

# **SWAMI VIVEKANAND UNIVERSITY, SIRONJA, SAGAR (M.P.)**



## **SYLLABUS**

**For**

**Course Code : II<sup>nd</sup> Semester**  
**Department of Diploma in II<sup>nd</sup> Semester**  
**II<sup>nd</sup> Semester of Faculty**

**Duration of Course : 3 Year**

**Examination Mode : Semester**

**Examination System : Grading**

**Swami Vivekanand University, Sironja Sagar (M.P.)**  
**2014-2015**



**Communication Skills (DEE-0101)**

Paper/ Subject Code	Title of the Paper / Subject	Credit Allotted			Total Credit	Distribution of Marks									Duration of Theory Exam	
		L	T	P		Theory					Practical			Grand Total (H= D+G)		
						End Sem.		Internal		Total (D= A +B+C)	End Sem.		Internal			Total (G= E+F)
						Max (A)	Min	TW (B)	MST (C)		Max (E)	Min				
DEE-0101	Communication Skills	3	1	-	4	70	22	10	20	100	-	-	-	-	100	3 Hrs

**UNIT – I**

**Marks :14**

**COMMUNICATION PROCESS AND ITS NEEDS**

How to make communication effective, Barriers in communication, Removal of barriers. Grammar and vocabulary for correct English usage. Determiners, Prepositions, Auxiliary verbs and subject- Verb agreement, Rewrite as directed ( change voice, correct form of verbs/ tenses), Vocabulary – Oneword substitution, words often misused and wrongly spelt.

**UNIT – II**

**Marks :14**

**PASSAGES OF COMPREHENSION**

Prescribed passages (six from existing syllabus), Language of Science, Desalination or Desalting Process, Safety Practices, Non-conventional Sources of Energy, Our Environment, Entrepreneurship, Writing summary, moral and characterization of any one story from the book prescribed.

**UNIT – III**

**Marks :14**

**BUSINESS COMMUNICATION**

Principles of effective business correspondence Its parts, mechanics, styles and forms., Application for job, Bio-Data and C.V., Letter of Enquiry, Placing order, Complaint

**Marks :14**

**UNIT – IV**

**COMPOSITION & TRANSLATION**

Writing paragraphs of 150 words on topics of general interest i.e. pollution, ragging college, importance of computers, importance of communication skill, importance of science and technology etc., Translation (Hindi to English and vice- versa).

**Marks :14**

**UNIT – V**

**UNSEEN PASSAGES & PRECIS WRITING**

Answer the questions based on the passage. Give suitable title, Writing Précis.



**Reference Books**

1. English Conversation Practice, Grant Taylor.
2. Practical English Grammar, - Thomson & Martinet.
3. Communication Skills for Technical Students Book– I, Book – II, M/S Somaiya Publication, Bombay.
4. Living English Structure, S. Allen.
5. English Grammar, Usage, and Composition, Tickoo & Subramanian, S. Chand & Co. Standard Allen Longman.
6. Essentials of Business Communication, Dr. Rajendra Pal & J.S. Korlahalli S.Chand & Sons, New Delhi.
7. Effective Business Communication, M.V. Rodriques, Concept Pub. Co. New Delhi.
8. Communication for Business, Shirely Taylor, Longman, England.
9. Communication for Engineers and Professors, P. Prasad, S.K.Kataria and sons publications, New Delhi.
10. Technical English Book-II, Somaya Publications, New Delhi.



**Physics (DEE-0102)**

Paper / Subject Code	Title of the Paper / Subject	Credit Allotted			Total Credit	Distribution of Marks										Duration of Theory Exam	
		L	T	P		Theory					Practical						Grand Total (H=D+G)
						End Sem.		Internal		Total (D= A +B+C)	End Sem.		Internal	Total (G= E+F)			
						Max (A)	Min	TW (B)	MST (C)		Max (E)	Min			LW (F)		
DEE-0102	Physics	3	1	2	6	70	22	10	20	100	30	09	20	50	150	3 Hrs	

**UNIT – I**

**Marks :14**

**UNITS & MEASUREMENT:** Fundamental and derived units, Scalar and vector, Basic requirements to represent vector, Symbols, abbreviation, and proclution, Linear measurement by vernier calipers, screw gauge and spherometer Angular measurement by angular vernier, **MOTION:** Motion and its type, Linear motion (laws and equation), Circular motion, Angular velocity and relation with linear velocity, Centripetal acceleration, Centripetal and Centrifugal forces Rotatory motion, Axis of rotation, Moment of Inertia, Radius of gyration, Kinetic energy of rotation, Numerical Problems and solution on the topic.

**UNIT – II**

**Marks :14**

**MOLECULAR PHENOMENON OF SOLIDS, LIQUIDS AND GASES:** Postulates Of Molecular Kinetic Theory of Structure of Matter, Brownian motion, Kinetic and Potential energy of molecules, Kinetic theory of gases, Postulates, Calculation of pressure by Kinetic theory, Prove of different gases law by Kinetic theory. **PROPERTIES OF MATTER:** Elasticity: Meaning, definition, stress, stain, Hook's law and elastic limit, Surface Tension : Meaning, definition, molecular forces, cohesive and adhesive forces, surface energy, capillary rise and capillary rise method. Viscosity : Meaning, definition, stream line and turbulent flow, critical velocity, Stock's law. Numerical problems and solution on the topic.

**UNIT – III**

**Marks :14**

**HEAT:** Heat and temperature, concept of heat as molecular motion, Transmission of heat, study state and variable state. Concept of heat capacity, specific heat and latent heat. Calorimeter and its uses, Thermodynamics , Relation between heat and work, Mechanical equivalent of heat, First law of thermodynamics and its application, Second law of thermodynamics and its application. Carnot cycle, Numerical problems and solution on the topic. Heating effect of current and thermoelectricity: Heating effect of electric current: Joule's law, work energy and power in electric circuit, calculation of electric energy. Thermo electricity, See back effect and thermoelectric power. Neutral temperature, emperature of inversion and relation between them, Thermo electric thermometer and thermo couples. Numerical problems and solution on the topic.

**UNIT – IV**

**Marks :14**

**SOUND:** Production of sound waves( Longitudinal and transverse waves), Progressive and stationary waves, Basic knowledge of refraction , reflection, interference and diffraction. Ultrasonic, Audible range, Production of ultrasonic, properties and uses, **OPTICS AND OPTICAL INSTRUMENTS:** Refraction, critical angle and total internal reflection, refraction, through lenses and problems, Power of lenses, Spherical and chromatic aberrations, Simple and compound microscope, telescope and derivation for their magnifying power, Numerical problems and solution on the topic.



**UNIT – V**

**Marks :14**

**ELECTROSTATICS AND ELECTROMAGNETIC INDUCTION:** Coulomb's law, Electric field intensity, potential. Capacity, principle of capacitor, types of capacitor, combination of capacitors, Electromagnetic Induction: Faraday's law, Lenz's law, Self and mutual inductance, Transformer and electric motor, Induction coil. **MODERN PHYSICS, BASIC ELECTRONICS:** Photoelectric effect, threshold frequency, Einstein- equation, Photo electric cells, Radioactivity : decay constant, Half life, mean life, Properties of nucleus, nuclear mass, mass defect, Production of x-rays, properties and its uses, Thermal emission, semiconductors, Types of semiconductors, Explanation of conductor, semiconductor and insulators on the basis of band theory, P-N junction, diode as rectifier.

**Reference Books**

1. Applied Physics Vol. 1 & 2, Saxena and Prabhakar.
2. Physics, - Titi Publication.
3. Physics Vol. 1 &2, Halliday and Resnic R.
4. Engineering Physics, - Gaur and Gupta.
5. Principle of Physics, Brij Lal & Subramanyan.
6. Physics for Technical Education, LS Zednov.

**List of Experiments**

1. Refractive index of prism ( I-d ) curve
2. Refractive index of prism ( spectrometer )
3. Focal length of a convex lens by u-v method
4. Focal length of a convex lens by displacement method
5. Verification of Ohm's law
6. To find out unknown resistance by meter bridge
7. To find out internal radius of hollow tube by vernier calipers.
8. To find out volume of given cylinder by screw gauge.
9. Surface tension by Capillary rise method.
10. Coefficient of viscosity
11. Coefficient of Thermal conductivity by searl's method.
12. Verification of Newton's cooling law.



**Chemistry (DEE-0103)**

Paper / Subject Code	Title of the Paper / Subject	Credit Allotted			Total Credit	Distribution of Marks										Duration of Theory Exam
		L	T	P		Theory					Practical			Grand Total (H=D+G)		
						End Sem.		Internal		Total (D= A +B+C)	End Sem.		Internal		Total (G= E+F)	
						Max (A)	Min	TW (B)	MST (C)		Max (E)	Min				
DEE-0103	Chemistry	3	1	2	6	70	22	10	20	100	30	09	20	50	150	3 Hrs

**UNIT – I**

**Marks :14**

**ATOMIC STRUCTURE AND RADIOACTIVITY :** Discovery of electron, proton, neutron and nucleus. Rutherford's and Bohr's model of atom. Bohr-Bury scheme of filling the electrons in various orbits. Idea of s,p,d,f orbital. Alpha, Gamma and Beta rays, theory of radio activity, Group displacement law, half life period, numerical problems on half life period, fission and fusion.

**SURFACE CHEMISTRY AND ITS APPLICATION:** True solution, colloidal solution and suspension, lyophobic and lyophilic colloids, optical and electrical properties of colloids, coagulation, coagulants, idea about gels and emulsions.

**ELECTROCHEMISTRY:** Electrolysis, Faraday's laws of electrolysis, Numerical problems on Faraday's Law, electroplating of copper and nickel.

**COLLIGATIVE PROPERTIES:** Osmosis & osmotic pressure, Relative vapour pressure and Raoult's law. Internal energy (enthalpy) Entropy, Entropy function free energy, Effect of change in temperature catalysis.

**UNIT – II**

**Marks :14**

**CHEMICAL BONDING AND CATALYSIS:** Bonding: Nature of bonds- Electrovalent, Co-valent, coordinate and hydrogen bond. Catalysis : Types, theory characteristic, positive, negative, auto and induced catalyst. Catalytic Promoter, and catalytic inhibitors. Industrial Application of catalysis.

**WATER:** Sources of water, types of water, hardness of water, its causes, types and removal, Boiler feed water, harmful - effects of hard water in boiler. Municipal water supply. Numerical on soda lime process. Determination of hardness of water by O. Hender's, EDTA and soap solution method.

**UNIT – III**

**Marks :14**

**METALS AND ALLOYS :** Physical and chemical properties of metals, copper, iron, aluminum, tin, nickel. General principle of metallurgy, minerals/ ores, ore dressing, roasting, smelting, blast-furnace, fluxes, purification. Explanation of alloying purposes, methods of alloying, composition and uses of alloy like brass, bronze, duralium, German silver, gun metal, solder, stainless steel, casting and bearing alloy. Ionization, Ph value corrosion and protection: Arrhenius theory of ionization, factors affecting ionization. pH meaning (numerical), Buffer solutions and Buffer actions, choice of indicator (acidimetry and alkalimetry). Explanation of corrosion, types of corrosion, factors affecting corrosion, corrosion control (protection against corrosion), metal and organic coating for corrosion control.

**UNIT – IV**

**Marks :14**

**GLASS, CEMENT AND REFRACTORY:** Glass: Basic raw materials for glass, composition and manufacture of glass, varieties of glass and annealing of glass, Cement : Constituting compounds in cement, Composition of Portland Cement, its manufacture, setting and hardening of cement. Refractories : Meaning, characteristics, use of common refractory materials.

**HIGH POLYMERS, RUBBER AND INSULATORS:** Polymerization and condensation, classification of plastics, Compounding and Moulding constituents of plastics. Preparation Properties and uses of PVC, polyethylene, polystyrene, polyamides, polyesters, Bakelite. Synthetic fibers - nylon, rayon, decron, and polyesters. Definition characteristics, classification and properties of insulators. Glass, wool and thermocole. Idea about rubber and vulcanization.



**UNIT – V**

**Marks :14**

**LUBRICANTS, PAINTS AND VARNISHES:** Lubricants: Meaning , type and theory of lubricants, properties of a good lubricants, Flash, and fire point and cloud point, emulsification number, viscosity. Paints and Varnishes : Meaning, ingredients and characteristics of good paints and varnishes, their engineering applications.

**FUELS, FIRE EXTINGUISHERS AND EXPLOSIVES :** Classification of fuel, gross and net calorific value, Determination of a solid fuel by bomb calorimeter , octane and octane number. Proximate analysis of fuel, its utility, crude petroleum, products of fractional distillation . Fire extinguishers - Description and use. Explosives - Meaning, types, characteristic and use of explosives. Name Dynamite, lead azide, T.N.T., Picric acid, R.D.X. Pollution and control: Introduction and chemical toxicology, air and water pollution, control of air and water pollution. Harmful effect of different gases like carbon mono-oxide, carbon dioxide, sulphur dioxide, nitric oxide, nitrous and lead.

**Reference Books**

1. Physical Chemistry, Bahl and Tuli
2. Inorganic Chemistry, Satyaprakash
3. Modern Text Book of Applied Chemistry, Dr. G. C. Saxena, Jain Prakashan, Indore
4. Applied Chemistry, Dr. G. C. Saxena, Deepak Prakashan, Gwalior
5. Applied Chemistry, Shrivastava & Singhal, Pbs Publication, Bhopal
6. Engineering Chemistry, Uppal
7. Engineering Chemistry, – Rao And Agarwal
8. Engineering Chemistry, P.C. Jain
9. Polymer Chemistry, O.P. Mishra
10. Applied Chemistry, H.N. Sahni, Deepak Prakash

**List of Experiments**

1. To identify one Anion and Cation in a given sample.
2. Determination of flash point and fire point of a given sample of oil by Abel's apparatus.
3. Determination of viscosity by Red Wood Viscometer no. 1 and no.2.
4. Redoximetry Titration :
  - a. Percentage of Iron in given sample of alloy.
  - b. Determination of strength of ferrous ammonium sulphate.
  - c. Determination of strength of anhydrous ferrous sulphate and ferrous sulphate.
5. Determination of hardness of water by :
  - a. EDTA Method and Soap Solution Method
6. Determination of solid content in the given sample of water.
7. Determination of percentage of moisture in the given sample of coal by proximate analysis.



**Mathematics (DEE-0104)**

Paper / Subject Code	Title of the Paper / Subject	Credit Allotted			Total Credit	Distribution of Marks										Duration of Theory Exam
		L	T	P		Theory					Practical			Grand Total (H=D+G)		
						End Sem.		Internal		Total (D= A +B+C)	End Sem.		Internal		Total (G= E+F)	
						Max (A)	Min	TW (B)	MST (C)		Max (E)	Min				
DEE-0104	Mathematics	3	1	-	4	70	22	10	20	100	-	-	-	-	100	3 Hrs

**UNIT – I**

**Marks:14**

**ALGEBRA:** Permutation- Meaning of factorial n, Permutation of 'n' dissimilar thing taken 'r' at a time. Combination Combination of n dissimilar things taken 'r' at a time, Binomial Theorem, Statement of the theorem for positive integer General Term, Middle term, Constant term, Partial Fractions, Define a proper-improper fraction, Break a fraction into partial fraction whose denominator contains Linear, Repeated linear and Non repeated quadratic factors. Determinant, Concept & principles of determinants, Properties of determinant, Simple examples. Complex Numbers, Algebra of Complex

**UNIT – II**

**Marks:14**

**TRIGONOMETRY :** Allied angles. Trigonometrical ratios of sum and difference of angles, (Only statement), Sum and difference of trigometric ratios (C-D formula), Multiple angles (Only double angle and half angle), Properties of triangle (without proof).

**MATRIX :** Definition of Matrix. Types of Matrix. Row, Column, Square, Unit, Upper and lower triangular, Symmetric & Skew Symmetric, Singular and non Singular Matrices. Adjoint of a Matrix. Inverse of a Matrix.

**UNIT – III**

**Marks:14**

**CO-ORDINATE GEOMETRY :** Co-ordinate System : Cartesian and Polar. Distance, Division, Area of a triangle. Locus of a point and its equation. Slope of St. Line, Angle between two St. lines. Parallel and perpendicular St. lines. Standard and general equation of St. line. Point of intersection of two st lines.

**STATISTICS :** Measures of Central tendency (Mean, Mode, Median), Measures of Dispersion (Mean deviation, standard deviation).

**UNIT – IV**

**Marks:14**

**DIFFERENTIAL CALCULUS :** Define constant, variable, function. Value of the function. Concept of limit of a function. Definition and concept of differential coefficient as a limit. Standard results. Derivatives of sum, difference, product, quotient of two functions. Diff coeff. of function of a function. Diff. coeff. of implicit function. Logarithmic Differentiation. Differential coeff. of Parametric function.

**UNIT – V**

**Marks:14**

**INTEGRAL CALCULUS :** Definition as a inverse process of differentiation, Standard Results (including inverse function), Methods of Integration, Substitution, Integration by parts, Breaking up into partial fraction, Concept of Definite Integral.

**VECTOR ALGEBRA :** Concept of Vector and Scalar Quantities. Different types of vectors. Addition and subtraction of vectors. Components of a vector, Multiplication of two vectors: Scalar Product, Vector Product, Applications (Work done, power & reactive power).





**Reference Books**

1. Differential Calculus, Gorakh Prasad.
2. Integral Calculus, Gorakh Prasad.
3. Co-ordinate Geometry, S.L. Loni.
4. Engineering Mathematics, Dr. S.K. Chouksey & Manoj Singh.
5. Mathematical Statistics, Ray and Sharma.
6. Higher Engineering Mathematics, B.S. Grewal.



**Applied Mechanics (II<sup>nd</sup> Semester )**

Paper / Subject Code	Title of the Paper / Subject	Credit Allotted			Total Credit	Distribution of Marks										Duration of Theory Exam	
		L	T	P		Theory					Practical						Grand Total (H= D+G)
						End Sem.		Internal		Total (D= A +B+C)	End Sem.		Internal		Total (G= E+F)		
						Max (A)	Min	TW (B)	MST (C)		Max (E)	Min	LW (F)				
DEE-0201	Applied Mechanics	3	1	2	6	70	22	10	20	100	30	09	20	50	150	3 Hrs	

**UNIT – I**

**Marks :14**

**COMPOSITION AND RESOLUTION OF FORCES**

Definition , Effect, characteristics of force, System of Forces, Principle of Transmissibility of Forces, Concept of Resultant Force, Law of –Parallelogram of Forces, Triangle of Forces, Polygon of Forces, Determination of Resultant of two or more concurrent forces ( analytically and graphically)

**PARALLEL FORCES AND COUPLES**

Classification of Parallel Forces, Methods of finding resultant Force of parallel forces- analytically & graphically, Position of resultant force of parallel forces- Definition, Classification and characteristics of a force Couple, moment of couple

**UNIT – II**

**Marks :14**

**MOMENTS AND THEIR APPLICATIONS**

Definition, Types and law of moment-Varignon’s Principle of moment and its applications Lever and its Applications. Types of supports and determination of support reactions of a simply supported beam subjected to point load and uniformly distributed load (UDL).

**EQUILIBRIUM OF FORCES**

Equilibrium of a system of concurrent forces, ConDITions and types of Equilibrium Lami’s Theorem and its applications.

**UNIT – III**

**Marks :14**

**CENTRE OF GRAVITY**

Difference between Centroid and Center of Gravity (CG), Centroid of standard plane figures and CG of simple solid bodies, Method of finding out Centroid of composite plane laminas and cut sections, Method of finding out CG of Composite solid bodies.

**FRICTION**

Concept and types of friction, Limiting Friction, coefficient of friction, angle of friction, angle of repose, Laws of friction ( Static and Kinetic), Analysis of equilibrium of Bodies resting on Horizontal and inclined Plane, Utility / Nuisance value of friction.

**UNIT – IV**

**Marks :14**

**SIMPLE LIFTING MACHINES**

Concept of lifting Machines, Definition of Mechanical Advantage, Velocity Ratio and Efficiency of Machines and their relation Reversibility of Machines and conDITion for self locking machine, Law of Machines, Maximum mechanical advantage and maximum efficiency of machine, Friction in machine ( In terms of Load and effort), Calculation of M.A., V.R. and efficiency of following machines, Simple wheel and axle Differential wheel and axle Single purchase crab Double purchase crab Simple screw jack, Different System of simple pulley blocks.

**MOTION OF A PARTICLE**

Definition of speed, velocity, acceleration, uniform velocity, uniform acceleration and variable acceleration, Motion under constant acceleration/ retardation ( equations of motion) Motion under force of gravity, Concept of relative velocity, Definition of projectile, velocity of projection , angle of projection, time of flight, maximum height, horizontal range and their determination, Definition of angular velocity, angular acceleration and angular displacement, Relation between linear and angular velocity of a particle moving in a circular path, Motion of rotation under constant angular acceleration.



**UNIT – V**

**Marks :14**

**LAWS OF MOTION**

Newton's Laws of motion and their applications.

**WORK, POWER AND ENERGY**

Definition unit and graphical representation of work, Definition and unit of power and types of engine power and efficiency of an engine. Definition and concept of Impulse, Definition, unit and types of energies, Total energy of a body falling under gravity.

**Reference Books**

1. A text book of Applied Mechanics – R.S. Khurmi , S.C. Chand & Co. , New Delhi
2. Applied Mechanics – I.B. Prasad, Khanna Publishers, New Delhi
3. Applied Mechanics ( Hindi) – R.S. Jog, Anand Publishers, Gwalior Applied

**List of Experiments**

1. Verification of laws of parallelogram of forces.
2. Verification of laws of polygon of forces
3. Verification of laws of moments
4. Determination of forces in the members of Jib Crane
5. Determination of Centroid of plane lamina by graphical method
6. Determination of coefficient of friction for surfaces of different materials on horizontal plane
7. Determination of coefficient of friction for surfaces of different materials on an inclined plane  
Determination of mechanical advantage, velocity ratio and efficiency of the following lifting machines.
8. Simple wheel and axle Differential wheel axle Single purchase crab Double purchase crab Simple pulley block Simple screw jack
9. Measurement of B.H.P. of an engine using rope brake dynamometer



**Environmental Engineering and Safety  
(II<sup>nd</sup> Semester )**

Paper / Subject Code	Title of the Paper / Subject	Credit Allotted			Total Credit	Distribution of Marks										Duration of Theory Exam	
		L	T	P		Theory					Practical						Grand Total (H=D+G)
						End Sem.		Internal		Total (D= A +B+C)	End Sem.		Internal	Total (G= E+F)			
						Max (A)	Min	TW (B)	MST (C)		Max (E)	Min			LW (F)		
DEE-0202	Environment Engineering and Safety	3	1	-	4	70	22	10	20	100	-	-	-	-	100	3 Hrs	

**UNIT – I**

**Marks :14**

**INTRODUCTION TO ENVIRONMENT.**

The Biosphere, biotic and abiotic, An aquatic ecosystem, Types of pollution, Impact of human being on environment, Impact of environment on human being, Basic approach to improve environmental qualities, Roll of an environmental engineer.

**AIR POLLUTION SOURCES AND EFFECTS.**

Standard definition of air pollution, Composition of natural air, Names of air pollutants, Classification of air pollutants, primary and secondary pollutants, Classification of source of air pollutants on different bases, Definition of different types of aerosols, Effect of air pollution on: human health, material properties, vegetation, Major toxic metals and their effects, Major environmental phenomenon e.g., acid rain, global warming, green house effect, ozone layer depletion, Air quality standards, Brief description of air pollution laws.

**UNIT – II**

**Marks :14**

**METEOROLOGICAL ASPECTS OF AIR POLLUTANT DISPERSION.**

Meteorological parameters influencing air pollution, Environmental laps rate, temperature inversion, atmospheric stability and adiabatic loss rate, Turbulence, topographical effects, Plume behavior, looping, coning, fanning fumigation, lofting , trapping.

**AIR POLLUTION CONTROL METHODS AND EQUIPMENTS.**

Natural purification processes of air,Artificial purification methods of air, Brief description of following control equipments along with sketch e.g, gravitation settling chamber, cyclone, scrubber, bag house filter, electrostatic precipitator, Brief description of following processes for the control of gaseous pollutants e. g., absorption, adsorption, condensation, combustion etc.

**UNIT – III**

**Marks :14**

**WATER POLLUTION SOURCES AND CLASSIFICATION.**

Water resources, Uses of water, Classification of water,Origin, composition and characteristics of domestic waste water as well as industrial waste water, Biochemical oxygen demand, Water pollution laws and standards, Uses of waste water,Classification of waste water, Chemical oxygen demand.

**WASTE WATER TREATMENT METHOD.**

basic processes of water treatment. Meaning of primary, secondary and tertiary treatment.Flow chart of a simple effluent treatment plant, Theory of industrial waste treatment,Volume reduction, neutralization and proportioning.

**UNIT – IV**

**Marks :14**

**SOLID WASTE MANAGEMENT.**

Sources and classification of solid waste, Public health aspects, Disposal methods – open dumping , sanitary , land fill. Incineration , composting, Potential methods of disposal, Recovery and recycling of paper, glass, metal and plastic.

**NOISE POLLUTION AND CONTROL.**

Sources of noise pollution, Units of Noise pollution measurement, Allowable limits for different areas, Problems of noise pollution and measures to control it, Noise pollution control devices brief discussion.



**Swami Vivekanand University, Sagar(M.P.)**



**UNIT – V**

**Marks :14**

**SAFETY PRACTICES**

Responsibility of employees and employers regarding health and safety, Fire hazards ,prevention and precautions, Industrial hazards prevention and protection, Protection from air and noise pollution.

**Reference Books**

1. Environmental pollution control Engineering by C.S. Rao.
2. Air pollution and control by Seth.
3. Air pollution by M.N Rao.



**Introduction to Computers (DEE-0203)**

Paper / Subject Code	Title of the Paper / Subject	Credit Allotted			Total Credit	Distribution of Marks										Duration of Theory Exam	
		L	T	P		Theory					Practical						Grand Total (H=D+G)
						End Sem.		Internal		Total (D= A +B+C)	End Sem.		Internal		Total (G= E+F)		
						Max (A)	Min	TW (B)	MST (C)		Max (E)	Min	LW (F)				
DEE-0203	Introduction to Computers	3	1	2	6	70	22	10	20	100	30	09	20	50	150	3 Hrs	

**UNIT – I**

**Marks :14**

**INTRODUCTION TO COMPUTERS**

Basic Concepts-Generations of Computers Overview of computer Systems Classifications of Computers Characteristics of Computers Applications of Computers. Numbers System & Codes-Decimal, Binary, Octal, Hexadecimal Conversions from one system to other Binary Coded Decimal & ASCII Code. Computer Hardware: Input Devices-KeyBoard, Mouse, Trackball, Joystick, Scanner, OMR OCR Bar-Code Reader, MICR, Digitizer, Card Reader, Voice Recognition, Web Cam, Video Cameras, Etc. Output Devices-Monitors, Printers : Dot matrix, Inkjet & Laser, Plotters, Commuter, Output Micro Film (COM), Multimedia Projector, Speech Synthesizer, Dumb, Smart & Intelligent Terminal.Storage Devices

**UNIT – II**

**Marks :14**

Primary and Secondary Storage- Characteristics and Limitation, Floppy, Hard disk, CD ROM DVD, Disk Cartridge. Microprocessor-Registers, Arithmetic Unit, Control Unit, Buses, Instruction Set, Processor Speed, Memory Concepts. Concept of Memory-Unit of Memory, Types of Memory, RAM,ROM, PROM, EPROM, EEPROM, Cache Memory. Computer Software-System Software Vs Application Software, Operating System Programs, Language Processor, Assembler, Compiler & Interpreter, Application Software, Types of Application Software and their examples., High Level Language, Low Level Language, Assembly Language. Multimedia-Basics of Multimedia,Components- Text, Graphics, Animation, Audio, Images & Video. Multimedia Applications.

**UNIT – III**

**Marks :14**

**OPERATING SYSTEM**

Overview of DOS- Internal Commands, External Commands. Windows Operating System-Overview of different versions of Windows Characteristics and Facilities of Windows, Terminologies of Windows – Desktop, Icon, Menu etc. Components of Desktop. Working with Files and Folders. Windows Utilities and Accessories – Notepad, WordPad, Paintbrush, Windows Explorer, Calculator. Introduction to Linux- An overview of Linux, Basic Linux elements System, Features Software, Features File structure, Linux H/W & S/W requirements.

**UNIT – IV**

**Marks :14**

**WORD PROCESSING**

Saving, Closing, Opening of documents, Selecting text EDITing text, Finding and replacing text\ Printing documents, Merge Documents. Character and paragraph Formatting, Page Design and layout. Spell Check, Creating Tables and Charts. Handling Graphics

**SPREADSHEET PACKAGE**

Spreadsheet concept – Need, advantage, Terminology like cell, row, column etc. Working with Spreadsheet– Creating, Saving, EDITing and printing, Entering data – Entering number, text, date, time etc. Selecting cells – Cut, copy, paste date, EDITing Worksheet data. Formatting – Text and Cells, Applying border shading, background patterns, conditional formats, positioning cells, formatting numbers, text, Date, time. Creating formulas- Entering, EDITing, Using Functions, Controlling calculations. Working with Charts- Creating charts, Adding & changing text, changing the view and display, types of charts. Presentation Software: Introduction Presentation design tools Presentation terminologies, Creating, Opening and Saving Presentation. Working with different views Creating and



Organizing slides, Adding and Formatting text in slides Formatting paragraphs Adding drawings and objects Creating special effects Working with table and charts Printing Presentation.

## UNIT – V

Marks :14

### DATABASE

Introduction – need, Characteristics and terminologies of database, Types of database – relational, Hierarchical and Network. Basic entities – Tables, records, Data types, Data, Validation and constraints, keys relation between tables. Query – Select, Insert, Update, Delete. Forms – Creating forms, Forms controls Report Designer- Customize formats, grouping reports. Computer Communication & Networks: Information Networks- The Technology of Workgroup Computing, Types of network, Network topology. Network components. Data Communication-Introduction to Data Communication, Types of Data, Transmission media. Internet and E-mail- Internet Basics, Websites- Applications, terminologies, naming conventions., Web Browsers- Types, Navigation and tools, E-mail – concept, terminologies, mailing services provider, advantages comparison with Conventional mailing. Search engine – concept, search engine websites, searching methods.

### Text Books

1. S . Jaiswal, A First Course in Computers, Golgotha Publication
2. Slotnick, Butterfield, Colantonio and Kopetzky, Computers & Application, C.C. Health & Company
3. Ron Mansfield, The Complete Guide to Microsoft Office Professional, Sybex /BPB Asian EDITION
4. Hardware Bible, BPB Publication
5. Learning Windows in 24 Hours, Sam Techmedia

### Reference Books

1. Suresh K. Basandra, Computers Today, Galgotia Publication
2. Norton Peter, Inside IBMPC
3. Computer Hardware, Osborne Series
4. Hardware Bible, BPB Publication
5. Learning Windows in 24 Hours, Sam Techmedia
6. Chapman, Understanding windows, BPB Publication

### List of Experiments

1. Study of various components of computer like CPU, keyboard, mouse, monitor, printer, CVT and storage devices.
2. Internal and external commands of DOS.
3. Using Windows operating system, study of desktop, control panel, accessories and settings.
4. File management in windows explorer, Study of WordPad, NotePad, PaintBrush, Calculator etc. Study of Linux operating system.
5. Study of MS-word – opening and saving of documents, formatting, eDITing and spell check, find and replace, printing, merging. Creating Table, Charts and Graphics.
6. Study of Spreadsheet – creating, saving, eDITing and printing. Entering data, selecting cells, formatting text, applying border shades and backgrounds, creating formulas, creating charts.
7. Study of Power Point – creating, opening, eDITing and saving of slides. Adding and formatting text, creating, animations, working with images and special effects. Printing presentation.
8. Study of MSAccess– creating, saving, eDITing and printing of tables. Managing relationships, writing queries e.g. SELECT, UPDATE, DELETE, INSERT. Forms designing and report printing.
9. Study of Web Browser and mailing programs.



## Engineering Drawing ( II<sup>nd</sup> Semester )

Paper / Subject Code	Title of the Paper / Subject	Credit Allotted			Total Credit	Distribution of Marks										Duration of Theory Exam
		L	T	P		Theory					Practical			Grand Total (H=D+G)		
						End Sem.		Internal		Total (D= A+B+C)	End Sem.		Internal		Total (G= E+F)	
						Max (A)	Min	TW (B)	MST (C)		Max (E)	Min				
DEE-0204	Engineering Drawing	3	1	-	4	70	22	10	20	100	30	9	20	50	150	3 Hrs

### UNIT – I

**Marks :14**

#### INTRODUCTION TO DRAWING INSTRUMENTS:

Introduction of drawing instruments, materials and their uses, Applications of minidrafter Applications of compass and divider Applications of French curves and spline Pencils grades and their uses, Designation and sizes of drawing sheet and drawing board.

#### PLANNING AND LAYOUT OF DRAWING SHEET:

Planning of drawing sheet as per I.S.: 696-1972 (SP 46: 1988). This should include- Margin, Title Block, Zoning, Revision panel, Folding marks, Numbering of sheet.

#### CONVENTIONAL REPRESENTATION:

Conventional representation of the following as per BIS practice. Common Engineering materials

Electrical installations and fittings – Main switches, (lighting and power), socket outlets (3 pin 5AMP, 3pin15AMP), bell, buzzer, loud speaker, Aerial, ceiling fan, exhaust fan, Bracket fan, fan regulator, battery and earth point.

Electronics components- Diode: Zener, varactor, Scotty, step recovery, light emitting diode (LED), PNP and NPN transistors, resistance, capacitor, Inductors (fixed and variable both), IC (8pin and 14pin), SCR, TRIAC, DIAC, UJT, FET, MOSFET, LOGIC GATES.

Sanitary fittings- showerhead, wall lavatory basin, corner Lavatory basin, urinal stall, kitchen sink, Indian type WC, Water closets (Asian pan, urissapan, Anglo-Indian, European)

Building -single and double swing doors and windows.

Mechanical components- Internal and external threads, slotted head, Square end and flat, radial arms and ribs, serrated shaft, splined shaft, Chain wheel, bearing, straight and diamond knurling,

Compression and tension spring, leaf spring (with and without eye), Spur and helical gear.

#### LINES, LETTERING AND DIMENSIONING:

Introduction of type of lines and their applications, Single stroke vertical, inclined letters (capital and lowercase) And numerals. Dimensioning: Elements of dimensioning- dimension line, extension line, arrowhead And leader line. Dimensioning system – Aligned and unidirectional. Dimensioning of Arcs and Circles. Angular Dimensioning. Dimension of counter sunk and counter bore.

### UNIT – II

**Marks :14**

#### GEOMETRICAL CONSTRUCTIONS AND ENGINEERING CURVES

Divide a line into any number of equal parts by parallel line method, Bisecting of line and angle. Construction of triangles and polygons Introduction of conic sections (curves), Construction of Ellipse by Eccentricity and Concentric circles methods, Construction of Parabola by Eccentricity and Rectangle methods, Construction of Hyperbola by Eccentricity method, Construction of Cycloid, Construction of Involute of circle and polygon, Construction of Archimedian Spiral of any number of convolutions.

#### SCALES:

Introduction of scales and their applications, Concept of reducing, enlarging and full size scale Classification of scales – plain, diagonal, vernier, Scale of chord and comparative scales Definition of R.F. Construction of plain and diagonal scales.

### UNIT – III

**Marks :14**

#### THEORY OF PROJECTION AND PROJECTION OF POINTS, LINES AND PLANES

Definition of various term associated with theory of projection- Planes of projection, Quadrants, first & third angle projection method, Projection of points in all the four quadrants. Projection of lines parallel to





HP and VP both, perpendicular to one plane and parallel to other, Inclined to one plane and parallel to other, knowledge of projection of line inclined to both the plane, (No practice required).

Projection of planes – Perpendicular to HP and VP both, Perpendicular to one plane and parallel to other, Inclined to one plane and perpendicular to other, Knowledge of projection of plane inclined to both the planes.

#### **UNIT – IV**

**Marks :14**

##### **PROJECTIONS OF SOLIDS:**

Projection of cylinder, cone, prism and pyramid. Under the conDITions :- Axis parallel to HP and VP, Axis perpendicular to HP and parallel to VP, Axis perpendicular to VP and parallel to HP, Axis inclined to HP and parallel to VP, Axis inclined to VP and parallel to HP, Axis inclined to both HP and VP.

##### **SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES:**

Section of cone, cylinder, prism and pyramid (Solid resting on its base in the HP i.e. the Axis perpendicular to HP and parallel to VP) in the cases:- Section plane parallel to HP and perpendicular to VP, Section plane parallel to VP and perpendicular to HP, Section plane inclined to HP and perpendicular to VP, Section plane inclined to VP and perpendicular to HP. Drawing True shape of section.

Introduction to development of lateral surface of solids- Cone, Cylinder, Prism and Pyramids (Simple and truncated). Under the conDITion – solid resting on its base in the HP and axis Perpendicular to HP and parallel to VP. Development of funnel and elbow.

##### **INTERSECTION OF SURFACES**

Intersection of following cases – Cylinder to cylinder and Prism to prism (With their axis intersecting and perpendicular to each other.)

#### **UNIT – V**

**Marks :14**

##### **ORTHOGRAPHIC PROJECTIONS & FREE HAND SKETCHING:**

Principles of orthographic projections- Identification of necessary views and superfluous view Selection of front view. Preparation of necessary orthographic views of simple objects From given pictorial views. Dimensioning of orthographic views as per standard practice. Free hand sketches of simple objects (Using Pencil, Eraser & Paper only)

##### **ISOMETRIC VIEWS**

Concept of isometric projection and isometric view (Isometric Drawing), Construction of isometric scale, Construction of isometric view of polygon and circle, Construction of isometric view of cone, cylinder, prism and pyramids, Construction of isometric view of simple objects from given orthographic views.

#### **Text Books**

1. ENGINEERING DRAWING – N.D. Bhatt
2. ENGINEERING DRAWING – R.K. Dhawan
3. ENGINEERING DRAWING – P.S.Gill

#### **Reference Books**

1. ENGINEERING DRAWING – P.S.Gill
2. SP: 46-1988 Bureau of Indian standard
3. PRINCIPLES OF ELECTRONICS - Malvino



## Workshop Practics (DEE-0205)

Paper / Subject Code	Title of the Paper / Subject	Credit Allotted			Total Credit	Distribution of Marks										Duration of Theory Exam	
		L	T	P		Theory					Practical						Grand Total (H= D+G)
						End Sem.		Internal		Total (D= A +B+C)	End Sem.		Internal	Total (G= E+F)			
						Max (A)	Min	TW (B)	MST (C)		Max (E)	Min			LW (F)		
DEE-0205	Workshop Practice	-	-	4	4	-	-	-	-	-	60	18	40	100	100	-	

### PURPOSE

To provide the students with hands on experience on different trades of engineering like fitting, carpentry, smithy, welding and sheet metal.

### INSTRUCTIONAL OBJECTIVES

To familiarize with

1. The basics of tools and equipments used in fitting, carpentry, sheet metal, welding and smithy.
2. The production of simple models in the above trades.

### Text Books

1. Gopal, T.V., Kumar, T., and Murali, G., A first course on workshop practice – Theory, practice and work book, Suma Publications, 2005.

### Reference Books

1. Kannaiah, P. & Narayanan, K.C. Manual on Workshop Practice, Scitech Publications, Chennai, 1999.
2. Venkatachalapathy, V.S., First year Engineering Workshop Practice, Ramalinga Publications, Madurai, 1999.

### List of Experiments

1. EMPHASIS TO BE LAID ON REAL LIFE APPLICATIONS WHEN FRAMING THE EXERCISES.
2. FITTING Tools & Equipments – Practice in Filing and Drilling. Making Vee Joints, Square, dovetail joints, Key Making.
3. CARPENTARY Tools and Equipments- Planning practice. Making Half Lap, dovetail, Mortise & Tenon joints, a mini model of a single door window frame.
4. SHEET METAL Tools and equipments - Fabrication of a small cabinet, Rectangular Hopper, etc.
5. WELDING Tools and equipments - Arc welding of butt joint, Lap Joint, Tee Fillet. Demonstration of Gas welding, TIG & MIG.
6. SMITHY Tools and Equipments – Making simple parts like hexagonal headed bolt, chisel.



**BASIC ELECTRONICS (DEE -0301)**

Paper / Subject Code	Title of the Paper / Subject	Credit Allotted			Total Credit	Distribution of Marks										Duration of Theory Exam
		L	T	P		Theory					Practical			Grand Total (H=D+G)		
						End Sem.		Internal		Total (D= A +B+C)	End Sem.		Internal		Total (G= E+F)	
						Max (A)	Min	TW (B)	MST (C)		Max (E)	Min				
DEE-0301	Basic Electronics	3	1	4	6	70	22	10	20	100	30	09	20	50	150	3 Hrs

**UNIT – I**

**MARKS - 14**

**Semiconductor Devices** –Concept of electronic emission –Different methods of electronic emission and their applications. Diodes - Formation of PN junction, forward biasing and reverse biasing of PN junction, construction, characteristics and application of different types of diodes, Zener diode .Transistor - PNP/ NPN Junction Transistors, different configurations: CB, CE, CC. Transistors Characteristics, and applications. Special Semiconductor devices – Construction, symbol and application of Tunnel diode, photo diode, varactor, FET, MOSFET, UJT.

**UNIT – II**

**MARKS - 14**

**Rectifiers** –Single phase, half wave, full wave and bridge types of rectifiers. calculation of output voltage, average and RMS values, ripple factor and rectification efficiency. Filter, and types of filters. Regulated Power Supply - Difference between linear and switch mode power supply, regulated power supply and its limitations, SMPS, IC regulated power supply.

**UNIT – III**

**MARKS – 14**

**Amplifiers** - Principal of amplification, types of transistor amplifiers, biasing techniques, RC coupled, transformer coupled, and direct coupled amplifiers, push pull Amplifier, advantages and disadvantages, detailed study of circuit diagram, working principle and applications of above amplifiers, use of operational amplifier as comparator, multiplier, summer, integrator and differentiator.

**UNIT – IV**

**MARKS – 14**

**Oscillators** – Principal of oscillation, Types of oscillators such as Hartley, Colpitts, tuned oscillator, Weign bridge oscillator: circuit diagram, principle, working & applications. Non-sinusoidal Generator - Astable, monostable and bistable multivariate circuits, principle of working and output waveforms.

**UNIT – V**

**MARKS – 14**

**Digital Techniques** - Number system, binary, decimal number system. Addition, subtraction, multiplication & division of binary numbers. Logic gates- their symbols, truth table and applications.

**Modulation and Demodulation** – Amplitude, phase and frequency modulation, principle, methods and applications of above modulations, A.M. and F.M. detection

**Integrated circuits** - Concepts of IC's classification, types and their advantages, applications of common IC's such as 741, 555, 810 and digital IC's.



**Reference Books :**

1. Basic Electronics & Linear Circuits- : By Bhargawa , T.T.T.I. Chandigarh .
2. Basic Electronics -: By V.K. Mehta
3. Electronics Principal - : By mahta.
4. Digital Electronics -: ByMahino & Leach .
5. Electronics Devices & Circits -: By G.K. Mithal

**List of Experiments:**

- 1 Study of C.R.O. & multimeter
- 2 Study of electrical and electronic components
- 3 Colour coding of Resistors
- 4 Testing of Diode and Transistor
- 5 Study of half wave rectifier, full wave rectifier, bridge rectifier with and without filter
- 6 Study of Zener regulated power supply
- 7 Study of IC Regulated power supply (78XXand 79XX)
- 8 Study of transistor characteristics
- 9 To plot the characteristics of diode
- 10 To plot the characteristics of Zener diode
- 11 Study of transistor amplifier
- 12 Study of oscillator
- 13 Study of astable and monostable multivibrators using transistors and IC 555
- 14 Study of inverting and non-inverting amplifiers using IC 741 and calculation of its gain
- 15 Study of A.M. modulation



**BASIC ELECTRICAL ENGINEERING AND MATERIALS  
(DEE - 0302)**

Paper / Subject Code	Title of the Paper / Subject	Credit Allotted			Total Credit	Distribution of Marks										Duration of Theory Exam
		L	T	P		Theory					Practical			Grand Total (H= D+G)		
						End Sem.		Internal		Total (D= A +B+C)	End Sem.		Internal		Total (G= E+F)	
						Max (A)	Min	TW (B)	MST (C)		Max (E)	Min				
DEE - 0302	Basic Electrical Engineering And Materials	3	1	4	6	70	22	10	20	100	30	09	20	50	150	3 Hrs

**Unit – I**

**MARKS – 14**

**D.C. Circuits -**

Concept of charge, current, voltage, EMF, resistance, resistivity. Ohm's law, KCL, KVL. Series and parallel combination of resistances, star-delta connection, star to delta and delta to star transformation.

**Unit – II**

**MARKS – 14**

**A.C. Fundamentals -**

Concept of inductance, capacitance, reactance, impedance, admittance, phasor diagram of pure resistive, inductive and capacitive circuit. Difference between AC and DEE quantities, sinusoidal waveform, frequency, time period. Instantaneous, maximum, average and RMS value.

**Unit – III**

**MARKS – 14**

**Heating And Chemical effect of electric current -** Heat produced. Work, power and energy, units.

Faradays laws of electrolysis. Primary and secondary cells.

**Unit – IV**

**MARKS – 14**

**Magnetic effect of electric current -**

Concept of lines of force, flux, MMF, reluctance, permeability, magnetic flux density, magnetic field intensity. Analogy of electric and magnetic circuit, units. Faraday's laws of electromagnetic induction, self and mutual induction. Lenz's laws, Fleming's left and right hand rule.

**Unit – V**

**MARKS – 14**

**Electrical Engineering materials -** Definition of conductors, insulators and semiconductors. Intrinsic and extrinsic semi conductor materials. Properties and applications of conducting, semi-conducting and insulating materials, classification of insulating materials on the basis of temperature. B-H curve, soft and hard magnetic materials. Different magnetic materials, properties and applications.



**Reference Books :**

1. Basic Electrical Engineering By Nagrath Kathari
2. Electrical Engineering Materials By TTTI Madras.
3. Basic Electrical Engineering By Jain & Jain
4. Basic Electrical Engineering By V.K. Mehta

**List of Experiments:**

- 1 Study of different types of meters/indicators, Ammeter, voltmeter, wattmeter etc.
- 2 Measurement of current and voltage in single phase and three phase circuit series and parallel circuit.
- 3 Measurement of current, voltage and power in single phase circuit.
- 4 Study of different types of loads i.e. resistive, inductive and capacitive load.
- 5 Study of multimeter.
- 6 Verification of ohms law.
- 7 Study of different types of conducting, insulating, and magnetic materials.
- 8 Study of different types of primary and secondary cells and batteries.



**ELECTRICAL CIRCUIT ANALYSIS**  
**(DEE - 0303)**

Paper / Subject Code	Title of the Paper / Subject	Credit Allotted			Total Credit	Distribution of Marks										Duration of Theory Exam	
		L	T	P		Theory					Practical						Grand Total (H=D+G)
						End Sem.		Internal			Total (D= A +B+C)	End Sem.		Internal	Total (G= E+F)		
						Max (A)	Min	TW (B)	MST (C)	Max (E)		Min	LW (F)				
DEE - 0303	ELECTRICAL CIRCUIT ANALYSIS	3	1	4	6	70	22	10	20	100	30	09	20	50	150	3 Hrs	

**Unit – I**

**MARKS – 14**

**CIRCUIT ANALYSIS** Active and passive elements, ideal current source and voltage source. Unilateral and bilateral elements. Number of loops, nodes, branches of a network. Analysis of networks by "Mesh" and "Node" methods. T and II terminal networks, input and output impedance and admittance.

**Unit – II**

**MARKS – 14**

**NETWORK THEOREMS** Maxwell’s loop theorem, Nodal analysis, Superposition, Thevenin's, Nortons' and maximum power theorems with numerical problems.

**Unit – III**

**MARKS – 14**

**SINGLE PHASE A.C. CIRCUITS** Representation of A.C. quantity by phasor methods, rectangular and polar co-ordinates. RLC series and parallel combinations. Impedance, power in single phase circuits. Concept of power factor, conductance, admittance and susceptance. Series and parallel circuits, resonance in series circuit.

**Unit – IV**

**MARKS – 14**

**POLYPHASE CIRCUITS** Concept of poly phase A.C. circuits, advantages over single phase. Generation of three phase voltage system. Three phase circuits, phase sequence, vector and wave diagrams. Star and delta connections, phase and line values of current and voltage, power in three phase circuits. Balanced and unbalanced systems.

**Unit – V**

**MARKS 14**

**TRANSIENTS** Concept of transient, variation of current when connected to D.C. or A.C. series circuit (R.L. combination and R.C. combination). Time constant.



## Reference Books :

1. M.E. Van Valkenburg, Network Analysis, (PHI)
2. F.F.Kuo, Network Analysis.
3. Mittal GK; Network Analysis; Khanna Publisher
4. Mesereau and Jackson; Circuit Analysis- A system Approach; Pearson.
5. Sudhakar & Pillai; Circuit & Networks- Analysis and Synthesis; TMH
6. Hayt W.H. & J.E. Kemmerly; Engineering Circuit Analysis; TMH
7. Decarlo lin; Linear circuit Analysis; Oxford
8. William D Stanley : Network Analysis with Applications, Pearson Education
9. Roy Choudhary D; Network and systems; New Age Pub
10. Charles K. Alexander & Matthew N.O. Sadiku: Electrical Circuits :TMH
11. Chakraborti :Circuit theory: Dhanpat Rai
12. B.Chattopadhyay & P.C.Rakshit; Fundamental of Electrical circuit theory; S Chand
13. Nilson & Riedel , Electric circuits ;Pearson

## List of Experiments:

- 1 Verification of Superposition theorem
- 2 Verification of Norton's and Thevenin's theorem
- 3 Verification of Maximum power transfer theorem
- 4 Performance of R-L-C- series circuit
- 5 Performance of R-L-C- parallel circuit
- 6 Study of electrical resonance in series circuit
- 7 Verification of relation between line and phase voltage and current in 3-phase circuit
- 8 Study of transients





**ELECTRICAL MACHINES - I (DEE - 0304)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (j= e+i)	Duration of Exam
		L	T	P	C	Theory				Total (e= a+c+d)	Practical			Total (i= f+h)		
						Max (a)	Min (b)	MS T (c)	T W (d)		Max (f)	Min (g)	T W (h)			
DEE - 0304	ELECTRICAL MACHINES - I	3	1	2	6	70	22	20	10	100	30	10	20	50	150	3 hrs.

**Unit – I**

**MARKS – 14**

**Energy Conversion Principle** - Law of conservation of energy, electromechanical energy conversion classification of machines.

**Unit – II**

**MARKS – 14**

**Single phase transformers** - Principle, construction, classification. EMF equation, turns ratio, name plate rating, phasor diagram, no load and on load equivalent circuit. Voltage regulation, polarity ratio, open and short circuit tests, losses and efficiency, condition of maximum efficiency. All day efficiency and its numerical. Auto transformer. Parallel operation of single phase transformer.

**Unit – III**

**MARKS – 14**

**Three phase transformer** - Connections, groups, Scott and open delta connection. Comparison of three phase transformer with bank of three single phase transformers. Parallel operation.

**unit – IV**

**MARKS – 14**

**D. C. Generator** - Principle, construction, armature winding, types of winding, EMF equation, armature reaction and commutation, interpoles and compensating winding. Types of generators, characteristics and applications, losses and efficiency. Simple numericals.

**Unit – V**

**MARKS 14**

**D. C. Motors** - Principle, production of back EMF, torque equation. Classification, characteristics of D. C. motors, starters, speed control, losses and efficiency, applications of motors. Brake test, Swinburn test. Simple numericals.



**Reference Books :**

1. Electrical Technology Vol. II by B. L. Thareja Khanna Publisher
2. Electrical Machines by Bhattacharya, T.T.T.I.
3. Electrical Machines by Nagrath & Kothari, PHI Publication
4. Electrical Machines Vol. I & II by P.S. Bhimbra, Khanna publishers

**List of Experiments:**

- 1 Study of D. C. Machines (Parts)
- 2 Speed control of D. C. Motor (armature and field control method)
- 3 To perform Swinburn test of DEE Motor.
- 4 Study of transformer (Parts) (single and three phase)
- 5 To perform polarity test of single phase transformer.
- 6 To perform ratio test of single phase transformer.
- 7 To perform open circuit test of single phase transformer.
- 8 To perform short circuit test of single phase transformer.
- 9 Parallel operation of single phase transformer.



**MARKETING MANAGEMANT (DEE - 0305)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (j=e+i)	Duration of Exam
		L	T	P	C	Theory				Total (e=a+c+d)	Practical			Total (i=f+h)		
						Max (a)	Min (b)	MS T (c)	TW (d)		Max (f)	Min (g)	TW (h)			
DEE - 0305	MARKETING MANAGEMANT	3	1	-	4	70	22	20	10	100	-	-	-	-	100	3 hrs.

**Unit – I**

**MARKS – 14**

**MARKETING & CONCEPT** Evolution of marketing-a historical background, The stage of barter , The stage of money economy , The stage of industrial revolution , The stage of competition , The emergence of marketing , Selected definitions of marketing , Different concept of marketing , The exchange concept The production concept, The product concept, The sales concept The marketing concept. Difference between selling & marketing Benefits & significance of marketing, Improve productivity & efficiency Insure better deal for consumer, Make economic planning meaningful & relevant etc.

**Unit – II**

**MARKS – 14**

**Marketing environment** Internal & external factors, Demographic environment, Economic environment, Political environment, Physical environment, Technological environment, Competitive environment, Social & cultural environment, Micro & macro environment

**Marketing planning & organization** Scope & importance of planning, Steps in marketing planning process, Purpose & principle of organization, Models of marketing organization, Line & staff type, Product based organization, Territory oriented organization, Complex organization, Task of chief marketing executive, Decentralization.

**Unit – III**

**MARKS – 14**

**Market segmentation** Types of market, Definitions & benefits of segmentation, Method s of segmentation, Geographic segmentation, Demographic segmentation, Psychographic segmentation, Buyer behavior Segmentation, Volume segmentation, Steps in market segmentation, Market targeting **Understanding consumer** , Factor influencing buyer behavior, Information from variety of sources Socio-cultural environment of buyer, Group influence, Religion & language, Concern about status, Buying motives –Product & patronage motive, Buying habits – Convenience, shopping and spatiality goods.



**Unit – IV**

**MARKS–14**

**Market mix** Definition of market mix, Elements of marketing mix Environmental variable Customer variable, Competition variable, Product management , Components of product, The brand names, package,label, Types of product, The generic product, The branded product, The differentiated product, The customized product, New product development (NPD) Significance & classification of new product, Test marketing, Product life cycle (PLC), Concepts & benefits of PLC, Different stages in PLC, Definitions & importance of physical distribution, Designing the physical distribution system, The role & importance of distribution channel , Planning & designing of distribution channel, Price management , The meaning & importance of pricing, Objectives of pricing, Factors affecting pricing –Internal & external, Pricing methods, Cost based pricing , Demand based pricing , Competition based pricing, Product line pricing.

**Unit – V**

**MARKS–14**

**Marketing research & sales forecasting**, Definition & importance of marketing research, Steps in marketing research, Defining problem, Problem analysis, Developing research design, Developing research procedure, Data collection –Primary & secondary, Analyzing & interpretation, Summarizing & preparing the research report, Method of market research, Necessity & purpose of sales forecasting  
Methods of sales forecasting.

**Salesmanagement**, Designing the sales force, Managing the sales force, Recruitment & selection, Training, compensation, control, Supervision & direction, Motivation of salesman, Fixing sales quota, Duties & responsibilities of sales manager.

**Reference Books :**

1. Marketing management - Analysis, Planning & Control - Philip Kotler
2. Principles & practice of Marketing in India - C.B. Memoria & R.L. Joshi
3. Contemporary Marketing –Louis & Bone & David L. Kurtz
4. Essential of Management –Koontz
5. Marketing management- S.A. Sherlekar



**ELECTRICAL INSTRUMENTATIONS AND MEASUREMENTS (DEE - 0401)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (j=e+i)	Duration of Exam
		L	T	P	C	Theory				Total (e=a+c+d)	Practical			Total (i=f+h)		
						Max (a)	Min (b)	MS T (c)	T W (d)		Max (f)	Min (g)	T W (h)			
DEE - 0401	ELECTRICAL INSTRUMENTATIONS AND MEASUREMENTS	3	1	2	6	70	22	20	10	100	30	10	20	50	150	3 hrs.

**Unit I**

**MARKS – 14**

**Measurement** and error, Accuracy and precision, sensitivity resolution, Error & Error analysis, Effect of temperature, Internal friction, Stray field, Hysteresis and Frequency variation & method of minimizing them, Loading effects, due to shunt connected and series connected instruments, calibration curve, Testing & calibration of instruments.

**Galvanometers** – Theory & operation of ballistic galvanometer, D’arsonal galvanometer, galvanometer motion & damping, Sensitivity, Flux meter, Vibration galvanometer, Spot deflection galvanometer. Definition of analog & digital instruments, Classification of analog instruments, their operating principle, Operating force, Types of supports, Damping, Controlling.

**Unit II**

**MARKS – 14**

**Different types of Ammeter & Voltmeter** – PMMC, MI, Electrodynamometer, Hotwire, Electrostatic, Induction, Rectifier, Ferro dynamic & Electro-thermic, Expression for control & deflection torque, their advantages, disadvantages & error, Extension of range of instruments using shunt & multiplier.

**Unit III**

**MARKS – 14**

**Instrument transformers:** Potential and current transformers, ratio and phase angle errors, testing of instrument transformers, Difference between CT and PT, errors and reduction of errors. **Measurement of power:** Power in AC and DC Circuit, Electrodynamometer type of wattmeter, Construction, theory, operation & error, Low power factor & UPF wattmeter, Double element and three element dynamometer wattmeter, Measurement of power in three phase circuit, one, two & three wattmeter method, Measurement of reactive power by single wattmeter, Measurement of power using CTs & PTs.

**Unit IV**

**MARKS – 14**

**Measurement of Energy:** Single phase induction type energy meter – construction & operation – driving and braking torques – errors & compensations – Three phase energy meter – Tri-vector meter – Maximum demand meter.

**Potentiometer** – DC potentiometer standardization – Lab type Crompton’s potentiometer, application of DC potentiometer, AC polar type and coordinate type potentiometer, their construction and applications.



**Unit V**

**MARKS– 14**

**Miscellaneous Instruments & Measurements:** Power factor meter, Single phase and three phase Electro-dynamometer type & moving iron type.

**Frequency meter** – Vibrating reed, Resonance type & Weston type, Synchronoscope, Ohmmeter – series & stunt type, Multi-meter, Megger & Ratio meter.

**Resistance Measurement** – Classification of low, medium & high resistance – Voltmeter, Ammeter, Wheatstone Bridge, Kelvin's double bridge & loss of charge methods for resistance measurement,

**Earth resistance** measurement.

**Magnetic Measurement** – B-H Curve, Hysteresis Loop determination, Power loss in sheet metal – Lloyd Fischer square for measurement of power loss.

**References:**

1. E W Golding & F C Widdis; Electrical Measurement & Measuring Instruments; Wheeler Pub.
2. A.K. Sawhney; Electrical & Electronic Measurements & Instrument; Dhanpat Rai & Sons Pub.
3. Buckingham & Price; Electrical Measurements; Prentice Hall

**List of experiments (Expandable):**

1. Measurement of low resistance using Kelvin's Double bridge
2. Measurement of medium resistance using Wheatstone's bridge
3. Measurement of high resistance by loss of charge method
4. Measurement of Insulation resistance using Megger
5. Measurement of earth resistance by fall of potential method and verification by using earth tester
6. Measurement of power in a single phase ac circuit by 3 voltmeter/ 3 Ammeter method
7. Calibration of a dynamometer type of wattmeter with respect to a standard/Sub Standard wattmeter
8. Calibration of a induction type single phase energy meter
9. Calibration of a dynamometer type of wattmeter by Phantom Loading method
10. Measurements using Instrument Transformers
11. Study of various types of Indicating Instruments
12. Measurement of Power in three phase circuit by one, two & three wattmeters



**POWER ELECTRONICS AND APPLICATION (DEE - 0402)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (j=e+i)	Duration of Exam
		L	T	P	C	Theory				Total (e=a+c+d)	Practical			Total (i=f+h)		
						Max (a)	Min (b)	MS T (c)	T W (d)		Max (f)	Min (g)	T W (h)			
DEE - 0402	POWER ELECTRONICS AND APPLICATION	3	1	2	6	70	22	20	10	100	30	10	20	50	150	3 hrs.

**Unit – I**

**MARKS – 14**

**Thyristor -**

SCR - Structure, Two transistor model, characteristics, turn-on methods, factor responsible for temperature rise, circuit for over voltage, over current, voltage surge & high dv/dt, Gate production. Modes of heat transfer. Triggering circuits - Resistance phase shift, UJT, Schmitt trigger. Turn-off types of commutation, methods of commutation. SCR rating, series and parallel connection. Thyristor family and other devices, DIAC, TRIAC, SCS, MOSFET, IGRT, GTO.

**Unit – II**

**MARKS – 14**

**Rectification** - Single phase HW and FW converters. Mathematical relations of Idc and Irms. Applications Advantages of polyphase rectification.

**Inverter** - Series and parallel inverter, current and voltage source inverter, emergency tube light, comparison of inverters using different types of (transistor, MOSFET, IGRT) devices, block diagram of UPS (on load / off load). Applications of Inverter

**Unit – III**

**MARKS – 14**

**Converter** - Block diagram of DC to DC converter. Converter duty cycle, 4-quadrant operation of choppers, applications. Working of single phase cyclo-converter, basic concept of three phase cyclo-converter, application of cyclo-converters.

**Unit – IV**

**MARKS – 14**

**Speed control of Motors -**

Advantages of electronic speed control, 4-quadrant operation of DC motors, constant torque and constant horse power operation, speed control of separately excited DC motor, single and 3 phase controlled rectifiers, field failure protection and armature current limiter, speed control using chopper, dual converter. Speed control of induction motor using rectifier, inverter and cyclo-convector (block diagram only). Speed control of slip ring induction motor using SCRS in rotor circuit.



**Unit – V**

**MARKS – 14**

**Applications -**

High frequency heating - induction and dielectric, principle, applications. Resistance welding, electronic line contactor, heat control circuit. Static AC & DC switch, over voltage protection, time delay circuits, reversing switch with plugging logic and digit circuits, PF corrections

**Reference Books :**

1. Power electronics : Circuits, devices & applications,  
M. H. Rashid, PHI
2. Power Electronics, P.C. Jain, TMH

**List of Experiments**

1. Characteristics of thyristor family devices.
2. Study of single phase controlled rectifiers.
3. Study of emergency tube light
4. Study of SCR triggering circuits
5. Study of commutation circuits
6. Electronic speed control of d.c.motor
7. Electronic speed control of induction motor
8. Study of UPS
9. Study of chopper





**INSTALLATION, MAINTENANCE AND TESTING (DEE - 0403)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks								Grand Total (j=e+i)	Duration of Exam	
		L	T	P	C	Theory				Total (e=a+c+d)	Practical					Total (i=f+h)
						Max (a)	Min (b)	MS T (c)	T W (d)		Max (f)	Min (g)	T W (h)			
DEE - 0403	INSTALLATION, MAINTENANCE AND TESTING	3	1	2	6	70	22	20	10	100	30	10	20	50	150	3 hrs.

**Unit – I**

**MARKS – 1**

**Installation** - Types of heavy Electrical equipment, unloading accessories precautions for unloading, installation of small and large machines of both static and rotating type. Installation of pole mounted transformer.

**Commissioning** - Tests required before commissioning procedure to be adopted for commissioning the electrical equipment in respect of - (1) Mechanical fixture and alignment. (2) Electrical tests. (3) Initial precautions for starting.

**Unit – II**

**MARKS – 14**

**Earthing** - Reasons of earthing, earthing system, earth lead and its size, permissible earth resistance for different installations, improvement of earth resistance, double earthing, earth resistance measurement, rules for earthing.

**Insulation testing and maintenance** - Instruments used for measuring insulation resistance, reasons for deterioration of insulation resistance, improving insulation resistance, drying of insulation, Measurement of internal temperature of winding, vacuum impregnation / filtering of insulating oil, testing of insulating oil.

**Unit – III**

**MARKS – 14**

**Preventive maintenance and environmental pollution prevention** – Concepts of preventive maintenance, advantages, preventive maintenance schedule for transformer, induction motor, transmission line, circuit breaker and underground cable. Preventive measures to control environmental pollution results due to production of smokes gases flow of waste material and automatic reactions in research stations, plants, electrical and electronic equipments and accessories.

**Unit – IV**

**MARKS – 14**

**Trouble Shooting** - Normal performance of equipment, trouble shooting internal and external faults, instruments and accessories for trouble shooting, trouble shooting charts. Electrical Accidents and Safety Measures - Electrical accidents, Safety regulations, treatment of shock, fire extinguishers.



**Unit – V**

**MARKS – 14**

**Testing and maintenance of Relays and Circuit Breakers** - Testing of Relays Factory test, commissioning test and preventive periodic maintenance test. Testing of circuit breakers, voltage test, type test, preventive maintenance of circuit breaker.

**Hot Line Maintenance** - Meaning and advantages, special types of nonconducting materials used for tools for hot line maintenance.

**Reference Books :**

1. Electrical Installations work by T.G. Ffancist. E.L.B.S (Vth metric edition)
2. Electrical Installations Maintenance & fault location work book by T.T.T.I.(W.R.)Bhopal
3. Preventive maintenance Electrical equipment by Charies J Hurburt.
4. Commision of Electrical plant by RCHRichardson.
5. Operation and maintenance of Electrical Equipments Vol. I & Vol.II by B.V.S. Rao, Asia Publishing or Media Promoter Publishers Pvt. Bombay.
6. Electrical Maintenance & Repair by J.I. Watts. Mc Millars London.
7. Troubles in Electrical Equipments by N.E. Stafford. McGraw Hills Pub.
8. A Text Book of Electrical installation work Vol.2. by R.A. Mee., Macdonald London.
9. Electrical Maintenance & Repairs by P.P.Gupta., Dhanpat Rai & Sons Pub.
10. Estimating Commisioning and maintenance of Electrical equipment by S. Rao, Khanna Pub.
11. Fundamentals of maintenance of Electrical Equipment by Bhatia Khanna Pub.

**List of Experiments:**

1. Maintenance of Overhead Lines.
2. Maintenance of switchgear OCB
3. Maintenance of distribution transformer in distribution system.
4. Routine / Preventive maintenance of induction motor in textile mills/ industrial establishments. (a) Shut down and energizing procedure. (b) Accident report writing. (c) Permit to work. (d) Fire extinguisher.
6. Insulation oil testing.
7. Earth resistance testing.
8. Test report of electrical installation.
9. Maintenance schedule.
10. Trouble shooting.
11. Report on hot line maintenance.



**ELECTRICAL MACHINES – II**  
**(DEE - 0404)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks								Grand Total (j= e+i)	Duration of Exam	
		L	T	P	C	Theory				Total (e= a+c+d)	Practical					
						Max (a)	Min (b)	MS T (c)	T W (d)		Max (f)	Min (g)	T W (h)			
DEE - 0404	ELECTRICAL MACHINES – II	3	1	2	6	70	22	20	10	100	30	10	20	50	150	3 hrs.

**Unit – I**

**MARKS – 14**

**Single phase induction motors** - Principle, double revolving field theory. Types of motors with their construction, characteristics and applications. Comparison of three phase with single phase induction motors

**Unit – II**

**MARKS – 1**

**Three phase Induction Motor** - Production of rotating magnetic field, principle, construction and types of induction motors. Equivalent circuit, torque equation, torque-slip characteristics. Types of starters: DOL, Star-delta, Autotransformer type, rotor resistance type, contactor type starter. Speed control. No load and blocked rotor test, losses and efficiency. Braking and applications. Simple numerical.

**Unit – III**

**MARKS – 14**

**Synchronous motor** - Principle, construction, phasor diagram, effect of change in excitation, V curves, synchronous condenser, starting of motors, hunting and its prevention, coding of synchronous machines.

**Unit – IV**

**MARKS – 1**

**Synchronous generator** - Principle, construction, salient and cylindrical rotors, speed-frequency relationship, EMF equation, distribution and pitch factor, equivalent circuit, synchronous impedance, regulation, O.C.C. and S.S.C., load characteristics, phasor diagram, parallel operation. Methods of synchronization, power-angle characteristics.

**Unit – V**

**MARKS – 14**

**AC commutator motors** - Introduction, series motor, compensated series motor, commutating poles, universal motor, repulsion motor.

**Special purpose machines** - Induction motor, stepper motor, PM motor.



**Reference Books :**

1. Electrical Technology Vol. II BL Thereja Khanna publisher
2. Electrical Machines Bhattacharya T.T.T.I.
3. Electrical Machines Nagrath & Kothari PHI
4. Electrical Machines Vol. I & II PS Bhimbra Khanna publishers

**List of Experiments:**

1. Study of three phase induction motor (parts).
2. Measurement of slip of three phase induction motor.
3. Study of three phase induction motor starters.
4. Study of synchronous machine (parts).
5. OCC and SCC of synchronous generator and determination of regulation.
6. To plot V curves of synchronous motor.
7. Study of different single phase induction motors (construction).
8. Study of AC commutator motors (construction).
9. Study of special purpose motors (construction).



**ELECTRICAL ENGINEERING DRAWING  
(DEE - 0405)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (j=e+i)	Duration of Exam
		L	T	P	C	Theory				Total (e=a+c+d)	Practical			Total (i=f+h)		
						Max (a)	Min (b)	MS T (c)	T W (d)		Max (f)	Min (g)	T W (h)			
DEE - 0405	ELECTRICAL ENGINEERING DRAWING	3	1	-	4	70	22	20	10	100	-	-	-	-	100	3 hrs.

**Unit – I**

**MARKS – 14**

**Symbols and Notations** - Symbols of practical units, multiples and submultiples, types of supplies, single phase, three phase three wire, three phase four wire, D.C. supply etc. Accessories like main switches, distribution boards, fans, light fixtures, bell, buzzer, lighting arrestor. All types of motor starters, instruments, electronic components etc. Rating plate of machines.

**Domestic Wiring** - All types of light circuits: Fluorescent tube circuits, intermediate switch circuits, fan circuits. Wiring of a residential building. Sodium vapor lamp, mercury vapor lamp.

**Unit – II**

**MARKS – 14**

**Instrument Circuits** - Connection of meters in circuits. Ammeter, voltmeter, wattmeter, energy meter, Power factor meter, frequency meter, synchroscope etc. Extension of range using shunt, multiplier, current transformer, potential transformers etc.

**Winding Diagrams** - Simplex type lap and wave diagrams for D. C. Machines. Single phase and three phase motor winding diagrams.

**Unit – III**

**MARKS – 14**

**Electrical Machine Drawing** - Parts of D.C. machines like, magnetic poles, commutator, armature etc. A.C. machines rotor, slip rings, etc. Various cable sections. Bushing of the transformer. Assembly diagrams of D.C. machine, A.C. machine, and transformer.

**Simple Electronic Circuits** - Battery eliminator, battery charger, single stage transistor amplifier, connections of common emitter, collector and base amplifier circuits.

**Unit – IV**

**MARKS – 14**

**Power Wiring** - Internal wiring diagrams of single phase motor. wiring diagrams of D.C. and A.C. motor starters like three point shunt motor starter, four point compound motor starter, direct on line (D.O.L.) starter, star- delta starter, contactor type and auto transformer starter. Internal connections of D.C. series, shunt and compound motors. Three phase motors: squirrel cage, slip ring, synchronous etc. Plate earthing and Pipe earthing as per I.S.S.



**Unit – V**

**MARKS–14**

**Transmission And Distribution** - All types of transmission towers and distribution poles. Arrangement of various types of cross arms, with insulators, jumpers. Electrical layout of 33KV/ 11KV substation, 11KV/415V pole mounted substations with all protective devices etc.

**Alternator Panel Diagrams** - Panel diagram with circuit breaker, isolator, measuring instruments, synchroscope. Over current and earth fault protection, differential protection, voltage regulator etc.

**Reference Books :**

- (1) A text book of Electrical Drawing .by S.L. Uppal (Khanna pub.)
- (2) Electrical Drawing by K.L. Narang.
- (3) Electrical Drawing by C.R. Bargan.



**ELECTRONIC MEASUREMENT &  
MEASURING INSTRUMENTS  
(DEE - 0501)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (j=e+i)	Duration
		L	T	P	C	Theory				Total (e=a+c+d)	Practical			Total (i=f+h)		
						Max (a)	Min (b)	MS T (c)	TW (d)		Max (f)	Min (g)	TW (h)			
DEE-0501	ELECTRONIC MEASUREMENT & MEASURING INSTRUMENTS	3	1	2	6	70	22	20	10	100	30	10	20	50	150	3 hrs

**UNIT-I**

**Marks : 14**

**Measuring System:** Elements of a measuring system, Block diagram of system configuration, performance, standards, time lag, error, distortion and distortion meters, noise and noise factor.

**UNIT-II**

**Marks : 14**

**Transducers:** Transducers definition and classification, Characteristic & choice of Transducers, Electrical transducers, Advantages of electric transducers, strain gauges, Gauge factor, applications. Thermistor, RTD, LVDT, RVDT and Capacitive transducers and their application. Thermocouples, Piezo-Electric transducers- principle, mode of operation and application. . Hall Effect transducers, Optoelectronic transducers such as photo voltaic, Photo conductive, and photo conductive cells, constructional details, characteristics and applications. Digital transducers.

**UNIT-III**

**Marks : 14**

**Signal Conditioners:** Purpose of signal conditioning, Classification, Input modifier, Operational amplifiers circuits used in instrumentation, D.C. amplifier, chopper amplifier. Instrumentation amplifier, characteristics, three amplifier configuration. A/D and D/A converters.

**UNIT-IV**

**Marks : 14**

**Measurement of Physical Quantities:** Measurement of Pressure-Types of pressure measurement devices, Secondary transducers, Low pressure measurement, Resistive, Inductive and Capacitive pressure measuring devices.



**Measurement of speed:** Measurement of speed by stroboscope, photoelectric and reluctance pick-up devices for speed measurement. Measurement of Temperature-Temperature measuring devices, Resistance thermometers, Radiation and Optical Pyrometers. Measurement of Humidity-Humidity, absolute and relative humidity, Resistive and Capacitive hygrometers. Measurement of pH Value-Concept, pH scale, pH cell, pH meter. Measurement of Thermal Conductivity (gas analyzer).

**UNIT-V**

**Marks : 14**

**Display Devices and Recorders:**

Digital display system and indicators like CRT, Seven Segment LED , LED, LCD. Analog and digital recorders, Strip and circular chart recorder and Magnetic tape recorder, X-Y recorders. Ultraviolet recorders, Frequency modulated (FM) recording. Digital tape recorders.

**REFERENCES:**

1. Electrical and Electronic Measurement and Instrumentation by A.K.
2. Sawhney
3. Instrumentation Devices and Systems by C S Rangan, G R Sharma and
4. V S V Mani
5. Digital Electronics By Malvino Leach
6. Instrumentation By Cooper

**List of Experiments:-**

1. Measurement of inductance of a coil using Anderson Bridge.
2. Measurement of capacitance of a capacitor using Schering Bridge.
3. LVDT and capacitance transducers characteristics and calibration.
4. Resistance strain gauge- Strain Measurement and calibration.
5. Measurement of R, L, C & Q using LCR-Q meter.
6. Study & measurement of frequency using Lissajous patterns.
7. Measurement of pressure using pressure sensor.
8. Study of Piezo-electric Transducer and Measurement of impact using Piezo-electric Transducer





**Electronics Devices & Circuits (DEE - 0502)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (j= e+i)	Duration
		L	T	P	C	Theory				Total (e= a+c+d)	Practical			Total (i= f+h)		
						Max (a)	Min (b)	MST (c)	TW (d)		Max (f)	Min (g)	TW (h)			
DEE-0502	Electronics devices & Circuit	3	1	2	6	70	22	20	10	100	30	10	20	50	150	3 hrs

**Unit I**

**Marks : 14**

Semiconductor device, theory of P-N junction, temperature dependence and break down characteristics, Zener diode, LED, Photo diode, Transistors BJT, FET, MOSFET, types, working principal, characteristics, and region of operation, load line biasing method. Transistor.

**Unit II**

**Marks : 14**

Feedback amplifier, negative feedback, voltage-series, voltage shunt, current series and current shunt feedback, L-C (Hartley-Colpitts) oscillators, RC phase shift and Crystal oscillators. Power amplifiers, class A, class B, class A B amplifiers, their efficiency and power Dissipation.

**Unit III**

**Marks : 14**

Switching characteristics of diode and transistor, turn ON, OFF time, reverse recovery time, transistor as switch, Clippers and clampers, Differential amplifier, Darlington pair, Cascade amplifier.

**Unit IV**

**Marks : 14**

Operational amplifier characteristics, slew rate, full power bandwidth, offset voltage, bias current, application, inverting, non inverting amplifier, summer, differentiator, integrator, differential amplifier, instrumentation amplifier, voltage to current and current to voltage converters, comparators, Schmitt trigger, 555 timer and its application.

**Unit V**

**Marks : 14**

Regulated power supplies, Series and shunt regulators, current limiting circuits, fixed and adjustable switching regulators, SMPS, UPS.

**References:**

1. Milliman Hallkias - Integrated Electronics; TMH Pub.
2. Gayakwad; OP-amp and linear Integrated Circuits; Pearson Education
3. Salivahanan; Electronic devices and circuits; TMH
4. Salivahanan; Linear Integrated Circuits; TMH-
5. Miliman Grabel; Micro electronics, TMH
6. Robert Boylestad & Nashetsky; Electronics Devices and circuit Theory; Pearson Ed.



**List of Experiment:**

1. V-I Characteristics of different types of Diodes.
2. Applications of diodes and Design of various clipping and clamping circuits.
3. Design half & full wave rectifier
4. Design & Analysis of transistor amplifier in CE, CB & CC configuration.
5. Use of UJT as relaxation Oscillator.
6. Design & Analysis of JFET Amplifier.
7. Design & Analysis of MOSFET Amplifier.
8. To study and construct power amplifiers of various classes.
9. Study of various oscillators.



**DIGITAL ELECTRONICS & LOGIC DESIGN (DEE - 0503)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (j= e+i)	Duration
		L	T	P	C	Theory				Total (e= a+c+d )	Practical			Total (i= f+h)		
						Max (a)	Min (b)	MS T (c)	TW (d)		Max (f)	Min (g)	TW (h)			
DEE-0503	DIGITAL ELECTRONICS & LOGIC DESIGN	3	1	2	6	70	22	20	10	100	30	10	20	50	150	3 hrs

**Unit I**

**Marks : 14**

Number System: Various number systems-decimal, Binary, Hex and Octal with mutual conversion, binary arithmetic in computers, addition, subtraction, multiplication and division.

Binary Codes: Weighted, non-weighted codes, error detecting and correcting codes, alphanumeric codes, ASCII codes

**UNIT II**

**Marks : 14**

Boolean Algebra & Logic Gates, Boolean Algebra: AND, OR, NOT, NAND, NOR, EXOR, operations and gates, laws of Boolean algebra, reduction of Boolean expression, logic diagram, universal building blocks, negative logic.

**UNIT III**

**Marks : 14**

Combinational circuits and system

(A) Combinational logic: Minterms and maxterms, Truth table and Karnaugh mapping, reduction of Boolean expression with SOP, POS and mixed terms, incompletely specified functions multiple output minimization, variable mapping, minimization by labular/ Quine Mc cluskey method.

(B) Encoders, Decoders, Multiplexers, Demultiplexers, code convertors, Binary address Digital comparator, parity checker/ generator, programming logic Array (PLA);

**UNIT IV**

**Marks : 14**

Sequential circuits

(A) State tables and diagrams, flip flop and its various types- JK, RS, T, D, pulse and edge triggered flip flops transition and excitation tables, timing diagrams.

(B) Shift registers: Series and parallel data transfer, ripple counters, synchronous counters, Modulo N counter design, Up down counters, Ring counter.



**UNIT V**

**Marks : 14**

Memory & A/D Conversion

(A) Semiconductor ROM, Bipolar and MOS RAM, organization of RAM memory subsystem.

Timing circuit, clock circuit and IC Timer.

(B) Analog/ Digital conversion: Digital to analog conversion, dual slope integration successive approximation, parallel and parallel/ series conversion, converter specifications.

**Reference Books:**

1. An Introduction to Digital Computer Design by V. rajaraman and T. Radhakrishnan, 3rd Edn. PHI.
2. Digital Principles and Applications by A.P. Malvino and B.P. Leach, 4th Edn. McGraw Hill.. Digital computer Fundamentals by T.C. Bratee, 6th Edn. McGraw Hill.
3. Pulse, Digital and switching circuits-Millman

**List of Experiments:-**

1. Verification of all the logic gates.
2. Design of BCD to Excess-3 code converter.
3. Implementation of NAND & NOR as Universal gate.
4. Design of RS, JK, T& D Flip flop.
5. Multiplexer based boolean function
6. Design of combinational circuit for the
  - (i) Half adder
  - (ii) Full adder
  - (iii) Half subtractor
  - (iv) Full subtractor
7. Design various D-A convertors.



**UTILIZATION OF ELECTRICAL ENERGY (DEE - 0504)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (j= e+i)	Duration
		L	T	P	C	Theory				Total (e= a+c+d )	Practical			Total (i= f+h)		
						Max (a)	Min (b)	MST (c)	TW (d)		Max (f)	Min (g)	TW (h)			
DEE-0504	UTILIZATION OF ELECTRICAL ENERGY	3	1	-	4	70	22	20	10	100	-	-	-	-	100	3hrs

**Unit-I**

**Marks : 14**

Illumination Engineering: Nature of light, units, sensitivity of the eye, luminous efficiency, glare. Production of Light; arc lamps gas discharge lamps- fluorescent lamps, polar curves, effect of voltage variation on efficiency and life of lamps, Distribution and control of light, lighting calculations, solid angle, inverse square and cosine laws, methods of calculations, factory lighting.

**Unit-II**

**Marks : 14**

Heating, Welding And Electrolysis: Electrical heating-advantages, methods and applications, resistance heating efficiency and losses control. Induction heating: core type furnaces, core less furnaces, dielectric heating: principle and special applications, arc furnaces: direct arc furnaces, Indirect arc furnaces. Different methods of electrical welding, resistance welding, arc welding, electro beam welding, and electrical equipment for them. Arc furnaces transformer and welding transformers. Review of electrolytic principles, laws of electrolysis.

**Unit-III**

**Marks : 14**

Traction: Special features of Traction motors, selection of Traction Motor, Different system of electric traction and their Advantages and disadvantages, Mechanics of train movement: simplified speed time curves for different services, average and schedule speed, tractive effort, acceleration and braking retardation.

**Unit-IV**

**Marks : 14**

Electric Drives: Individual and collective drives- electrical braking, plugging, rheostatic and regenerative braking load equalization use of fly wheel, criteria for selection of motors for various industrial drives, calculation of electrical loads for refrigeration and air-conditioning, intermittent loading and temperature rise curve.



**Unit-V**

**Marks : 14**

Introduction to Electric and Hybrid Vehicles: Configuration and performance of electrical vehicles, traction motor characteristics, tractive effort, transmission requirement, vehicle performance and energy consumption.

**References:**

1. \_ Open Shaw ,Taylor, .Utilization of electrical energy., Orient Longmans, 1962.
2. \_ H. Pratap, Art and Science of Utilization of Electrical Energy.
3. \_ Gupta, J.B., Utilization of Elect. Energy ,Katariya and sons, New Delhi.
4. \_ Garg, G.C., Utilization of Elect. Power and Elect. Traction.
5. \_ N V Suryanarayan, Utilization of Elect. Power including Electric Drives and Elect.
6. \_ Hancock N N, Electric Power Utilisation, Wheeler Pub.
7. \_ Mehrdad,Ehsani, Yimin Gao,Sabastien.E. Gay,Ali Emadi, “Modern electric, hybrid electric and fuel cell vehicles”, CRC Press



**ENERGY CONSERVATION & MANAGEMENT (DEE - 0505)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks										Grand Total (j=e+i)	Duration
		L	T	P	C	Theory				Total (e= a+c+d)	Practical			Total (i= f+h)			
						Max (a)	Min (b)	MST (c)	TW (d)		Max (f)	Min (g)	TW (h)				
DEE-0505	ENERGY CONSERVATION & MANAGEMENT	3	1	-	4	70	22	20	10	100	-	-	-	-	100	3 hrs	

**UNIT-I**

**Marks : 14**

General energy problem: Energy use patterns and scope for conservation. Energy audit: Energy monitoring, Energy accounting and analysis, Auditing and targeting. Energy conservation policy, Energy management & audit, Types of energy audit, qualities and function of energy managers, language of an energy manager, Loss of energy in material flow, energy performance, Maximizing system efficiency, Optimizing, input energy requirements, Energy auditing instruments.

**Unit-II**

**Marks : 14**

Thermodynamics of Energy Conservation. Basic principle. efficiency analysis of systems. Primary energy sources, optimum use of prime-movers, energy efficient house keeping, energy recovery in thermal systems, waste heat recovery techniques, thermal insulation. Thermal energy audit in heating, ventilation and air conditioning. Maintenance and Energy audit – friction, lubrication and tribo-logical innovations.

**Unit-III**

**Marks : 14**

Load curve analysis & load management DSM, Energy storage for power systems (Mechanical, Thermal, Electrical & Magnetic) Economic analysis depreciation method, time value of money, Evaluation method of projects, replacement analysis, special problems inflation risk analysis. Payback period, Energy economics, Cost Benefit Risk analysis.

**UNIT-IV**

**Marks : 14**

Energy efficient electric drives, Energy efficient motors V.S.D. power factor improvement in power system. Energy Conservation in transportation system especially in electric vehicle. Energy flow networks, Simulation & modeling.

**Unit-V**

**Marks:14**

Energy conservation task before industry, Energy conservation equipments, Co-Generation, Energy conservation process, Industry Sugar, Textiles, Cement Industry etc Electrical Energy Conservation in building, heating and lighting. domestic gadgets.



**Swami Vivekanand University, Sagar(M.P.)**



**References:**

1. Energy Management – W.R. Murphy & G. Mckey Butler worths.
2. Energy Management Head Book- W.C. Turner, John Wiley
3. Energy Management Principles- Craig B. Smith, Pergamon Press
4. Energy Conservation- Paul O Callagan- Pergamon Press
5. Design & Management of energy conservation. Callaghan,
6. Elect, Energy Utilization & Conservation. Dr. TripathiS.C





**MICROPROCESSOR AND  
MICROCONTROLLER (DEE - 0601)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (j=e+i)	Duration
		L	T	P	C	Theory				Total (e=a+c+d)	Practical			Total (i=f+h)		
						Max (a)	Min (b)	MS T (c)	TW (d)		Max (f)	Min (g)	TW (h)			
DEE-0601	MICROPROCESSOR & MICROCONTROLLER	3	1	2	6	70	22	20	10	100	30	10	20	50	150	3 hrs

**UNIT I**

**Marks : 14**

**Microprocessor 8086**

Introduction to 16-bit 8086 microprocessors, architecture of 8086, Pin Configuration, interrupts, Comparative study of Salient features of 8086, 80286 and 80386.

**UNIT II**

**Marks : 14**

**Microprocessor 8086 programming**

Instruction set of 8086, Addressing mode, Assembler directives & operations, assembly and machine language programming, subroutine call and returns, Concept of stack, Stack structure of 8086, timings and delays.

**UNIT III**

**Marks : 14**

**Input-Output interfacing:** Memory Mapped I/O and Peripherals I/O. PPI 8255 Architecture and modes of operation, Interfacing to 16-bit microprocessor and programming, DMA controller (8257) Architecture, Programmable interval timer 8254, USART 8251, 8 bit ADC/DAC interfacing and programming.

**UNIT IV**

**Marks : 14**

**Microcontroller 8051**

Intel family of 8 bit microcontrollers, Architecture of 8051, Pin description, I/O configuration, interrupts; Interrupt structure and interrupt priorities, Memory organization, Addressing mode, instruction set of 8051 and programming.

**UNIT V**

**Marks : 14**

**8051 Interfacing, Applications and serial communication**

8051 interfacing to ADC and DAC, Stepper motor interfacing, Timer/ counter functions, 8051 based thyristor firing circuit, 8051 connections to RS-232, 8051 Serial communication, Serial communication modes, Serial communication programming, Serial port programming in C.



**Reference Books:**

1. Hall Douglas V., Microprocessor and interfacing, Revised second edition 2006,
2. Macmillan, McGraw Hill .
3. A.K. Ray & K.M. Bhurchandi, Advanced Microprocessors and peripherals- Architecture,
4. Programming and Interfacing, Tata McGraw – Hill, 2009 TMH reprint..
5. Kenneth J. Ayala, The 8086 microprocessor: programming and interfacing the PC,
6. Indian -edition , CENGAGE Learning.
7. Muhammad Ali Mazidi and Janice Gillespie Mazidi, The 8051 Microcontroller and
8. Embedded Systems, Pearson education, 2005.
9. Kenneth J. Ayala, The 8051 Microcontroller Architecture, III edition, CENGAGE Learning.
10. V.Udayashankara and M.S.Mallikarjunaswamy, 8051 Microcontroller: Hardware,
11. Software & Applications, Tata McGraw – Hill, 2009.
12. McKinlay, The 8051 Microcontroller and Embedded Systems – using assembly and C, PHI, 2006 /  
Pearson, 2006.

**List Of Experiment**

1. Introduction to 8086 & 8051 kit, hardware features & modes of operation.
2. Technique of programming & basic commands of kit.
3. Instruction set of 8086 & 8051.
4. Write a program to add two 8-bit numbers.
5. Write a program to add two 16-bit numbers.
6. Write a program for 8-bit decimal subtraction.
7. Write a program to find 1's complement and then 2's complement of a 16-bit numbers.
8. Write a program to find larger of two numbers.



**SWITCHGEAR AND PROTECTION  
(DEE - 0602)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (j= e+i)	Duration
		L	T	P	C	Theory				Total (e= a+c+d )	Practical			Total (i= f+h)		
						Max (a)	Min (b)	MST (c)	TW (d)		Max (f)	Min (g)	TW (h)			
DEE-0602	SWITCH GEAR AND PROTECTION	3	1	2	6	70	22	20	10	100	30	10	20	50	150	3 hrs

**UNIT-I**

**Marks : 14**

**Fault Analysis**

Per unit representation and its advantages, faults in power systems (Symmetrical & Unsymmetrical), Single line and equivalent impedance diagram representation of power system components. Symmetrical components and its application to power systems, fault analysis, Sequence networks and their interconnection for different types of faults, Effect of fault impedance, Current limiting reactors, its location and application, Short circuit calculation.

**Unit-II**

**Marks : 14**

**Proactive Relays**

Requirement of relays, Primary & backup protection, Desirable qualities of relays, Concept of Pickup, reset & drop-off, Drop off/ Pickup ratio, inverse time & definite time characteristics, Induction disc, Induction cup, Moving coil & moving Iron, directional relay. Pilot & negative sequence, over current, Over Voltage, Directional, Differential and Distance relays, R-X diagram, Impedance mho & reactance relay.

**Unit-III**

**Marks : 14**

**Circuit Breakers**

Elementary principle of arc quenching, recovery & re-striking voltage, arc quenching devices, description and operation of Bulk oil, Minimum oil, Air break, Air blast, SF6, Vacuum circuit breakers and DC circuit breakers, their comparative merits, LT Switch gear, HRC fuses, current limiting reactor & influence of reactors in CB ratings.

**Unit-IV**

**Marks : 14**

**System Protection**

Protection of Generators - Earth Fault, percentage, differential, Loss of excitation, Prime mover failure, Over current, Turn to turn fault, Negative phase sequence, Reverse power protection schemes.

**Protection of Transformers**

Internal & external fault protection, Differential, Earth fault, Over Current, Overheating, Protection schemes, Protection of transmission lines, Distance and carrier current protection schemes.



## Unit-V

Marks : 14

### Surge Protection & insulation co-ordination

Switching surges, Phenomena of Lightning, over voltage due to lightning, Protection against lightning, Lightning arrestors, selection of lightning arrestors, Surge absorbers and diverters, Horn gap expulsion type & valve type lightning arrestors, solid resistance and reactance earthing, Earthing transformers, Earthwires, Definitions determination of line insulation, insulation level of substation equipment.

### Reference Books:

1. B. Ravindran and M Chander, Power System protection and Switchgear, New Age International reprint 2006.
2. Badrirk, Power System protection and switchgear, TMH.
3. CL Wadhwa, Electrical Power systems, New age International.
4. Haddi Saadet, Power System Analysis, TMH
5. A.R. Bergen, Vijay Vittal, "Power System Analysis, Pearson Education, Asia.
6. Switchgear & protection Sunil S. Rao. Khanna Publication.

### List of Experiments:-

1. Determination of drop out factor of an instantaneous over current relay.
2. Determination of operating characteristic of IDMT relay.
3. Determination of operating characteristic of differential relay.
4. Study and operation of gas actuated protective relay.
5. Study and operation of static over current relay.
6. Analysis of power system faults (Symmetrical & Asymmetrical) using MATLAB.
7. Study of SF<sub>6</sub> circuit breaker
8. Protection simulation study of generator, Transformer, Feeder & Motor protection



**GENERATION, TRANSMISSION AND DISTRIBUTION (DEE - 0603)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks									Gr and Total (j= e+i )	Duration
		L	T	P	C	Theory				Total (e= a+c+d)	Practical			Total (i= f+h)		
						Max (a)	Min (b)	MST (c)	TW (d)		Max (f)	Min (g)	TW (h)			
DEE-0603	GENERATION, TRANSMISSION AND DISTRIBUTION	3	1	2	6	70	22	20	10	100	30	10	20	50	150	3 hrs

**UNIT-I**

**Marks : 14**

Non Conventional Sources Of Energy, difference between conventional and non conventional sources of energy, concept of solar , wind, biogas, ocean, tidal, geothermal, fuel cell , MHD and their practical applications. Conventional Sources Of Energy Detailed study of generating stations-thermal, hydro, nuclear, schematic diagram, site selection main components and auxiliaries for above power stations. Study of gas turbines plant Advantages and disadvantages of thermal hydro power plant.

**UNIT-II**

**Marks : 14**

**Concept Of Load**

Types of load, load curve, load duration curve, connected load, demand factor, average load, maximum demand, load factor, diversity factor, plant utilization factor, capacity factor. Types of Tariff, flat rate, block rate, maximum demand and power factor tariff. Their merits and demerits.

**UNIT-III**

**Marks : 14**

Concept of Transmission, single line standard voltages of A.C. Transmission, efficiency (no derivation). H.V.D.C. transmission system, line diagram, advantages and Disadvantages of H.V.D.C Sag, causes & effects of sag on transmission line, effect of wind, ice and temperature on sag. Types of line wire supports, earth wires, ground wire and vibration dampers. Importance of R,L,C in transmission line (no derivation), skin effect, transposition, corona, advantages and disadvantages of corona

**UNIT-IV**

**Marks : 14**

Types of insulators, string efficiency and voltage distribution, grading ring and Arcing horn. Types of Transmission line, T and II network of medium Transmission line, transmission efficiency, Ferranti effect medium Transmission line. Difference between overhead line and underground cables. Classification and construction of L.T. and H. T. cables.



**UNIT-V**

**Marks : 14**

Classification of distribution system, ring main, radial and interconnected system. Concept of feeder, distributor and service mains in distribution system. Simple problems .

**Reference Books:**

1. B. Ravindran and M Chander, Power System protection and Switchgear, New Age
2. Badrirka, Power System protection and switchgear, TMH.
3. CL Wadhwa, Electrical Power systems, New age International.
4. Haddi Saadet, Power System Analysis, TMH
5. A.R. Bergen, Vijay Vittal, "Power System Analysis, Pearson Education, Asia.
6. Switchgear & protection Sunil S. Rao. Khanna Publication.

**List of Experiments:-**

1. To study the Thermal Power Station.
2. To study the Hydro Power Station.
3. To study the Nuclear Power Station.
4. To study & draw Towers used in Transmission lines.
5. To study & draw the different types of insulator.
6. To study & design Electrical Power Transmission line.
7. Determination of Transmission Parameters of a transmission line.



**MAJOR PROJECT (DEE-0604)**

Course Code	Title of the Paper	Periods Per week				Distribution of Marks								Grand Total (j=e+i)	Duration	
		L	T	P	C	Theory				Total (e=a+c+d)	Practical					Total (i=f+h)
						Max (a)	Min (b)	MST (c)	TW (d)		Max (f)	Min (g)	TW (h)			
DEE-0604	MAJOR PROJECT	-	-	4	4	-	-	-	-	-	150	-	100	-	250	3 hrs

**COURSE GUIDELINES:**

The objectives of the course ‘Major Project’ are To provide students with a comprehensive experience for applying the knowledge gained so far by studying various courses. To develop an inquiring aptitude and build confidence among students by working on solutions of small industrial problems. To give students an opportunity to do some thing creative and to assimilate real life work situation in institution. To adapt students for latest developments and to handle independently new situations. To develop good expressions power and presentation abilities in students. The focus of the Major Project is on preparing a working system or some design or understanding of a complex system using system analysis tools and submit it the same in the form of a write-up i.e. detail project report. The student should select some real life problems for their project and maintain proper documentation of different stages of project such as need analysis, market analysis, concept evaluation, requirement specification, objectives, work plan, analysis, design, implementation and test plan. Each student is required to prepare a project report and present the same at the final examination with a demonstration of the working system (if any).

The faculty and student should work according to following schedule:

- i) Each student undertakes substantial and individual project in an approved area of the subject and supervised by a member of staff.
- ii) The student must submit outline and action plan for the project execution (time schedule) and the same be approved by the concerned faculty.
- iii) At all the steps of the project, students must submit a written report of the same.

**REFERENCES / SOURCES FOR GUIDANCE TO STUDENT FOR SELECTION OF PROJECT WORK:**

1. Electronics Magazines & Journals.
2. District Industries Center.
3. Industry-Institution Interaction (III)
4. Small Scale industry
5. Industrial problems discussed during industry visit/training.
6. Entrepreneurship development Board Magazine.
7. “Prime Minister Rojgar Yojana” projects from district Collectorate