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

In

Civil

Course Structure

Second Year

Fourth Semester

Paper Code	Subject
BSC6	Society, Environment, Engineering
BSC7	Building Construction
BSC8	Structural Analysis
BSC9	Advanced Surveying
BSC10	Solid Mechanics

Syllabus

BSC6 : 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 contril , means of social control informal means of social control formal methods of Social control . Agencie 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.SOCIALOGY AND TECHNICAL CHANGES:

Science and society , Advantages of science and technology in the economic Development , Technology and women , Influence of Technology on social Insitutions , 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 , optimisaiton , 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 Efflent, 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 facilties, 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, Suppy & 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 , Hirarchy 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, Prinicples of Direction, controlling , characteristics of Good control systems, co-ordination, Tools of co-ordination, Types of co-ordination,priniciples 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, moslow's theory of motivation, Leadership, leadership Style.

BSC7 : BUILDING CONSTRUCTION

1. FOUNDATION

General Discussion, Assessment Of Allowable Soil Pressure, Settlement In Clay, Settlement In Sand, Differential Settlement, Types Of Foundations, Deep Foundations, Pile Foundations, Well Foundations And Caissons, Foundations In Special Conditions
Foundation Failures, Durability Of Foundation, Excavations For Foundation Trenches And Basements, Dewatering Of Foundation Excavations, General Procedure In Foundation Design, Cofferdams, Circular Cellular Cofferdam.

2. ACOUSTICS AND SOUND INSULATION

General Discussion And Scope Of Study, Acoustics Of Buildings, Sound Insulation Of Buildings, Characteristics Of Audible Sound, Rating Of Intensity Levels Of Sound Or Noises (In Decibels Or Db), Behaviour Of Sound And Its Effects (Or Principles Of Acoustics), Absorption Coefficients For Important Surfaces, Acoustical Defects, General Remarks On Reverberatlon Time And Audience Factor, Acoustics Of Buildings, Sound Absorbents Or Acoustical Materials, Sound Insulation Of Buildings, Transmission Of Noise, Sound Insulation Vs. Sound Absorption, Transmission Loss, Maximum Acceptable Noise Levels

3. VENTILATION, AIR-CONDITIONING AND THERMAL INSULATION

General Remarks, Ventilation, Definitions And Necessity Of Ventilation, Functional Requirements Of A Ventilation System, Systems Of Ventilation And Their Choice, General Considerations And Rules For Natural Ventilation Air-

Conditioning Of Buildings, General-Purposes And Classification, Principles Of Comfort Air-Conditioning, Comfort Air-Conditioning Under Indian Conditions, Systems Of Air –Conditioning, Essentials Of An Air-Conditioned System, Air Pumps, Thermal Insulation Of Buildings (Or Heat Insulation Of Buildings), General Discussion And Definitions Of Terms, General Principles Of Thermal Insulation, Heat Insulating Materials Or Material, Of Heat Insulation, Values Of Density, Thermal Conductivity And Thermal Resistivity Of Some Building And Insulating Materials,
Methods Of Heat Insulation Or Thermal Insulation

4. STRUCTURAL STEEL WORK

General Principles Of Steel Work, Rolled Steel Sections Or Sections In Steel Work, Methods Of Connecting Steel-Work, Structural Steel Members And Their Interconnection, Important Considerations In Fire Protection, Properties Of Fire-Resisting Materials, Fire-Resistant Construction, General Measures Of Fire Safety In Buildings

5. MISCELLANEOUS STRUCTURES

General, Shell Structures, Folded Plate Structures, Skeletal Space-Frame Structures, Pneumatic Structures, Grain Storage Structures, Prefabricated Structures, Fireplaces And Flues, R.C.C. Chimneys, Earthquake-Resistant Structures, Modified Mercalli Intensity Scale (Abridged)

6. CONSTRUCTION MANAGEMENT, CONTROL AND VALUATION OF A BUILDING

Introduction, Objects Of Planning, Construction Stages, Construction Operation, Construction Schedules, Bar Chart, Milestone Chart, Definitions, Pert Network, Cpm Network, Explanation Of Table, Cost Analysis, Value Engineering Manpower And Materials Requirements In Buildings, Job Layout For Building, Project Supervision, Project Control During Construction, Construction Contracts, Management Techniques For Rural Housing Development In India, Demolition Works In Buildings, Building Disaster Management, Environmental Impact Management

BSC8 : STRUCTURAL ANALYSIS

1. SHEAR FORCES AND BENDING MOMENT

Beam, Types of Loads, Types of Supports, Shear Force and Bending Moment, Sign Convention, Shear Force and Bending Moment Diagrams, S.F. and B. M. Diagrams for Simply Supported Beams, S. F. and B.M. Diagrams for Overhanging Beams, Relationship between Rate of Loading, Shear Force and Bending Moment, Graphical Method of Plotting S. F. and B. M. Diagrams, Uniformly Distributed Loads

2.DEFLECTION OF BEAMS

Introduction, Relationship between Curvature, Slope and Deflection, deflection Curves, Macaulay's Method, Deflection Curve by Macaulay's Method, Propped Cantilevers, Deflections by Moment Area Method, Sign Convention, Slope and Deflection for Cantilever, Slope and Deflection for simply Supported Beam, Deflections by Conjugate Beam Method, Deflection by strain Energy, Impact Loading on Beams, Laminated Spring, Deflection Due to Shear

3. FIXED AND CONTINUOUS BEAMS

Introduction, Fixing Moments for a Fixed Beam of Uniform Section, Effect of Sinking of Support, Effect of Rotation of a Support, Slope and Deflection at a point, by Moment Area Method, Introduction, Analysis of Continuous Beams, Reactions at the supports, Effect of Sinking of Supports

4. COLUMNS AND STRUTS

Introduction, Euler Crippling Load-Column with One End Free and the Other End Fixed, Column with both ends fixed, Column with One End Fixed and the other Hinged, Limitation of Euler's Formula, Column with Initial Curvature, Column Carrying Eccentric Load, Laterally Loaded Columns, Empirical Formulae

5. RIVETED CONNECTIONS

Introduction, Riveted Connections, Types of Riveted Joints, Failure of Riveted Joints, Strength of Riveted Joints, Permissible Stresses in Rivets, Design of Riveted Joints, Riveted Joints in Cylindrical and Spherical Shells, Structural Connections, Riveted Joints Subjected to Moment Acting in the Plane of the Joint, Riveted Joint Subjected to Moment Acting at Right Angles to the Plane of the Joint

6.WELDED CONNECTIONS

The welding process, types of welds, intermittent fillet welds, combined stresses in weld, eccentric welded connection

BSC9 : ADVANCED SURVEYING

1. TRIGONOMETRICAL LEVELLING

Introduction, Heights And Distances, Base Of The Object Acessible, Base Of The Object Inaccessible: Instrument Stations Not In The Same Vertical Plane As The Elevated Object, Geodetical Observations, Axis Signal Correction (Eye And Object Correction), Determination Of Difference In Elevation,

2. TRIANGULATION

Geodetic Surveying, Classification Of Triangulation System, Triangulation Figures Or Systems, The Strength Of Figure, Routine Of Triangulation Survey, Signals And Towers Towers, Non-Luminous Or Opaque Signals, Base Line Measurement, Calculations Of Length Of Base, Measurement Of Horizontal Angles, Satellite Station: Reduction To Centre, Extension Of Base: Base Net.

3. TOPOGRAPHIC SURVEYING

Introduction, Methods Of Representing Relief, Contours And Contour Interval, Characteristics Of Contours, Procedure In Topographic Surveying, Methods Of Locating Contours, Interpolation Of Contours

4. ROUTE SURVEYING

Introduction, Reconnaissance Survey, Preliminary Survey, Location Survey, Construction Survey.

BSC10 : SOLID MECHANICS

1. **ANALYSIS OF STRESS**
   Introduction, stress, complementary shear stress, simple shear, the state of pure shear, principal stresses and principal planes, sign convention, Mohr's circle for biaxial stresses, Mohr's circle.

2. **ANALYSIS OF STRAIN**
   Introduction, Strain On An Oblique Plane, Mohr's Circle Of Strain, Compatibility Equations

3. **STRESS – STRAIN RELATIONS FOR LINEARLY ELASTIC SOLIDS**
   Introduction, Hooke's Law, Poisson's Ratio, Differential Equation Of Equilibrium, The Stress Function-Plane Stress

4. **THEORY OF FAILURE**
   Introduction, Maximum Principal Stress Theory, Maximum Shearing Stress Theory, Maximum Strain Theory, Significance Of Theories Of Failure, Factor Of Safety

5. **ELASTIC STABILITY**
   Introduction, Failure Of A Column Or Strut , Euler's Column Theory , A Sign Conventions , Limitation Of Euler's Formula , Empirical Formula For Columns, Rankine's Formula For Columns, Euler's Formula

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