

COURSE STRUCTURE & SYLLABUS OF BACHELOR OF TECHNOLOGY (B.TECH)

In

Electrical

Course Structure

Second Year

Fourth Semester

Paper Code	Subject
BSE6	Society, Environment, Engineering
BSE7	Electronic Devices & Circuit
BSE8	Analog Electronic Circuit
BSE9	Electromagnetic Theory & Appl
BSE10	Electrical Measurement – I

BSE6 : SOCIETY, ENVIRONMENT & ENGINEERING

1.DEFINITION AND SCOPE OF SOCIOLOGY:

Introduction, History of Sociology, Meaning of Sociology, Definition of Sociology, Nature of Sociology, Scope of Sociology, Specialistic OR Formalistic School, Synthetic School of Thought, Conclusion on Scope of Sociology, Differences between Social Sciences and Physical Sciences, Sociology and Other Social Sciences, Sociology and Psychology, Sociology and Anthropology, Sociology and Political Science, Advantages of Study of Sociology, Utility of Study of Sociology to Engineers, Study of Sociology and Democracy, Study of Sociology in India, Methods of Predicting: Preferred and Expected Future.

2. BASIC SOCIOLOGICAL CONCEPT:

Introduction, Society, Basic Characteristics of Society, Factors affecting Social Life of a man, Social factors, Biological factors, External factors, Industrial societies/Technological society, Community, Characteristics of a Community, Comparison between Society and Community, Association, Characteristics of Association, Comparison between Association and Community, Institution, Characteristics of Institution, Significance of Institution, Distinction between Institution and Community, Customs, Difference between Institution and Customs, Customs in Indian Society, Habit, Types of Habits, Difference between Customs and Habits, Folkways, Mores. Distinction between Folkways and Mores, Fashions, Social Utility of Fashion, Factor which cause Fashion to spread in Modern Society, Crowd, Characteristics of Crowd, Theories of Crowd behaviour, Comparison between Crowd and Public, Audience, Mob, Social groups, Classification of Social group, 'Cooley's' classification:- Primary v/s Secondary group, Difference between Primary and Secondary group, Social Structure, Role Systems, Role Conflict and Role Strain, Tribe.

3. SOCIAL INSTITUTION:

Introduction, Types of social institution, Origin of society, Theory of Divine origin, Force theory, Patriarchal and Matriarchal theories, theory of social contract, Organic theory, Group mind theory modern theory, Socialization, Types of socialization process of socialization, Factors responsible to socialization, Advantages of socialization. Family characteristics of a family, classification of family, Functions of family, changing characteristic of modern family, future of family, joint family, characteristics of joint family, Advantages of joint family, Disadvantages of

joint family system. Future of joint family, Nuclear family or conjugal family, Marriage forms of marriage, Advantages of monogamy, selection of marriage. Partners. Divorce Reasons for Divorce, Marriage system in India, Hindu marriages Act. Divorce under marriage act 1955. Marriage and family in India – some recent trends, dowry, how to curb this customs, religion, characteristics of religion, Religion and morality, Distinction between Religion and morality. Education functionalist aspects of Education – Role of social control. Challenges to Education, Reforming Educational system – practical measures to remove illiteracy. Measures to reduce illiteracy – full Literacy, Multiplicity of Language – 3 language formula. Write in diversity.

4.SOCIAL CHANGE

Factors of social change, social movements, Types of social movements. Theories of social change, Resistance to social change. General continues responsible for social change. Causes responsible for opposition to social changes. When are changes favoured ? Conflicts, causes of conflict, forms of conflict, co-operation social advantages of co-operation. Conflict and co-operation, competition, Distinction between competition and conflict, social progress, social invention, social evolution, characteristics of social evolution, difference between social evolution & social progress, social evolution & social change, Effects of conflict in social change, role of sociologists in Promoting social change, Social disorganization, Causes of social disorganization, Symptoms of social disorganization, Difference between social organization and Disorganization.

5.SOCIAL CONTROL:

Social control and self control necessity of social control , means of social control informal means of social control formal methods of Social control . Agencies of social control , person's views about systems, cybernetic communication and control

6. SOCIAL PROBLEMS:

Deviance , social problems classification of social problems, causes of social problems some important social problem , major social problems.

7. CULTURE:

What culture is ? , characteristics of culture. Concept connected with culture characteristics of lag, causes of culture lag , civilization .

Difference between culture and civilization .Acquired behaviour, culture Diffusion.

8. CAPITALISM , MARXISM AND SOCIALISM:

Some important features of capitalism. Advantages of capitalism , Disadvantages of capitalism , communism or Marxism. Basic features of communism, Difference between capitalism of communism , socialism, silent features of socialism. Difference between socialism and communism.

9.SOCIOLOGY AND TECHNICAL CHANGES:

Science and society , Advantages of science and technology in the economic Development , Technology and women , Influence of Technology on social Institutions , Influence of family systems, Demerits, Influence of technology on religion influence of technology on rural life. Influence of Technology on Urban life, social effects of technology, Technology and planning process of nation.

10. HISTORICAL PERSPECTIVE:

Introduction , phases in development of Technology , Science & technology in India after independence . Technology policy statement 1983. Role of Science and technology in development. Super conductivity programme , Instrument development program. Natural resources date management systems , Nuclear power program, Indian space program. Technology. Development in Electronics , Results of planning , science policy resolution of 1958, manpower Development , Impact of Science & Technology in various sectors.

11. TECHNOLOGY ASSESSMENT AND TRANSFER:

Introduction , meaning of Technology Assessment and Transfer what Technology is information Technology , Technology Assessment , Importance of Technology, Technology forecasting and upgradation, Appropriate. Technology , criteria for success of Technology Transfer, Transfer of technology from laboratory to field.

12.CYBERNETICS:

Introduction, what cybernetics is ? control system

13.ENGINEER IN SOCIETY:

Introduction , optimisation , Limitations of optimization , concepts of optimisation . Advantages of optimisation , Methods of optimisation operation research , optimisation of Human Resources . Important of Human Resources , Human Resources planning, Needs and strategies for Human Resources planning, factors affecting manpower planning . Responsibility for Human Resource planning , work rules , wage , factors affecting wages , methods of wage fixation optimum use of capital resources, capital , Types of capital , capitalisation , Banking

Classification of bank: Credit instruments optimum utilization of material resources , material Handling , Principles & functions of materials Handling material Handling Devices , manual handling , mechanical handling, conveying equipment , Transportation and transferring equipment , Lifting, lowering or elevating equipment , Productivity , Labour productivity, importance of productivity, Benefits of productivity measures of increase of productivity, Automation , formulation of problem , formulation of problems and alternative solution. Strategies, Alternative solution strategies ; The principle of limiting factor, the basic process of Evaluation; maintenance of Public system, Defence & Security requirements.

14.INFLATION AND POVERTY:

Inflation, causes of Inflation in India, measures to control inflation and deflation; poverty, Industrialisation of country; conclusion.

15.ENVIRONMENTAL DEGRADATION AND CONTROL:

Meaning of Environment ; Environment pollution, pollution, classification of pollutants; Effects of pollution on Living systems, causes of Environmental pollution , Kinds of pollution, suggestion for improving , atmospheric pollution , Environmental control monitoring of environmental pollution , Air pollution, classification of air pollutants, sources of Air pollutants, Geographical factors affecting air pollution , Effects of Air pollution ,prevention and control of Air pollution, water pollution, sources of water pollution, Effect of water pollution , water Analysis, waste water; its treatment and Enviroments, waste water treatment , stages of waste , water treatment , treatment and disposal of sewage, treatment of sewage. Industrial waste treatment and Disposal , Treatment of Effluent, Standards for drinking water, water treatment process, some suggestions for reducing water pollution , Role of Engineer in Environmental protection , Ecological imbalance and its Effects,

16.PLANT LAYOUT AND SITE SELECTION:

Introduction , Nature of location decisions, choice of site for location, Urban Area, selection of Site in Rural Area, Suburban Area, Comparison of site for location of facilities , models of location of service facilities, Economic survey for site selection , plant layout , Advantages of good layout , Principles of plant layout, Types of pant layout , Fixed position Layout process layout, product layout, combination layout, Selection of space requirement in layouts.

17. PERSONAL MANAGEMENT:

Defination of personnel management, importance of personnel management,principle of personnel management objectives of personnel management functions of personnel management , Recruitment and selection of employees. Manpower planning ; objectives of manpower planning , Types of manpower planning , steps in manpower planning , Procedure of appointing an employee in a factory , Training and Development, principles of Training ,methods of Training , Industrial safety , Accident Human causes, Effect of accidents, Effect to the Industry , Effect on worker, cost of society, Types of Accidents , Safety procedures.

Ways to prevent or minimize Accidents , Accident reporting and Investigation, Investigation of causes Precautionary measures for maintaining . Industrial Health, Incentives premium OR Incentive Bonus system, Essential s of a Good Incentive systems, Understanding duties of other officials in Department. Duties of Maintenance Engineer. Duties of safety officer, Duties of Security officer.

18.INDUSTRIAL ACTS:

Introduction, Indian Boiler Act 1923, The Indian factories Act 1948, Health provisions. Important provisions of the factory Act regarding safety of workers, welfare provisions , penalties for breach of provisions of the act, Indian Electricity Act, Supply & Use of Energy, The Employee's State Insurance Act 1948, Workmen's compensation Act, The Industrial Dispute Act,1947, Strikes and Lockouts, The payment of wages Act 1936 , The Indian Trade Union Act, 1926 , Minimum Wages Act 1948.

19.STANDARDS:

Indian standard Institution, BIS Publications, ISO-9000 Quality systems.

20.FUNCTIONS OF MANAGEMENT:

Difference between Management , Administration, Organisation, Functions of management , Planning , Production planning and control , steps in production planning and control , Routing procedure of Routing , Scheduling & Loading scheduling and loading , Advantages of planning. Management by objectives, forecasting , Types of forecasting , organizing , meaning of organization,purpose of organizing, Advantages of organization. Classification of organization , Hierarchy systems of organization, Advantages & Disadvantages of scalar systems , Types of organization structures, functional organization, communication objectives of communication, communication process model superior subordinate communication , Types of communication systems , Advantages of oral communication systems , Disadvantages of oral communication systems, written communication, Directing , Nature of Directing, Principles of Direction, controlling , characteristics of Good control systems, co-ordination, Tools of co-ordination, Types of co-ordination,principles of co-ordination, co-ordinationVs co-operation. Motivation Importance of motivation, Techniques of motivation, Methods of participation, Extent of worker's participation in management, worker's participation in Indian Industries, Human needs, Importance of fulfillment of needs, maslow's theory of motivation, Leadership, leadership Style.

BSE7 : ELECTRONIC DEVICES & CIRCUIT

1. MULTI STAGE TRANSISTOR AMPLIFIERS

Introduction, Multi-Stage Transistor Amplifier, Gain Decibel, Frequency Response, Band Width, R-C (Resistance-Capacitance) Coupled Transistor Amplifier), Frequency Response, Transformer Coupled Transistor Amplifiers, Direct - Coupled Amplifiers, Comparison Of Different Types Of Multi-Stage Amplifiers,

2. TRANSISTOR POWER AMPLIFIERS

Introduction, voltage and power amplifiers, comparison of voltage and power amplifiers, process of power amplification, single-ended transistor power amplifier, performance of power amplifiers, classification of power amplifiers, calculations for maximum collector efficiency of a class-a power amplifier, transistor temperature control by heat sinks, collector dissipation curve and its importance, stages of a practical power amplifier, driver stage, complementary-symmetry push-pull amplifier, harmonic distortion in power amplifiers, distortion in push-pull amplifiers

3. FEEDBACK AMPLIFIERS

Introduction, Feedback, Principle Of Negative Feedback In Amplifiers, Gain Of Amplifier With Negative Feedback, Transistor Amplifier Circuit With Negative Voltage Feedback, Feedback Circuit, Negative Feedback Circuits, Transistor Amplifier Circuits With Negative Current Feedback, Circuit Analysis

4. SINUSOIDAL OSCILLATORS

Introduction, sinusoidal oscillator, types of electrical oscillations, transistor oscillator, different types of transistor oscillators, principle of phase shift oscillators, r.c phase shift oscillator, wein bridge oscillator, piezoelectric effect and crystals, characteristics of crystal, transistor crystal oscillator

5. TUNED AMPLIFIERS (RF AMPLIFIERS)

Introduction, classification of tuned amplifiers, merits and limitations of tuned amplifiers, narrow band tuned amplifier, tunability Single tuned capacitance coupled amplifier, tuned power amplifier, tuned class c amplifiers,

6. SWITCHING AND WAVE – SHAPING

Introduction, switching circuit, switch, electronic switch, comparison between electronic and other switches, analysis of switching action of a transistor, multivibrators and their working principle, types of multivibrators, bistable multivibrator, differentiating circuit, wave-shaping by differentiating circuit, integrating circuit, wave-shaping by integrating circuit, voltage multipliers, voltage doubler, voltage tripler, voltage quadrupler, necessity of voltage multipliers, clamping circuits, wave-shaping by various clipping/clamping circuits

7. SPECIAL POWER SUPPLIES

Introduction, transistorized inverter, constant voltage transformer (cvt), construction of cvt, comparison between cvt and stabilizer, comparison among three types of ups systems, three-terminal ic voltage regulators

8. OPERATIONAL AMPLIFIERS

Introduction, operational amplifiers, ideal opamps with feed back (virtual ground), properties of practical op-amps, op-amps as voltage amplifiers, the voltage follower, differential amplifier, op-amp differentiator, practical operational amplifiers

BSE8 : ANALOG ELECTRONICS CIRCUITS

1. BIASING OF BJT

Introduction, Types Of Bjt's, Transistor Terminals, Transistor Action, Transistor Configurations Or Connections, Common-Base (Cb) Configuration, Characteristics Of Cb Configuration, Transistor Configurations Or Connections, Common-Base (Cb) , Configuration, Characteristics Of Cb Configuration, Common-Emitter (Ce) Configuration, Common Collector (Cc) , Configuration, Comparison Of Three Configurations, Ce (Common Emitter) Configuration, Operating Point (Quiescent, Q Or Silent Point), Different Points On The Characteristic, Different Operating Conditions Of A Transistor, Transistor Biasing , Need For Biasing A Transistor, What Happens If A Transistor Is Not Biased , Faithful Amplification, Transistor Biasing, Inherent Variations Of Transistor Parameters, Stabilization, Biasing Circuits, Base Resistor/Fixed Bias Circuit, Biasing With A Feedback Resistor, Emitter Resistance Biasing (Or Self Bias), Voltage (Or Potential) Divider Biasing , Two Battery Bias Stabilisation, Thermal Resistance, Determine Of Operating Point In Presence Of Self Heating, Thermal Stability, Bias Compensation, Design Of biasing Circuits,

2. BIASING OF FET

Introduction, comparison between BJT and FET, field effect transistors (FET), construction of a JEFT (or simply FET), biasing of FET, working principle of an- n- FET, working of a p- FET, static characteristic of FET, FET parameters, FET as an amplifier, FET applications, description of important applications, Biasing the FET basic FET amplifier

3. SMALL SIGNAL BJT AMPLIFIER

Introduction, Single Stage Small Signal Amplifiers, A Practical (Single Stage) Transistor Amplifier Phase Relationship Between Input And Output Of A Transistor Amplifier (Phase Reversal), Analysis Of Transistor Amplifier, Equivalent Circuits Of Transistor Amplifier, Alternative Ac Equivalent Circuits For The Amplifier, Graphical Method (By Drawing Load Lines), Current, Voltage And Power Gains, Hybrid Parameters, Advantages Of Hybrid Parameters, Two-Port Network, Determination Of H-Parameters, Nomenclature Of H-Parameters, Hybrid Model, Performance Of A Transistor In H-Parameters, Limitations Of H-Parameters, Grounded Emitter Circuit, Common Base Amplifier, Grounded Collector Circuit , Comparative Study Of Three Types Of Amplifier Circuits, The Common Emitter Amplifier With Emitter Resistor, Simplified Common Emitter Hybrid Model, Effect Of An Emitter Bypass Capacitor In Low Frequency Response, The Physical Model Of Cb Transistor, Resistor As A Switch

4. SMALL SINGLE FET AMPLIFIER

FET Parameters, JFET As An Amplifier, FET Small Signal Model, Common Source A.C. Amplifier, The Common Drain Or Source Follower, Common Gate Amplifier, General Treatment Of Low Frequency Common Source And

Common Drain Amplifier, Common Source Amplifier At High Frequencies, Common Drain Amplifier (Source Follower) At High Frequencies

5. POWER CIRCUITS (RECTIFIER & FILTERS & REGULATORS)

Introduction Semiconductor Diode Rectifiers (Single Phase), Half-Wave (H.W) Rectifiers, Full-Wave (F.W.) Rectifiers, F.W. Bridge Rectifier, Efficiency Of An F.W. Rectifier, Selection Of A Circuit For F.W. Rectification, Ripple Factor, Types Of Filter Circuits, Power Supply Filters; Capacitor Filter, L-Section Filter (Lc Filter), Clc Or π Filter, Zener Diode Voltage Regulator

6. POWER SWITCHING & CONTROL DEVICE

Introduction, Thyristor, Thyristor Family, Working Of An SCR, Two-Transistor Analogy For An SCR, Regeneration, An SCR As A Latch, V_i - Characteristics Of An SCR, SCR Terms, Applications Of SCR, SCR Packages (Packages), Variations Of SCR (Family Of SCR Or Thyristors), Silicon Controlled Switch (SCS), Gate Turn-Off (GTO) Switch, Light Activated SCR (Laser), Triac, Application Of Triac, Diac, Diac Characteristic, Operation Of Diac, Application Of Diac, UJT (Uni-Junction Transistor), Equivalent Circuit Of UJT, Operating Characteristic, Latching (Switching) Operation Of UJT, Application Of UJT-Relaxation Oscillator, Frequency Of Sawtooth Waves Generated By Relaxation Oscillator

BSE9 : ELECTROMAGNETIC THEORY & APPLICATION

1. COLOMB'S LAW AND ELECTRIC FIELD INTENSITY

The Experimental Law of Coulomb, Electric Field Intensity, Field Due to Continuous Volume Charge Distribution

2. ELECTRIC FLUX DENSITY, GAUSS' LAW, AND DIVERGENCE

Electric Flux Density, Gauss' Law, Applications of Gauss' Law : Some Symmetrical Charge Distributions, Application of Gauss' Law : Differential Volume Element, Divergence, Maxwell's First Equation (Electrostatics), The Vector Operator ∇ and the Divergence Theorem

3. ENERGY AND POTENTIAL

Energy and Potential in a Moving Point Charge in an Electric Field, The Line Integral, Definition of Potential Difference and Potential, The Potential Field of a Point Charge, The Potential Field of a System of Charges : Conservative Property, Potential Gradient, The Dipole, Energy Density in the Electric Field

4. CONDUCTORS, DIELECTRICS, AND CAPACITANCE

Current and Current Density, Continuity of Current, Metallic Conductors, Conductor Properties and Boundary Conditions, The Nature of Dielectric Materials, Boundary Conditions for Perfect Dielectric Materials, Capacitance

5. POISSON'S AND LAPLACE'S EQUATIONS

Poisson's and Laplace's Equations, Uniqueness Theorem, Examples of the Solution of Laplace's Equation, Example of the Solution of Poisson's Equation, Product Solution of Laplace's Equation

6. THE STEADY MAGNETIC FIELD

Ampere's Circuital Law, Magnetic Flux and Magnetic Flux Density, The Scalar and Vector Magnetic Potentials, Derivation of the Steady-Magnetic-Field Laws

BSE10 : ELECTRICAL MEASUREMENT-i

1. UNITS , SYSTEMS, DIMENSIONS AND STANDARDS

Introduction, Unit, Absolute Units, Fundamental And Derived Units, Dimensions, Dimensions Of Mechanical Quantities, Cgs System Of Units, Practical Units, Rationalised M.K.S.A System, SI Units, Base Units Of SI,

Multiplying Prefixes Of Units, Standards And Their Classification, International Standards, Standards For Mass And Length,

2. RESISTANCE MEASUREMENTS OF RESISTANCE.

The Pyrolitic or cracked –carbon resistor, Metal –film resistors, Resistors, Time constant resistors. Measurement of Resistance: Voltmeter Ammeter Method, Substitution Method, Direct Deflection Method, Differential Galvanometer Method, Kohlrausch's Method, Wheatstone Bridge, Working of the bridge, Measurement of high-resistances

3. POTENTIOMETER

Analysis of Potentiometer Circuit, Limitation due to the galvanometer sensitivity, Student Type Potentiometer, Use of potentiometer in the measurement of resistance, voltage and current: Resistance, Measurement of current, Measurement of high voltages

4. A.C. BRIDGES

Sources and detectors, general form of an a.c. Bridge, measurement of self inductance, maxwell's inductance-capacitance bridge, hay's bridge, Anderson's bridge, owen's bridge, measurement of capacitance, measurement of mutual inductance, heaviside mutual inductance bridge, campbell's modification of heaviside bridge, heaviside campbell equal ratio bridge,

5. ANALOG AMMETERS, VOLTMETERS AND OHMMETERS

Types of instruments, errors in ammeters and voltmeters, permanent magnet moving coil instrument (pmmc), ammeter shunts, multi-range ammeters, moving iron (m.i.) Instruments, general torque equation of moving iron instruments, classification of moving iron instruments, shape of scale of moving iron instruments, multipliers for moving iron instruments, comparison between attraction and repulsion types of instruments, errors in moving iron instruments, electrodymanometer (electrodynamic) type instruments, operating principle of electrodymanometer type instrument, construction of electrodymanometer type instrument, torque equation of electrodymanometer instruments, hot wire instruments, thermocouple instruments, principle of operation of thermo-electric instruments, electrostatic instruments, force and torque equations of electrostatic instruments. Rectifier type instruments, rectifier elements, multimeters

6. INSTRUMENT TRANSFORMER

Use of instrument transformers, ratios of instrument transformers, burden of an instrument transformer, current transformers, relationships in a current transformer, errors in current transformers, potential transformers, relationships in a potential transformer, errors in potential transformers, reduction of errors in potential transformers, construction of potential transformers, high voltage potential transformers, protection of potential transformers

7. MEASUREMENT OF NON-ELECTRIC QUANTITIES

Linear Displacement Transducers, Measurement Of Rotary Displacement, Strain Gauges And Measurement Of Strain, Ballast Circuit, Null Type Wheastone Bridge, Deflection Type Wheastone Bridges, Gauge Sensitivity, Temperature Compensation, Adjacent Arm Compensating Gauge, Use Of Two Active Gauges In Adjacent Arms, Use Of Our Active Gauges, Poisson's Method, Practical Strain Bridge, Strain Gauge Calibration, Uses Of Strain Gauges, Measurement Of Pressure, Measurement Of Pressure Using Electrical Transducers As Secondary Transducers, Measurement Of Linear Velocity, Moving Magnet Type, Measurement Of Angular Velocity, Electrical Tachometers, Electromagnetic Tachometer Generators, Digital Methods, Photoelectric Tachometer, Toothed Rotor Variable Reluctance Tachometer, Measurement Of Temperature, Measurement Of Resistance Of Thermometers, Salient Features Of Resistance Wire Thermometers, Thermistors.
