Publishing CompanyLtd. ,New Delhi, 1997.
4. Renewable Energy, Power for a Sustainable Future, Godfrey Boyle, Oxford University Press, U.K., 1996.
5. Fundamental of Renewable Energy Sources, G N Tiwari and M K Ghoshal, Narosa, New Delhi, 2007.
6. Renewable Energy and Environment A Policy Analysis for India ,NH Ravindranath, U K Rao, B Natarajan, P Monga, Tata McGraw Hill.
7. Energy and The Environment, R A Ristinen and J J Kraushaar, second edition, John Willey & Sons, New York, 2006.
8. Renewable Energy Resources, J W T widell and A D Weir, ELBS, 2006.

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(SEMESTER SCHEME-2020-21)
Sunrise University

PRODUCT DESIGN

CourseCode	EL 63001(Common in all branches of Engg.)
CourseTitle	Product Design
NumberofCredits	3 (L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES

•To acquire the basic concepts of product design and development process

•To understand the engineering and scientific process in executing a design from concept to finished product

•To study the key reasons for design or redesign.

COURSE OUTCOMES

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

CO1	Understand the basic concepts of product design and development process.
CO2	Illustrate the methods to define thecustomer needs.
CO3	Describe an engineering design and development process.
CO4	Understand the intuitive and advanced methods used to develop and evaluate a concept.
CO5	Apply modelling and embodiment principles in product design and development process.

COURSE CONTENTS

1. DEFINITION OF A PRODUCT

Types of product;
Levels of product;
Product-market mix;
New prod-uct development (NPD) process;
Idea generation methods;
Creativity;
Creative attitude;
Creative design process;
Morpho logical analysis;
Analysis of inter-connected decision areas;
Brain storming.

2. PRODUCT LIFECYCLE;

The challenges of Product development;
Product analysis;
Product characteristics;
Economic considerations;
Production and Marketing aspects;
Characteristics of successful Product development;
Phases of a generic product development process;
Customer need identification;
Product development practices and industry-product strategies.

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Sharda University

3. PRODUCT DESIGN

Design by evolution;
Design by innovation;
Design by imitation;
Factors affecting product design;
Standards of performance and environmental factors;
Decision making and iteration;
Morphology of design (different phases);
Role of aesthetics in design.

4. INTRODUCTION TO OPTIMIZATION IN DESIGN

Economic factors in design;
Design for safety and reliability;
Role of computers in design;
Modeling and Simulation;
The role of models in engineering design;
Mathematical modeling;
Similitude and scale models;
Concurrent design;
Six sigma and design for six sigma;
Introduction to optimization in design;
Economic factors and financial feasibility in design;
Design for manufacturing;
Rapid Proto typing (RP);
Application of RP in product design;
Product Development versus Design.

5. DESIGN OF SIMPLE PRODUCTS DEALING WITH VARIOUS ASPECTS OF PRODUCT DEVELOPMENT;

Design Starting from need till the manufacture of the product

REFERENCE BOOKS

1. Product Design and Development, Karl T.Ulrichand Steven D.Eppinger, TataMc Graw–Hill edition.
2. Engineering Design– George E. Dieter.
3. An Introduction to Engineering Design methods Vijay Gupta.
4. Merie Crawford: New Product management, McGraw-Hill Irwin.
5. Chitale A K and Gupta R C," Product Design and Manufacturing", Prentice Hall of India, 2005.
6. Kevin Otto and Kristin Wood, Product Design, Techniques in Reverse Engineering and New Product Development, Pears on education.

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(SEMESTER SCHEME-2020-21)
Suthers University

DISASTER MANAGEMENT

Course Code	EL 63002(Common in all branches of Engg.)
Course Title	Disaster Management
Number of Credits	3 (L: 3, T: 0 ,P :0)
Prerequisites	NIL
Course Category	OE

COURSE LEARNING OBJECTIVES

Following are the objectives of this course:
•To learn about various types of natural and man-made disasters.
•To know pre and post-disaster management for some of the disasters.
•To know about various information and organizations in disaster management in India.
•To get exposed to technological tools and their role in disaster management.

COURSE OUTCOMES:

After competing this course, student will be:
Acquainted with basic information on various types of disasters
Knowing the precautions and awareness regarding various disasters
Decide first action to be taken under various disasters
Familiarised with organization in India which are dealing with disasters
Able to select IT tools to help in disaster management

COURSE CONTENTS

1. UNDERSTANDING DISASTER

Understanding the Concepts and definitions of Disaster,
Hazard,
Vulnerability,
Risk,
Capacity–Disaster and Development,
Disaster management.

2. TYPES, TRENDS, CAUSES, CONSEQUENCES AND CONTROL OF DISASTERS

Geological Disasters (earth quakes, land slides,tsunami, mining);
Hydro-Meteorological Di-sasters (floods, cyclones, lightning, thunder-storms, hailstorms, avalanches, droughts, cold and heat waves)
Biological Disasters (epidemics, pestattacks, forestfire);
Technological Disasters (chemical, industrial, radiological, nuclear)
Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters)
Global Disaster Trends
Emerging Risks of Disasters
Climate Change and Urban Disasters.

3. DISASTER MANAGEMENT CYCLE AND FRAME WORK

Disaster Management Cycle
Paradigm Shift in Disaster Management.
Pre-Disaster
Risk Assessment and Analysis,
Risk Mapping,
Zonation and Microzonation,
Prevention and Mitigation of Disasters,
Early Warning System
Preparedness,

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SAMPLE COPY

Capacity Development;
Awareness.
During Disaster
Evacuation
Disaster Communication
Search and Rescue
Emergency Operation Centre
Incident Comm and System
Relief and Rehabilitation
Post-disaster
Damage and Needs Assessment,
Restoration of Critical Infra structure
Early Recovery Reconstruction and Redevelopment;
IDNDR, Yokohama Stretegy, Hyogo Frame-work of Action.

4. DISASTER MANAGEMENT IN INDIA

Disaster Profile of India
Mega Disasters of India and Lessons Learnt.
Disaster Management Act 2005
Institutional and Financial Mechanism,
National Policy on Disaster Management,
National Guidelines and Plans on Disaster Management;
Role of Government (local, state and national),
Non-Government and Inter Governmental Agencies

5. APPLICATIONS OF SCIENCE AND TECHNOLOGY FOR DISASTER MANAGEMENT

Geo informatics in Disaster Management (RS, GIS, GPS and RS).
Disaster Communication System (Early Warning and Its Dissemination).
Land Use Planning and Development Regulations,
Disaster Safe Designs and Constructions,
Structural and Non Structural Mitigation of Disasters
S & T Institutions for Disaster Management in India

REFERENCES

1. Publications of National Disaster Management Authority (NDMA) on Various Templates and Guide lines for Disaster Management
2. Bhandani, R. K., An over view on natural & man-made disasters and their reduction, CSIR, New Delhi
3. Srivastava, H. N., and Gupta G. D. , Management of Natural Disasters in developing countries, Daya Publishers, Delhi
4. Alexander, David, Natural Disasters, Kluwer Academic London
5. Ghosh, G .K. ,Disaster Management, APH Publishing Corporation
6. Murthy, D. B. N., Disaster Management: Text & Case Studies, DEp & DEp Pvt. Ltd.

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(SEMESTER SCHEME-2020-21)
Suresh Gyan Vihar University

INDIAN CONSTITUTION

CourseCode	EL 6333(Common in all branches of Engg.)
CourseTitle	Indian Constitution
NumberofCredits	0 (L:2,T:0;P:0)
Prerequisites(Coursecode)	None
CourseCategory	AU

COURSE CONTENT

1. THE CONSTITUTION –

Introduction
The History of the Making of the Indian Constitution
Preamble and the Basic Structure, and its interpretation
Fundamental Rights and Duties and their interpretation
State Policy Principles

2. UNION GOVERNMENT

Structure of the Indian Union
President– Role and Power
Prime Minister and Council of Ministers
Lok Sabha and Rajya Sabha

3. STATE GOVERNMENT

Governor– Role and Power
Chief Minister and Council of Ministers
State Secretariat

4. LOCAL ADMINISTRATION

District Administration
Municipal Corporation
Zila Panchayat

5. ELECTION COMMISSION

Role and Functioning
Chief Election Commissioner
State Election Commission

SUGGESTED LEARNING RESOURCES:

S.No.	Title of Book	Author	Publication
1.	Ethics and Politics of the Indian Constitution	Rajeev Bhargava	Oxford University Press, New Delhi,
2.	The Constitution of India	B.L.Fadia	Sahitya Bhawan; New edition(2017)
3.	Introduction to the Constitution of India	D D Basu	Lexis Nexis; Twenty-Third 2018 edition

SUGGESTED SOFTWARE / LEARNING WEBSITES:

1. https://www.constitution.org/cons/india/const.html
2. http://www.legislative.gov.in/constitution-of-india
3. https://www.sci.gov.in/constitution
4. https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/

(SEMESTER SCHEME-2020-21)
SUBJECT TO University

COMPUTER NETWORKING AND DATA COMMUNICATION

Course Code	EL 6001
Course Title	Computer Networking And Data Communication
Number of Credits	4 (L-4, T-0, P-0)
Prerequisites	NIL
Course Category	PC

COURSE CONTENTS:

1. UNIT 1 – DATA COMMUNICATION

Introduction to data communication.

Concept of analog and digital signals, Bandwidth, Network architecture

Basics of OSI and TCP/IP reference models.

Types of Computer Networks – Personal Area Network, Local Area Network, Metropolitan Area Network, Wide Area Network, Internetwork.

Computer Network Topologies – Point to Point, Bus topology, Star topology, ring topology, mesh topology, tree topology, Daisy Chain, Hybrid Topology,

Computer Network Model. Transmission media, Wired and wireless connectivity

2. UNIT 2 – TRANSMISSION

Digital & Analog Transmission

Digital Transmission – Digital to Digital Conversion, Line Coding, Unipolar Encoding, Polar Encoding, Bipolar Encoding, block Coding

Analog Transmission - Analog-to-Digital Conversion, Digital to analog Conversion, Analog to Analog Conversion

Sampling, Quantization, Encoding, Transmission Modes

3. UNIT 3 – WIRELESS COMMUNICATION

Wireless Communication, Radio, Microwave, Infra-red, Light Transmission

Wireless Communication Standards, Characterization of the Wireless Channel, Receiver Techniques for Fading Dispersive Channels,

Mobility Management in Wireless Networks, Mobile IP, Mobile Ad hoc Networks, Ad hoc Routing Protocols, Performance Analysis of DSR and CBRP,

Cluster Techniques, Incremental Cluster Maintenance Scheme, and Space time coding for Wireless Communication.

4. UNIT 4 –DATA LINK

Data Link Layer Technologies.

Types of Network Routing, Network Layer Protocols. FDM, TDM and CDMA.

Circuit and packet switching. Frame relay and ATM switching. ISDN. Local area network protocols, Fibre optic networks. Satellite networks

Data link layer design issues: its functions and protocols. Internet protocol. Routing algorithms. Congestion control algorithms. IP addressing schemes, Internetworking and sub-netting.

Error Detection and Correction - Types of Errors, Detection, Correction Switching and Data link layer, data link control and protocol

5. UNIT 5 – TRANSMISSION MEDIA

Transmission Media & Transmission Control protocol.

Magnetic Media, Twisted Pair Cable, Coaxial Cable, Power Lines, Fiber Optics.

Protocol– Features, Header, Addressing, Connection Management, Error Control and Flow Control, Multiplexing, Congestion Control, Timer Management, Crash Recover

6. REFERENCES / SUGGESTED LEARNING RESOURCES:

1. Computer networking a top down Approach: J.F.Kurose Pearson
2. Computer Networks and Internet D.E. Comer Pearson
3. Wireless Communications: Principles and Practice, 2nd edition T. Rappaport Prentice Hall, 2002
4. Wireless Communication and Networking John W. Mark, Weihua Zhuang
5. Modelling and Analysis of Computer Communication Networks Jeremiah F. Hayes
6. Data communication & Networking Stallings

(SEMESTER SCHEME-2020-21)

7. SUGGESTED SOFTWARE/LEARNING WEBSITES:

1. www.tutorialspoint.com/data_communication_computer_network/data_communication_computer_network_tutorial.pdf
2. www. turbofuture.com/industrial/Elements-of-Electronic-Communications-System
3. www.st-andrews.ac.uk/~www_pa/Scots_Guide/iandm/part3/page1.html
4. www.antenna-theory.com/basics/main.php
5. www.explainthatstuff.com/antennas.html
6. www.circuitdiagram.org/am-radio-receiver-with-mk484.html
7. www.circuitstoday.com/single-chip-fm-radio-circuit

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(SEMESTER SCHEME-2020-21)
Sunrise University

COMPUTER NETWORKING AND DATA COMMUNICATION LAB

Course Code	EL 6002
Course Title	Computer Networking And Data Communication Lab
Number of Credits	1 (L-0,T-0, P-2)
Prerequisites	NIL
Course Category	PC

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:-

1. To study the different physical equipment used for networking
2. Study the different internetworking devices in a computer network
3. Study the working of basic networking commands
4. To study PC to PC communication using parallel port
5. Study of LAN in Star Topology
6. Study of LAN in Bus Topology
7. Study of LAN in Tree Topology
8. Study and configuration of modem of computer
9. Study of wireless communication
10. Studying PC Communication using LAN

REFERENCES / SUGGESTED LEARNING RESOURCES:

1. Computer networking a top down Approach: J.F.Kurose Pearson
2. Computer Networks and Internet D.E. Comer Pearson
3. Wireless Communications: Principles and Practice, 2nd edition T. Rappaport Prentice Hall, 2002
4. Wireless Communication and Networking John W. Mark, Weihua Zhuang
5. Modelling and Analysis of Computer Communication Networks Jeremiah F. Hayes
6. Data communication & Networking Stallings

SUGGESTED SOFTWARE/LEARNING WEBSITES:

www.tutorialspoint.com/data_communication_computer_network/data_communication_ computer_network_tutorial.pdf
www. turbofuture.com/industrial/Elements-of-Electronic-Communications-System
www.st-andrews.ac.uk/~www_pa/Scots_Guide/iandm/part3/page1.html
www.antenna-theory.com/basics/main.php
www.explainthatstuff.com/antennas.html
www.circuitdiagram.org/am-radio-receiver-with-mk484.html
www.circuitstoday.com/single-chip-fm-radio-circuit

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