



M. Phil. / Ph.D. Admission 2019

Entrance Test Syllabus Details:

- ❖ Agriculture
- ❖ Agri-Informatics
- ❖ Biotechnology
- ❖ Biomedical Engineering
- ❖ Computer Engineering
- ❖ Conflict Management
- ❖ Chemistry
- ❖ Economics
- ❖ Education
- ❖ Civil Engineering
- ❖ Commerce
- ❖ Electrical Engineering
- ❖ Electronics Engineering
- ❖ English
- ❖ Environmental Sciences
- ❖ Law
- ❖ Management
- ❖ Mathematics
- ❖ Microbiology
- ❖ Pharmaceutical Sciences
- ❖ Physics
- ❖ Psychology



SYLLABUS FOR AGRICULTURE

Agronomy: Crop Production (Kharif, Rabi & Zaid Crops, Weeds and Control, Herbicides, Integrated Farming, Systems, Organic Farming, Tillage, Irrigation Type & Methods, Seed and Sowing, Crop Nutrition).

Soil Science: Soil Type, Distribution and Classification, Soil pH, Ec, BD, Alkaline and Saline Soil, Problematic Soils, Soil Nutrients, Soil Fertility, Soil Physical Properties, Composition of soil.

GPB: Basics of genetics & Plant breeding, Botany and plant breeding methods, Genome organization and cytogenetic of crop plants, Genetic Engineering and Biotechnological Tools in plant breeding varietal release and seed production,

Ag.Extension: Extension Programme planning-Meaning, Process, Principles and Steps in Programme Development. various extension/ agriculture development programmes launched by ICAR/Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND,NATP, NAIP, etc.). New trends in agriculture extension: privatization extension, cyber extension/ e-extension. Rural Development: concept & meaning, Gurgaon Experiment, Sriniketan Scheme, Etawah Pilot Project, etc.

Horticulture: Basics of Horticulture Science, Scope and importance of Horticulture, Growth and development of Horticultural plants, propagation, breeding, and seed production of Horticulture crop, ornamental horticulture, use of plant bio regulators, nutrients and water management improved varieties physiological disorder, Post harvest Mgmt.

Ag. Statistics ; Designs: LSD, RBD, SPD, SSPD, CD, SD, Tests, Probability,

Ag. Meteorology: Basics of Meteorology and climatology, Micro meteorology ,Crop weather Modeling, weather forecasting for Agriculture, Evapo-transpiration.

Dairy Technology: Procurement of Milk, Milk and Milk Products & its secretion, Clean milk production, Physiochemical and microbiological properties of Milk.

Ag. Biotechnology: DNA, RNA, Vitamins, Enzymes, Fundamental of Biotech,Bio Analytical Techniques, & Hormones.

Bio-Chemistry: Lipids, Fats (Saturated and un-saturated), Carbohydrates, Amino Acids,

Animal Breeding: Breeds of Cattles (chicken, Goat ,Sheep, Pig, Cow & Buffalos) Breeding System, Care and Management of Milch Animal during and after calving. Classification of Diseases and it's control measures. Dairying under specialized mixed farming.

Food & Nutrition: Aspects of Food Quality, Macro & Micro-nutrients, (Starches in food, Proteins, Carbohydrates, Sugars, Grains, Meat, poultry, Fish & Dried Beans.

Food Processing & Food Tech. Aspects of food production, Food Processing & preservation techniques. Natural and chemical preservation, Food Additives and Packaging of food products.

Plant Pathology: Genetically distribution of Crops, Plant Disease, Terms and concepts in Pathogenesis. Causes / factors affecting disease development: classification of plant diseases. Important plant pathogenic organisms, different groups: fungi, Bacteria, Viruses, algae, protozoa, parasites and nematodes with examples of diseases and caused by.

Entomology: Pests Identification, Impact on Different Crops, Control. Major points related to dominance of Insects in Animal kingdom. Insect Ecology, Types of reproduction in insects. Concept of IPM, Practices, scope and limitations of IPM.

Ag. Economics: Principles of Economics, Farming Systems, GDP,. Micro and Macro economics, Nature of economic theory; Rationality assumption, Concept of equilibrium, Economic laws as generalization of human behavior. Basic concepts: Goods and services, desire, want, demand, utility, cost and price, wealth, capital, income and welfare. Agricultural Economics: meaning, definition, characteristics of agriculture, importance and its role in economic development. law of demand, utility theory; law of diminishing marginal utility



SYLLABUS FOR AGRI INFORMATICS

Introduction to Computers, Operating Systems, definition and types, Applications of MSOffice for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types, uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations.

Kharif and rabi crops: cultivation practices of important crops; Organic Farming-definition, scope and components of Organic Farming; Watershed management - problems and prospects and land use planning; Cropping Pattern, Area under different Crops, Crop production; Scope, Limitations & Strategies, Production Constraints for Oilseeds, Pulses, Fibre Crops, Fodder Crops, and Commercial Crops, Production and Distribution of Quality Seed. Chemical Fertilizers and organic manures, Plant Protection Practices, Rainfed Agriculture, Dry Land Farming, Irrigated lands, Sources of Irrigation Water, Development of efficient Irrigation System. Postharvest Technology, Agri-food Processing. Soil types, Soil texture, structure characteristics for suitability of crops, soil fertility and productivity. Agronomical measures to maintain fertility and productivity, concept of tillage and zero tillage problematic soils and their management, Wasteland management of wasteland

Agricultural Marketing: Concepts Definition and Scope, Agriculture marketing: Meaning, Definitions, Components of a market, marketing structure, marketing efficiency. Agricultural Credits, Bank Loans, Crop Insurance, Agricultural Trading, Human Resource Management. Supply Chain Management.

Definition of Remote Sensing and GIS. The Electromagnetic spectrum. Wave Phenomenon concept. Electromagnetic waves. Spectral reflectance of soil, water and vegetation. Satellites and sensors. Geospatial technology for generating valuable agri-information. Decision support systems, concepts, components and applications in Agriculture, Agriculture Expert System, Soil Information Systems etc. for supporting Farm decisions. Preparation of contingent crop-planning using IT tools.

e-Agriculture, concepts and applications, Use of ICT in Agriculture. Computer Models for understanding plant processes. IT application for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management, Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc.



SYLLABUS FOR BIOTECHNOLOGY

Microbiology:

Prokaryotic and eukaryotic cell structure; Microbial nutrition, growth and control; Microbial metabolism (aerobic and anaerobic respiration, photosynthesis); Nitrogen fixation; Chemical basis of mutations and mutagens; Microbial genetics (plasmids, transformation, transduction, conjugation); Microbial diversity and characteristic features; Viruses.

Biochemistry:

Biomolecules and their conformation; Ramachandran map; Weak inter-molecular interactions in biomacromolecules; Chemical and functional nature of enzymes; Kinetics of single substrate and bi-substrate enzyme catalyzed reactions; Bioenergetics; Metabolism (Glycolysis, TCA and Oxidative phosphorylation); Membrane transport and pumps; Cell cycle and cell growth control; Cell signaling and signal transduction; Biochemical and biophysical techniques for macromolecular analysis.

Molecular Biology and Genetics:

Molecular structure of genes and chromosomes; DNA replication and control; Transcription and its control; Translational processes; Regulatory controls in prokaryotes and eukaryotes; Mendelian inheritance; Gene interaction; Complementation; Linkage, recombination and chromosome mapping; Extrachromosomal inheritance; Chromosomal variation; Population genetics; Transposable elements, Molecular basis of genetic diseases and applications.

Process Biotechnology:

Bioprocess technology for the production of cell biomass and primary/secondary metabolites, such as baker's yeast, ethanol, citric acid, amino acids, exo-polysaccharides, antibiotics and pigments etc.; Microbial production, purification and bioprocess application(s) of industrial enzymes; Production and purification of recombinant proteins on a large scale; Chromatographic and membrane based bioseparation methods; Immobilization of enzymes and cells and their application for bioconversion processes. Aerobic and anaerobic biological processes for stabilization of solid / liquid wastes; Bioremediation.

Bioprocess Engineering:

Kinetics of microbial growth, substrate utilization and product formation; Simple structured models; Sterilization of air and media; Batch, fed-batch and continuous processes; Aeration and agitation; Mass transfer in bioreactors; Rheology of fermentation fluids; Scale-up concepts; Design of fermentation media; Various types of microbial and enzyme reactors; Instrumentation in bioreactors.

Plant and Animal Biotechnology:

Special features and organization of plant cells; Totipotency; Regeneration of plants; Plant products of industrial importance; Biochemistry of major metabolic pathways and products; Autotrophic and

heterotrophic growth; Plant growth regulators and elicitors; Cell suspension culture development: methodology, kinetics of growth and production formation, nutrient optimization; Production of secondary metabolites by plant suspension cultures; Hairy root cultures and their cultivation. Techniques in raising transgenics.

Characteristics of animal cells:

Metabolism, regulation and nutritional requirements for mass cultivation of animal cell cultures; Kinetics of cell growth and product formation and effect of shear force; Product and substrate transport; Micro & macro-carrier culture; Hybridoma technology; Live stock improvement; Cloning in animals; Genetic engineering in animal cell culture; Animal cell preservation.

Immunology:

The origin of immunology; Inherent immunity; Humoral and cell mediated immunity; Primary and secondary lymphoid organ; Antigen; B and T cells and Macrophages; Major histocompatibility complex (MHC); Antigen processing and presentation; Synthesis of antibody and secretion; Molecular basis of antibody diversity; Polyclonal and monoclonal antibody; Complement; Antigen-antibody reaction; Regulation of immune response; Immune tolerance; Hyper sensitivity; Autoimmunity; Graft versus host reaction.

Recombinant DNA Technology:

Restriction and modification enzymes; Vectors: plasmid, bacteriophage and other viral vectors, cosmids, Ti plasmid, yeast artificial chromosome; cDNA and genomic DNA library; Gene isolation; Gene cloning; Expression of cloned gene; Transposons and gene targeting; DNA labeling; DNA sequencing; Polymerase chain reactions; DNA fingerprinting; Southern and northern blotting; In-situ hybridization; RAPD; RFLP; Site-directed mutagenesis; Gene transfer technologies; Gene therapy.

Bioinformatics:

Major bioinformatics resources (NCBI, EBI, ExPASy); Sequence and structure databases; Sequence analysis (biomolecular sequence file formats, scoring matrices, sequence alignment, phylogeny); Genomics and Proteomics (Large scale genome sequencing strategies; Comparative genomics; Understanding DNA microarrays and protein arrays); Molecular modeling and simulations (basic concepts including concept of force fields).



SYLLABUS FOR BIOMEDICAL ENGINEERING

ANATOMY AND PHYSIOLOGY Cellular Organization, Tissue, Major Organ Systems, Homeostasis

BIOMECHANICS Basic Mechanics, Mechanics of Materials, Viscoelastic Properties, Cartilage, Ligament, Tendon, and Muscle, Clinical Gait Analysis, Cardiovascular Dynamics

REHABILITATION ENGINEERING AND ASSISTIVE TECHNOLOGY The Human Component, Principles of Assistive Technology Assessment, Principles of Rehabilitation Engineering, Practice of Rehabilitation Engineering and Assistive Technology

BIOMATERIALS

Materials in Medicine: From Prosthetics to Regeneration, Biomaterials: Properties, Types, and Applications, Lessons from Nature on Biomaterial Design and Selection, Tissue–Biomaterial Interactions, Guiding Tissue Repair with Bio-Inspired Biomaterials, Safety Testing and Regulation of Biomaterials, Application-Specific Strategies for the Design and Selection of Biomaterials

TISSUE ENGINEERING Biological Considerations, Physical Considerations, Scaling Up, Implementation of Tissue Engineered Products, Future Directions: Functional Tissue Engineering and the “-Omics” Sciences

BIOINSTRUMENTATION Basic Bioinstrumentation System Charge, Current, Voltage, Power, and Energy Resistance, Linear Network Analysis, Linearity and Superposition, Thevenin’s Theorem, Inductors, Capacitors, A General Approach to Solving Circuits Involving Resistors, Capacitors, and Inductors, Operational Amplifiers, Time-Varying Signals, Active Analog Filters, Bioinstrumentation Design

BIOMEDICAL SENSORS Biopotential Measurements, Physical Measurements, Blood Gases and pH Sensors, Bioanalytical Sensors, Optical Biosensors

BIOSIGNAL PROCESSING Physiological Origins of Biosignals, Characteristics of Biosignals, Signal Acquisition, Frequency Domain Representation of Biological Signals, Linear Systems, Signal Averaging, Wavelet Transform and Short-Time Fourier Transform, Artificial Intelligence Techniques

BIOELECTRIC PHENOMENA Neurons, Basic Biophysics Tools and Relationships, Equivalent Circuit Model for the Cell Membrane, Hodgkin–Huxley Model of the Action Potential, Model of the Whole Neuron

PHYSIOLOGICAL MODELING Compartmental Modeling, An Overview of the Fast Eye Movement System, Westheimer Saccadic Eye Movement Model, The Saccade Controller, Development of an Oculomotor Muscle Model, A Linear Muscle Model, A Linear Homeomorphic

Saccadic Eye Movement Model, A Truer Linear Homeomorphic Saccadic Eye Movement Model, System Identification

GENOMICS AND BIOINFORMATICS Core Laboratory Technologies, Core Bioinformatics Technologies

COMPUTATIONAL CELL BIOLOGY AND COMPLEXITY Computational Biology, The Modeling Process, Bionetworks, Introduction to Complexity Theory

RADIATION IMAGING Emission Imaging Systems, Instrumentation and Imaging Devices, Radiographic Imaging Systems

MEDICAL IMAGING Diagnostic Ultrasound Imaging, Magnetic Resonance Imaging (MRI), Comparison of Imaging Modes

BIOMEDICAL OPTICS AND LASERS Essential Optical Principles, Fundamentals of Light Propagation in Biological Tissue, Physical Interaction of Light and Physical Sensing, Biochemical Measurement Techniques Using Light, Fundamentals of Photothermal Therapeutic Effects of Lasers, Fiber Optics and Waveguides in Medicine, Biomedical Optical Imaging

MORAL AND ETHICAL ISSUES

Morality and Ethics: A Definition of Terms, Two Moral Norms: Beneficence and Nonmaleficence, Redefining Death, The Terminally Ill Patient and Euthanasia, Taking Control, Human Experimentation, Definition and Purpose of Experimentation, Informed Consent, Regulation of Medical Device Innovation, Marketing Medical Devices, Ethical Issues in Feasibility Studies, Ethical Issues in Emergency Use, Ethical Issues in Treatment Use, The Role of the Biomedical Engineer in the FDA Process



SYLLABUS FOR COMPUTER ENGINEERING

Digital Logic:

Logic functions, Minimization, Design and synthesis of combinational and sequential circuits; Number representation and computer arithmetic (fixed and floating point).

Computer Organization and Architecture:

Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Secondary storage.

Programming and Data Structures:

Programming in C; Functions, Recursion, Parameter passing, Scope, Binding; Abstract data types, Arrays, Stacks, Queues, Linked Lists, Trees, Binary search trees, Binary heaps.

Algorithms:

Analysis, Asymptotic notation, Notions of space and time complexity, Worst and average case analysis; Design: Greedy approach, Dynamic programming, Divide-and-conquer; Tree and graph traversals, Connected components, Spanning trees, Shortest paths; Hashing, Sorting, Searching. Asymptotic analysis (best, worst, average cases) of time and space, upper and lower bounds, Basic concepts of complexity classes P, NP, NP-hard, NP-complete.

Theory of Computation:

Regular languages and finite automata, Context free languages and Push-down automata, Recursively enumerable sets and Turing machines, Undecidability.

Compiler Design:

Lexical analysis, Parsing, Syntax directed translation, Runtime environments, Intermediate and target code generation, Basics of code optimization.

Operating System:

Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Memory management and virtual memory, File systems, I/O systems, Protection and security.

Databases:

ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures (sequential files, indexing, B and B+ trees), Transactions and concurrency control.

Information Systems and Software Engineering:

information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project, design, coding, testing, implementation, maintenance.

Computer Networks:

ISO/OSI stack, LAN technologies (Ethernet, Token ring), Flow and error control techniques, Routing algorithms, Congestion control, TCP/UDP and sockets, IP(v4), Application layer protocols (icmp, dns, smtp, pop, ftp, http); Basic concepts of hubs, switches, gateways, and routers. Network security basic concepts of public key and private key cryptography, digital signature, firewalls.

Web technologies:

HTML, XML, basic concepts of client-server computing.



SYLLABUS FOR CONFLICT MANAGEMENT



SYLLABUS FOR CHEMISTRY

Inorganic Chemistry

Chemical bonding in homo- and heteronuclear molecules, including shapes of molecules (VSEPR Theory), MO Theory.

Atomic Structure: Concept of proton, neutron, electron, atom and molecule. Bohr's theory and its limitation, Heisenberg Uncertainty principle, Madelung Constant, atomic orbitals and their variations for $1s$, $2s$, $2p$, $3s$, $3p$ and $3d$ orbitals (only graphical representation). Quantum numbers (n , l , m and s) and its significance. Stability of half-filled and full-filled orbitals. Electronic configuration, Hund's rule, Pauli exclusion principle. Aufbau principle.

Main group elements and their compounds: Allotropy, synthesis, structure and bonding, industrial importance of the compounds.

Transition elements and coordination compounds: structure, bonding theories, spectral and magnetic properties, reaction mechanisms.

Inner transition elements: spectral and magnetic properties, redox chemistry, analytical applications.

Organometallic compounds: synthesis, bonding and structure, and reactivity. Organometallics in homogeneous catalysis.

Organic Chemistry

IUPAC nomenclature of organic molecules including regio- and stereoisomers.

Principles of stereochemistry: Configurational and conformational isomerism in acyclic and cyclic compounds; stereogenicity, stereoselectivity, enantioselectivity, diastereoselectivity and asymmetric induction.

Aromaticity: Benzenoid and non-benzenoid compounds – generation and reactions.

Organic reactive intermediates: Generation, stability and reactivity of carbocations, carbanions, free radicals, carbenes, benzyne and nitrenes.

Organic reaction mechanisms involving addition, elimination and substitution reactions with electrophilic, nucleophilic or radical species. Determination of reaction pathways.

Common named reactions and rearrangements – applications in organic synthesis.

Organic transformations and reagents: Functional group interconversion including oxidations and reductions; common catalysts and reagents (organic, inorganic, organometallic and enzymatic). Chemo, regio and stereoselective transformations.

Concepts in organic synthesis: Retrosynthesis, disconnection, synthons, linear and convergent synthesis, umpolung of reactivity and protecting groups.

Asymmetric synthesis: Chiral auxiliaries, methods of asymmetric induction – substrate, reagent and catalyst controlled reactions; determination of enantiomeric and diastereomeric excess; enantio-discrimination. Resolution – optical and kinetic.

Pericyclic reactions – electrocycloaddition, cycloaddition, sigmatropic rearrangements and other related concerted reactions. Principles and applications of photochemical reactions in organic chemistry.

Synthesis and reactivity of common heterocyclic compounds containing one or two heteroatoms (O, N, S).

Chemistry of natural products: Carbohydrates, proteins and peptides, fatty acids, nucleic acids, terpenes, steroids and alkaloids.

Structure determination of organic compounds by IR, UV-Vis, ^1H & ^{13}C NMR and Mass spectroscopic techniques.

Physical Chemistry:

Basic principles of quantum mechanics: Postulates; operator algebra; exactly- solvable systems: particle-in-a-box, harmonic oscillator and the hydrogen atom, including shapes of atomic orbitals; orbital and spin angular momenta; tunneling.

Approximate methods of quantum mechanics: Variational principle; perturbation theory up to second order in energy; applications.

Chemical applications of group theory; symmetry elements; point groups; character tables; selection rules.

Chemical thermodynamics: Laws, state and path functions and their applications; thermodynamic description of various types of processes; Maxwell's relations; spontaneity and equilibria; temperature and pressure dependence of thermodynamic quantities; Le Chatelier principle; elementary description of phase transitions; phase equilibria and phase rule; thermodynamics of ideal and non-ideal gases, and solutions.

Electrochemistry: Nernst equation, redox systems, electrochemical cells; Debye-Huckel theory; electrolytic conductance – Kohlrausch's law and its applications; ionic equilibria; conductometric and potentiometric titrations.

Chemical kinetics: Empirical rate laws and temperature dependence; complex reactions; steady state approximation; determination of reaction mechanisms; collision and transition state theories of rate constants; unimolecular reactions; enzyme kinetics; salt effects; homogeneous catalysis; photochemical reactions.

Colloids and surfaces: Stability and properties of colloids; isotherms and surface area; heterogeneous catalysis.

Solid state: Crystal structures; Bragg's law and applications; band structure of solids.

Polymer chemistry: Molar masses; kinetics of polymerization.



SYLLABUS FOR ECONOMICS

Micro Economic Analysis

Demand Analysis Marshallian, Hicksian and Revealed Preference Approaches Consumer Behaviour under Conditions of Uncertainty, Theory of Production and Costs, Pricing and output under different forms of market structure, Collusive and non-Collusive oligopolies, Different models of objectives of the firm Baumol, Morris & Williamson, Cournot, Sweezy, Factory-Pricing, General Equilibrium & Welfare Economics.

Macroeconomics

Classical approach: Implications Keynesian approach concepts Determinants of Effective Demand Relevance Economic Fluctuations-Hicks & Samuelson Approaches Measures to minimize economic fluctuations Phillips curve-Concepts Trade off Implications-New classical Macroeconomics: Propositions and Policy conclusions of Supply Side Economics and Rational Expectations Analysis Open Economy Macroeconomics concepts Simultaneous Equilibrium Implications.

Development and Planning

Sustainable Development various measures of economic development Human Development Index capability approach to development Development as freedom-Development management Development ethics-Development Vs Displacement Inclusive growth Gender substituted development Market failure Development planning State & Development State failure Emerging issues of Development Planning.

Mathematical and Statistical Methods

Linear and Non-linear functions and their applications -Application of Differential and Integral Calculus in consumer behaviour and production theories Matrix algebra and its application. Measures of Central Tendencies and Dispersion Elementary theory of probability Binominal, Poisson and Normal Distribution Testing of Hypothesis Z, t, X^2 and F test Index numbers Time series.

Public Economics

Economic Functions of Modern Government Role of Government in Economic Planning and Market Governance Welfare foundations Budget-Types of budget concepts of deficits Reforms in Budgeting Zero Base Budgeting and Performance Budgeting Public Revenue Sources of Revenue Tax Revenue Effects of taxes on production, consumption, work efficiency, Savings Public Expenditure Effects of Public Expenditure on the Economy Evaluation of Public Expenditure: Cost Benefit Analysis Public debt Issues in Management Fiscal Policy Objectives Instruments As an instrument of growth and social justice.

International Economics

Foreign trade and Economic Development Two gap model Foreign trade multiplier Heckscher Ohlin

theory of International trade Secular Decline in Terms of Trade Prebisch Singer & Myrdal's thesis Balance of payment problem in LDCs , Traditional, Absorption & Monetary approaches to BOP Foreign exchange market & its functions impact of tariff & non-tariff on trade Regional trade Blocks WTO & India.

Money, Banking & Finance

Money supply & Money Demand Role, Constituents & Functions of money -capital markets central Bank commercial banks-cooperative banks-Regional Rural banks-Technological developments in banking Mutual funds SEBI & RBI guidelines Insurance sector LIC-GIC-reforms in the Financial sector.

Environmental Economics

Natural Resources Classification Environmental costs Environmental Accounting Valuation of Natural Resources Green GDP Valuation of forests Environmental Economics-Public goods-Market Failure Common Property Resources Market Based Instruments Environmental Impact Assessment Environmental Policy in India-Global warning climate change

Emerging Issues in the Indian Economy Poverty and Income Distribution

National Income accounting: Trends and major issues performance of different sectors problems of poverty, unemployment, migration, inflation & environment Economic reforms in India India on the eve of economic reforms-objectives, nature & structures of economic reforms impact of economic reforms India & WTO-India & GATS

Agricultural Economics

Agriculture and Economic Development Farming systems Theories of Agricultural Development Laws of returns Production Function Cobb-Douglas production function supply behavior of Agriculture-Agricultural Marketing Problems Farm Budgeting-Techniques Agricultural Price Policy Agricultural growth and productivity capital formation sustainable agriculture Green Revolution-Man land ratio-agricultural finance-NABARD WTO and Indian Agriculture.



SYLLABUS FOR EDUCATION

Philosophy of Education Relationship between Education and Philosophy

- 1 Conceptual analysis in education role of methodology, analysis of the concept of education.
- 2 Epistemological bases of curriculum logical relationship between objectives, knowledge and methods of teaching.
- 3 Value education need and different approaches

Sociology of Education

- 1 Education as a social system.
- 2 Socialization, culture and personality.
- 3 Education and social change, democracy and economic order.
- 4 Education and modernization; role of Educational technology.
- 5 Education and community with special reference to Indian Society

Educational Psychology

- 1 Growth and Development Principles, determining factors different dimensions; contributions of Piaget, Bruner, Ericson, Kohlberg, Chomsky.
- 2 Learning types Concepts and Principles relation to major theories of learning.
- 3 Major concepts and Principles and factors in group dynamics, motivation, remembering and forgetting as related to learning process

Intelligence and Personality

- 1 Theories of intelligence, types of intelligence test; Emotional intelligence, Multiple Intelligence, creativity (Verbal and Non Verbal)
- 2 Personality and Mental Health Concepts, major theories of personality; Personality assessment; adjustment and mental health.

ICT in Education:

Educational Technology as systems approach to education. Systems approach in educational technology and its characteristics. Components of educational technology, software, hardware Multi media approach in Educational Technology. Modalities of teaching difference between teaching and instruction, conditioning and training.

- 1 Programmed Instruction (origin, types, linear and branching, development of programmed

instruction material linear / branching model, teaching machines, computer assisted instruction.

2 Concept of communication, Principles. Modes and Barriers of communication, Classroom communication (interaction verbal and non verbal).

Teacher Education:

Objectives of Teacher Education at different levels Primary, Secondary and tertiary; Pre Service and in service teacher education (Need and Objectives).

1 Teacher Competencies Communication, organization, instruction and evaluation; National Curriculum Framework for teacher education; recent trends in teacher Education.

2 Issues and Challenges in teacher education Quality assurance in teacher education, recent trends in teacher education.

Methodology of Educational Research Characteristics of educational research

1 Planning the research study; review of the literature purpose and references, using database and internet; formulation of objectives and hypotheses (different types), variables types and inter relationship, preparation of research proposal.

2 Research Paradigms in education: Quantitative, qualitative and mixed Characteristics and types Quantitative methods experimental (True experimental designs and quasi experimental designs), internal and external validity of results in experimental research; descriptive (survey, casual comparative, correlational programme evaluation) qualitative methods Ethnography, phenomenology, case study, historical research, mixed research strengths and weakness Characteristics of educational research.

Sampling and Tools/ Techniques of data collection

1 Sampling : Representative and biased sample; Random sampling techniques simple, systematic, stratified, cluster sampling and multi stage sampling; Non Random Sampling, technique convenience sampling, proportionate sampling, Quota sampling and snow ball sampling; sampling in qualitative research.

2 Tools / Techniques data collection: Characteristic of a good research tool, tests inventories and scales Types construction and Uses, Questionnaire Forms, Principles and Construction Administration of Questionnaires' Interview Types Characteristics and Guidelines for conducting Interviews Observation Types, Rating Scale, Check List, Schedules, Focus group discussion.

Analysis of data I

1 Data types Nominal, ordinal, interval and ratio data levels individual and group

2 Description and Comparison of Groups Measures of Central Tendency Dispersion, Characteristics and Uses Normal distribution(NPC) characteristics Deviation from normality and underline causes Correlation Types (Spearman, Pearson, Biserial, Pointbiserial, Tetrachoric, partial and multiple) regression analysis

Analysis of Data II

Testing of hypotheses; levels of significance, types of error, sampling distribution, sampling error, standard error: parametric test t test, F test, ANOVA , ANCOVA concepts ,assumption and uses Non Parametric tests chi-square, sign test, median test Analysis of Qualitative data content analysis , transcription.



SYLLABUS FOR CIVIL ENGINEERING

SOLID MECHANICS AND STRUCTURAL ANALYSIS

Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; Theories of failures; Simple bending theory, flexural and shear stresses, shear centre; Uniform torsion, buckling of column, combined and direct bending stresses.

Statically determinate and indeterminate structures by force/ energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods; Influence lines; Stiffness and flexibility methods of structural analysis.

CONSTRUCTION ENGINEERING & MANAGEMENT

Construction Materials and Management: Construction Materials: Structural steel – composition, material properties and behaviour; Concrete – constituents, mix design, short-term and long-term properties; Bricks and mortar; Timber; Bitumen. Construction Management: Types of construction projects; Tendering and construction contracts; Rate analysis and standard specifications; Cost estimation; Project planning and network analysis – PERT and CPM.

STRUCTURAL ENGINEERING

Concrete Structures: Working stress, Limit state and Ultimate load design concepts; Design of beams, slabs, columns; Bond and development length; Prestressed concrete; Analysis of beam sections at transfer and service loads.

Steel Structures: Working stress and Limit state design concepts; Design of tension and compression members, beams and beam- columns, column bases; Connections – simple and eccentric, beam-column connections, plate girders and trusses; Plastic analysis of beams and frames.

GEOTECHNICAL ENGINEERING

Soil Mechanics: Origin of soils, soil structure and fabric; Three-phase system and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability – one dimensional flow, Darcy's law; Seepage through soils – two-dimensional flow, flow nets, uplift pressure, piping; Principle of effective stress, capillarity, seepage force and quicksand condition; Compaction in laboratory and field conditions; One- dimensional consolidation.

Foundation Engineering: Sub-surface investigations – scope, drilling bore holes, sampling, plate load test, standard penetration and cone penetration tests; Earth pressure theories – Rankine and Coulomb; Stability of slopes – finite and infinite slopes, method of slices and Bishop's method; Stress distribution in soils – Boussinesq's and Westergaard's theories, pressure bulbs; Shallow foundations – Terzaghi's and Meyerhoff's bearing capacity theories.

HYDRAULICS AND WATER RESOURCES ENGINEERING

Hydraulics: Forces on immersed bodies; Flow measurement in channels and pipes; Dimensional analysis and hydraulic similitude; Kinematics of flow, velocity triangles; Basics of hydraulic machines, specific speed of pumps and turbines; Channel Hydraulics – Energy-depth relationships, specific energy, critical flow, slope profile, hydraulic jump, uniform flow and gradually varied flow

Hydrology: Hydrologic cycle, precipitation, evaporation, evapo-transpiration, watershed, infiltration, unit hydrographs, hydrograph analysis, flood estimation and routing, reservoir capacity, reservoir and channel routing, surface run-off models, ground water hydrology – steady state well hydraulics and aquifers; Application of Darcy's law.

Irrigation: Duty, delta, estimation of evapo-transpiration; Crop water requirements; Design of lined and unlined canals, head works, gravity dams and spillways; Design of weirs on permeable foundation; Types of irrigation systems, irrigation methods; Water logging and drainage; Canal regulatory works, cross-drainage structures, outlets and escapes.

TRANSPORTATION ENGINEERING

Transportation Infrastructure: Highway alignment and engineering surveys; Geometric design of highways – cross-sectional elements, sight distances, horizontal and vertical alignments; Geometric design of railway track; Airport runway length, taxiway and exit taxiway design.**Highway Pavements:** Highway materials – desirable properties and quality control tests; Design of bituminous paving mixes; Design factors for flexible and rigid pavements; Design of flexible pavement using IRC: 37-2012; Design of rigid pavements using IRC: 58-2011; Distresses in concrete pavements.

Traffic Engineering: Traffic studies on flow, speed, travel time – delay and O-D study, PCU, peak hour factor, parking study, accident study and analysis, statistical analysis of traffic data; Microscopic and macroscopic parameters of traffic flow, fundamental relationships; Control devices, signal design by Webster's method; Types of intersections and channelization; Highway capacity and level of service of rural highways and urban roads.



SYLLABUS FOR COMMERCE



SYLLABUS FOR ELECTRICAL ENGINEERING

Electric Circuits:

Network graph, KCL, KVL, Node and Mesh analysis, Transient response of DC and AC networks, Sinusoidal steady state analysis, Resonance, Passive filters, Ideal current and voltage sources, Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum power transfer theorem, Two port networks, Three phase circuits, Power and power factor in ac circuits.

Electromagnetic Fields:

Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss's Law, Divergence, Electric field and potential due to point, line, plane and spherical charge distributions, Effect of dielectric medium, Capacitance of simple configurations, Biot-Savart's law, Ampere's law, Curl, Faraday's law, Lorentz force, Inductance, magnetomotive force, Reluctance, Magnetic circuits, Self and mutual inductance of simple configurations.

Signals and Systems:

Representation of continuous and discrete-time signals; shifting and scaling operations; linear, time-invariant and causal systems; Fourier series representation of continuous periodic signals; sampling theorem; Fourier, Laplace and Z transforms.

Electrical Machines:

Single phase transformer: equivalent circuit, phasor diagram, open circuit and short circuit tests, regulation and efficiency; Three phase transformers: connections, parallel operation; Auto transformer, Electromechanical energy conversion principles, DC machines: separately excited, series and shunt, motoring and generating mode of operation and their characteristics, starting and speed control of dc motors; Three phase induction motors: principle of operation, types, performance, torque-speed characteristics, no-load and blocked rotor tests, equivalent circuit, starting and speed control; Operating principle of single phase induction motors; Synchronous machines: cylindrical and salient pole machines, performance, regulation and parallel operation of generators, starting of synchronous motor, characteristics; Types of losses and efficiency calculations of electric machines.

Power Systems:

Power generation concepts, AC and DC transmission concepts, Models and performance of transmission lines and cables, Series and shunt compensation, Electric field distribution and insulators, Distribution systems, Per unit quantities, Bus admittance matrix, Gauss Seidel and Newton-Raphson load flow methods, Voltage and Frequency control, Power factor correction, Symmetrical components, Symmetrical and unsymmetrical fault analysis, Principles of over current, differential and distance protection; Circuit breakers, System stability concepts, Equal area criterion.

Control Systems:

Mathematical modeling and representation of systems, Feedback principle, transfer function, Block diagrams and Signal flow graphs, Transient and Steady state analysis of linear time invariant systems, Routh-Hurwitz and Nyquist criteria, Bode plots, Root loci, Stability analysis, Lag, Lead and Lead-Lag compensators; P, PI and PID controllers; State space model, State transition matrix.

Electrical and Electronic Measurements:

Bridges and Potentiometers, Measurement of voltage, current, power, energy and power factor, Instrument transformers, Digital voltmeters and multimeters, Phase, Time and Frequency measurement; Oscilloscopes, Error analysis.

Analog and Digital Electronics:

Characteristics of diodes, BJT, MOSFET; Simple diode circuits: clipping, clamping, rectifiers; Amplifiers: Biasing, Equivalent circuit and Frequency response; Oscillators and Feedback, amplifiers; Operational amplifiers: Characteristics and applications; Simple active filters, VCOs and Timers, Combinational and Sequential logic circuits, Multiplexer, De-multiplexer, Schmitt trigger, Sample and hold circuits, A/D and D/A converters, 8085 Microprocessor: Architecture, Programming and Interfacing.

Power Electronics:

Characteristics of semiconductor power devices: Diode, Thyristor, Triac, GTO, MOSFET, IGBT; DC to DC conversion: Buck, Boost and Buck-Boost converters; Single and three phase configuration of uncontrolled rectifiers, Line commutated Thyristor based converters, Bidirectional ac to dc voltage source converters, Issues of line current harmonics, Power factor, Distortion factor of ac to dc converters, Single phase and three phase inverters, Sinusoidal pulse width modulation.



SYLLABUS FOR ELECTRONICS ENGINEERING

Networks:

Network graphs: matrices associated with graphs; incidence, fundamental cut set and fundamental circuit matrices. Solution methods: nodal and mesh analysis. Network theorems: superposition, Thevenin and Norton's maximum power transfer, Wye-Delta transformation. Steady state sinusoidal analysis using phasors. Linear constant coefficient differential equations; time domain analysis of simple RLC circuits, Solution of network equations using Laplace transform: frequency domain analysis of RLC circuits. 2-port network parameters: driving point and transfer functions. State equations for networks.

Electronic Devices:

Energy bands in silicon, intrinsic and extrinsic silicon. Carrier transport in silicon: diffusion current, drift current, mobility, and resistivity. Generation and recombination of carriers. p-n junction diode, Zener diode, tunnel diode, BJT, JFET, MOS capacitor, MOSFET, LED, p-I-n and avalanche photo diode, Basics of LASERS. Device technology: integrated circuits fabrication process, oxidation, diffusion, ion implantation, photolithography, n-tub, p-tub and twin-tub CMOS process.

Analog Circuits:

Small Signal Equivalent circuits of diodes, BJTs, MOSFETs and analog CMOS. Simple diode circuits, clipping, clamping, rectifier. Biasing and bias stability of transistor and FET amplifiers. Amplifiers: single-and multi-stage, differential and operational, feedback, and power. Frequency response of amplifiers. Simple op-amp circuits. Filters. Sinusoidal oscillators; criterion for oscillation; single-transistor and op-amp configurations. Function generators and wave-shaping circuits, 555 Timers. Power supplies.

Digital circuits:

Boolean algebra, minimization of Boolean functions; logic gates; digital IC families (DTL, TTL, ECL, MOS, CMOS). Combinatorial circuits: arithmetic circuits, code converters, multiplexers, decoders, PROMs and PLAs. Sequential circuits: latches and flip-flops, counters and shift-registers. Sample and hold circuits, ADCs, DACs. Semiconductor memories. Microprocessor(8085): architecture, programming, memory and I/O interfacing.

Signals and Systems:

Definitions and properties of Laplace transform, continuous-time and discrete-time Fourier series, continuous-time and discrete-time Fourier Transform, DFT and FFT, z-transform. Sampling theorem.

Linear Time-Invariant (LTI) Systems: definitions and properties; causality, stability, impulse response, convolution, poles and zeros, parallel and cascade structure, frequency response, group delay, phase delay. Signal transmission through LTI systems.

Control Systems:

Basic control system components; block diagrammatic description, reduction of block diagrams. Open loop and closed loop (feedback) systems and stability analysis of these systems. Signal flow graphs and their use in determining transfer functions of systems; transient and steady state analysis of LTI control systems and frequency response. Tools and techniques for LTI control system analysis: root loci, Routh-Hurwitz criterion, Bode and Nyquist plots. Control system compensators: elements of lead and lag compensation, elements of Proportional-Integral-Derivative (PID) control. State variable representation and solution of state equation of LTI control systems.

Communications:

Random signals and noise: probability, random variables, probability density function, autocorrelation, power spectral density. Analog communication systems: amplitude and angle modulation and demodulation systems, spectral analysis of these operations, superheterodyne receivers; elements of hardware, realizations of analog communication systems; signal-to-noise ratio (SNR) calculations for amplitude modulation (AM) and frequency modulation (FM) for low noise conditions. Fundamentals of information theory and channel capacity theorem. Digital communication systems: pulse code modulation (PCM), differential pulse code modulation (DPCM), digital modulation schemes: amplitude, phase and frequency shift keying schemes (ASK, PSK, FSK), matched filter receivers, bandwidth consideration and probability of error calculations for these schemes. Basics of TDMA, FDMA and CDMA and GSM.

Electromagnetics:

Elements of vector calculus: divergence and curl; Gauss' and Stokes' theorems, Maxwell's equations: differential and integral forms. Wave equation, Poynting vector. Plane waves: propagation through various media; reflection and refraction; phase and group velocity; skin depth. Transmission lines: characteristic impedance; impedance transformation; Smith chart; impedance matching; S parameters, pulse excitation. Waveguides: modes in rectangular waveguides; boundary conditions; cut-off frequencies; dispersion relations. Basics of propagation in dielectric waveguide and optical fibers. Basics of Antennas: Dipole antennas; radiation pattern; antenna gain.



SYLLABUS FOR ENGLISH

- History of English Literature from the Age of Chaucer to the Modern Age.
- English Language Studies.
- Indian Writing in English.
- American Literature.
- New Literatures in English (Major African, Caribbean, Latin American, Canadian and Australian writers and their works).
- Literary Criticism from Aristotle to T.S. Eliot.
- Modern Critical Theories.
- Comparative Literature: Concepts and Major Applications.
- Translation Studies: Concepts and Major Applications.
- Cultural Studies: Concepts and Relevance.



SYLLABUS FOR ENVIRONMENTAL SCIENCES

Environmental Chemistry : Air pollution, sources of air pollutants, CFC's photochemical smog, effect of air pollution on vegetation, animals and human beings, Air pollution control measures carcinogens in the air. Global warming, Green house effect, Ozone depletion and its impact, acid rain. Water pollution – sources, heavy metal pollution noise pollutions, effect of noise pollution, prevention and control of noise pollution. Principles and applications of UV-Visible spectroscopy AAS, FES, IR, Nephelometry, Polarography, GC and HPLC.

Environmental Earth Science : Interior of earth; Earth systems and its interaction. Earth's Materials

– Minerals and their definition, Definition of resources and reserve. Earthquakes: causes, intensity and magnitude of earthquakes; geographic distribution of earthquake zones, volcanism: nature, extent and causes of volcanism, geographic distribution of volcanoes. The hydrological cycle, and its balance. Factors influencing the surface water and characteristics of stream flow, sub-surface water.

Environmental Microbiology : Classification, microbes as bioindicators of pollution, role of microorganisms in environmental pollution and management, microbes of extreme environment. Bioaccumulation and Biomagnification. Advanced techniques in detection of microbes in air, water and soil.

Environmental Biotechnology – Role of biotechnology in energy production, role of environmental biotechnology in field of prevention, deduction and monitoring and genetic engineering. Application of biotechnology to environmental problems. Biosensors – Types of biosensors. Applications of biosensors. – Composting – types of composting. GMO's Bioremediation, Applications, biofilters, microchips

Solid waste Management – Sources, characteristics, classification, collection, storage, segregation, transportation and disposal methods – sanitary land filling, waste prevention and recycling, commonly recycling material and processes, recovery of biological conversion products, biogasification, energy recovery, energy and hazardous waste management classification of hazardous waste, characteristics listing criteria, hazardous waste management, hazardous waste management in India, municipal solid waste management roles 2000, biomedical waste management and handling rules 1998, pyrolysis, incineration. Hospital waste – characteristics and Management

Occupational Health Hazards : Occupational Environment, Physical, Chemical, Biological agent. Occupational Hazards – physical hazards, chemical hazards, Biological hazards. Occupational diseases-Pneumoconiosis-silicosis, Anthracosis, Byssinosis, Bagassosis, Asbestosis, Farmers lung, Lead poisoning, Occupational cancer, Occupational Dermatitis, Radiation hazards.

Environmental Biology – Ecosystem, Homeostasis, energy flow in a lake ecosystem, Lindeman model – climatic factors, influence of light on morphology and physiology of plants, characteristics of heliophytes and sciophytes, effect of low and high temperature on plants, mechanical and physiological effects of wind, characteristics of populations, biological interaction.

Remote Sensing GIS and Disaster Management : Principle of Remote Sensing and its applications to Environment, types of sensors spectral reflectance and their characteristics, products used in Remote sensing, GIS and their use for environmental monitoring. Environmental Disaster – Types of Hazards, Hazard mitigation. Earthquake, volcanic, seismic Hazards – nature of destruction, ground subsidence, protection of earthquake and volcanic hazards, Landslides and mudflows floods and flood management, nature and frequency of flooding, man made disaster and Hazards.

Biodiversity : Genetic diversity, Species diversity and ecosystem diversity, alpha, beta, and gamma diversity, endemism, significance of the endemism, Hot spots of Biodiversity, Red data book and IUCN categories, endangered species, vulnerable species. Rare species. Ecological consequences of reduction in biodiversity. Deforestation and its impact. Causes for depletion of biodiversity in India, Sacred grooves. Biosphere Reserves – A new concept of conservation – objectives and management, In situ and ex situ conservation.

EIA and Environmental Laws : Framework of Environmental Impact assessment (EIA), simple methods of identification of impacts, matrices network, checklists. Methods of impact analysis, public participation in Environmental decision making, EIA in project planning. Legal control of Environmental pollution in India with special reference to :

- i. The Wildlife protection Act – 1972
- ii. The Water prevention and control of pollution Act, 1974.
- iii. The Forest Conservation Act, 1980.
- iv. The Air prevention and control of pollution Act, 1981.
- v. The Environment protection Act. 1986.
- vi. Hazardous waste management rules-1989 ix Biological Diversity Act of India, 2002



SYLLABUS FOR LAW

Jurisprudence Analytical School, Natural Law Theory, Historical School, Sociological Theory of Law – Concept of Person, Rights and Liability.

Judicial Process & Social Transformation Doctrine of Precedent – Ratio decidendi and Obiter dicta – Methods of Determining ratio decidendi – Stare-decisis -Judicial Activism – Concept of Social Transformation-Legal & non-legal factors – Social Justice-Empowerment of Women

Constitutional Law Fundamental Rights Concept of Equality – Freedom – Right to life & Liberty Freedom of Religion, Relation between part III & IV -Right to Constitutional remedies – Act.32 – International Human Rights Law.

Constitutional Law Federalism – Centre – State Relations – Organization of Govt.-Legislature, Executive, Judiciary – Theory of Separation of Powers – Power of amendment, Parliamentary Privileges.

International Law Relationship between International and Municipal Law – Subjects of International Law-State Responsibility – Law of the Sea – International Organizations – Law of Treaties

Research Methodology Concept and Meaning of Research – Reflective thinking – Nature & Objectives of Legal Research – Doctrinal & Non-doctrinal Legal Research – Formulation of Research Problem – Hypothesis – Observation – Questionnaire – Research report – Law Reform and Legal Research.

Human Resource Development Definition of Industry, Workman – Concept of Collective Bargaining – Dispute Settlement Mechanism – Welfare and Safety under Factories Act – Strike, Lockout, Layoff, Retrenchment & Closure

Intellectual Property Rights Economic & legal Justifications for protection of IPR – TRIPs and WIPO – Meaning and subject matter of Copyright – Infringement of copyright-Concept of patent–Ingredients of Innovation – Non-patentability – Procedure for getting patent

– compulsory licensing – Definition of Trade mark – Registered Trade mark & Unregistered Trade

mark – Passing off action – Concept of Industrial Design.

Environmental Law Concept of Environment – Environmental Law & Polity in India (Water Act, Air Act Environment Protection Act, Wildlife Protection Act) -International Environmental Principles – Conservation of Natural Resources – Common Law and Constitutional remedies

Corporate Law Registration of Companies – Memorandum & Articles of Association – Prospectus-Directors Powers & Functions-Indoor Management & Constructive Notice – Company Meetings – Prevention of oppression & Mismanagement of Companies – Winding up of Companies.



SYLLABUS FOR MANAGEMENT

Managerial Economics-Demand Analysis, Production function, Cost Output Relation Market Structures, Pricing theories, Advertising, Macro-economics, and National Income Concepts Infrastructure Management and Policy Business Environment Capital Budgeting.

The concept and significance of organisational behaviour-kills and roles in an organisation-classical, Neo-classical and modern theories of Organisational Structure-Organisational design understanding and managing individual behaviour Personality Perception Values Attitude Learning Motivation. Understanding and Managing group behaviour, Process-Inter-Personal and Group dynamics Communication-Leadership. Managing Change, Managing Conflicts, and organisational development.

Concepts and perspectives in HRM, HRM in changing environment Human Resource planning-Objectives, Process and Techniques Job analysis-Job Description Selecting human resources Induction, Training and Development Exit policy and implications Performance appraisal and Evaluation Potential assessment Job evaluation Wage determination Industrial Relations and Trade Unions Dispute resolution and Grievance Management Labour Welfare and Social security measures.

Financial Management-Nature and Scope Valuation concepts and valuation of securities Capital budgeting decisions-Risk analysis Capital structure and Cost of capital Dividend policy-Determinants Long-term and short-term financing instruments Mergers and Acquisitions.

Marketing environment and Environment scanning; Marketing Information Systems and Marketing research; Understanding consumer and industrial markets, Demand Measurement and Forecasting; Market Segmentation-Targeting and positioning Product · decisions, product mix, Product Life Cycle; New product development; Branding and Packaging; Pricing methods and strategies. Promotion decisions-Promotion mix; Advertising; Personal selling; Channel management; Vertical marketing systems; Evaluation and control of marketing effort; Market of services; Customer · Relation Management; Uses of internet as marketing medium-other related issues like branding, market development, Advertising and retailing on the net. New issues in Marketing.

Role and scope of production management; Facility location; Layout planning and analysis; Production planning and control-production process analysis; Demand forecasting for operations; Determinants of product mix; Production scheduling; Work measurement; Time and motion study; Statistical Quality Control. Role and scope of Operations Research; Linear Programming; Sensitivity analysis; Duality; Transportation model; Inventory control; Queuing theory; · Decision theory; Markov analysis; PERT/CPM.

Concepts and perspectives in HRM, HRM in changing environment Human Resource planning-Objectives, Process and Techniques Job analysis-Job Description Selecting human resources Induction, Training and Development Exit policy and implications Performance appraisal and Evaluation Potential assessment Job evaluation Wage determination Industrial Relations and Trade Unions Dispute resolution and Grievance Management Labour Welfare and Social security measures.

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SYLLABUS FOR MATHEMATICS

Analysis:

Elementary set theory, finite, countable and uncountable sets, Real number system as a complete ordered field, Archimedean property, supremum, infimum. Sequences and series, convergence, limsup, liminf. Bolzano Weierstrass theorem, Heine Borel theorem. Continuity, uniform continuity, differentiability, mean value theorem. Sequences and series of functions, uniform convergence. Riemann sums and Riemann integral, Improper Integrals. Monotonic functions, types of discontinuity, functions of bounded variation, Lebesgue measure, Lebesgue integral. Functions of several variables, directional derivative, partial derivative, derivative as a linear transformation. Metric spaces, compactness, connectedness. Normed Linear Spaces. Spaces of Continuous functions as examples.

Linear Algebra:

Vector spaces, subspaces, linear dependence, basis, dimension, algebra of linear transformations. Algebra of matrices, rank and determinant of matrices, linear equations. Eigenvalues and eigenvectors, Cayley-Hamilton theorem. Matrix representation of linear transformations. Change of basis, canonical forms, diagonal forms, triangular forms, Jordan forms. Inner product spaces, orthonormal basis. Quadratic forms, reduction and classification of quadratic forms.

Complex Analysis:

Algebra of complex numbers, the complex plane, polynomials, Power series, transcendental functions such as exponential, trigonometric and hyperbolic functions. Analytic functions, Cauchy-Riemann equations. Contour integral, Cauchy's theorem, Cauchy's integral formula, Liouville's theorem, Maximum modulus principle, Schwarz lemma, Open mapping theorem. Taylor series, Laurent series, calculus of residues. Conformal mappings, Mobius transformations.

Algebra: Permutations, combinations, pigeon-hole principle, inclusion-exclusion principle, derangements. Fundamental theorem of arithmetic, divisibility in \mathbb{Z} , congruences, Chinese Remainder Theorem, Euler's ϕ -function, primitive roots. Groups, subgroups, normal subgroups, quotient groups, homomorphisms, cyclic groups, permutation groups, Cayley's theorem, class equations, Sylow theorems. Rings, ideals, prime and maximal ideals, quotient rings, unique factorization domain, principal ideal domain, Euclidean domain. Polynomial rings and irreducibility criteria. Fields, finite fields, field extensions.

Ordinary Differential Equations (ODEs):

Existence and Uniqueness of solutions of initial value problems for first order ordinary differential equations, singular solutions of first order ODEs, system of first order ODEs. General theory of homogenous and non-homogeneous linear ODEs, variation of parameters, Sturm-Liouville boundary value problem, Green's function.

Partial Differential Equations (PDEs):

Lagrange and Charpit methods for solving first order PDEs, Cauchy problem for first order PDEs.

Classification of second order PDEs, General solution of higher order PDEs with constant coefficients, Method of separation of variables for Laplace, Heat and Wave equations.

Numerical Analysis :

Numerical solutions of algebraic equations, Method of iteration and Newton-Raphson method, Rate of convergence, Solution of systems of linear algebraic equations using Gauss elimination and Gauss-Seidel methods, Finite differences, Lagrange, Hermite and spline interpolation, Numerical differentiation and integration, Numerical solutions of ODEs using Picard, Euler, modified Euler and Runge-Kutta methods.

Calculus of Variations:

Variation of a functional, Euler-Lagrange equation, Necessary and sufficient conditions for extrema. Variational methods for boundary value problems in ordinary and partial differential equations.

Linear Integral Equations:

Linear integral equation of the first and second kind of Fredholm and Volterra type, Solutions with separable kernels. Characteristic numbers and eigenfunctions, resolvent kernel.

Classical Mechanics:

Generalized coordinates, Lagrange's equations, Hamilton's canonical equations, Hamilton's principle and principle of least action, Two-dimensional motion of rigid bodies, Euler's dynamical equations for the motion of a rigid body about an axis, theory of small oscillations.

Descriptive statistics, exploratory data analysis.

Sample space, discrete probability, independent events, Bayes theorem. Random variables and distribution functions (univariate and multivariate); expectation and moments. Independent random variables, marginal and conditional distributions. Characteristic functions. Probability inequalities (Tchebyshef, Markov, Jensen). Modes of convergence, weak and strong laws of large numbers, Central Limit theorems (i.i.d. case). Markov chains with finite and countable state space, classification of states, limiting behaviour of n-step transition probabilities, stationary distribution. Standard discrete and continuous univariate distributions. Sampling distributions. Standard errors and asymptotic distributions, distribution of order statistics and range. Methods of estimation. Properties of estimators. Confidence intervals. Tests of hypotheses: most powerful and uniformly most powerful tests, Likelihood ratio tests. Analysis of discrete data and chi-square test of goodness of fit. Large sample tests. Simple nonparametric tests for one and two sample problems, rank correlation and test for independence. Elementary Bayesian inference. Gauss-Markov models, estimability of parameters, Best linear unbiased estimators, tests for linear hypotheses and confidence intervals. Analysis of variance and covariance. Fixed, random and mixed effects models. Simple and multiple linear regression. Elementary regression diagnostics. Logistic regression. Multivariate normal distribution, Wishart distribution and their properties. Distribution of quadratic forms. Inference for parameters, partial and multiple correlation coefficients and related tests. Data reduction techniques: Principle component analysis, Discriminant analysis, Cluster analysis, Canonical correlation. Simple random sampling, stratified sampling and systematic sampling. Probability proportional to size sampling. Ratio and regression methods. Completely randomized, randomized blocks and Latin square designs. Connected, complete and orthogonal block designs, BIBD. 2^k factorial experiments: confounding and construction. Series and parallel systems, hazard function and failure rates, censoring and life testing. Linear programming problem. Simplex methods, duality. Elementary queuing and inventory models. Steady-state solutions of Markovian queuing models: M/M/1, M/M/1 with limited waiting space, M/M/C, M/M/C with limited waiting space, M/G/1



SYLLABUS FOR MECHANICAL ENGINEERING

Engineering Mechanics - Force System's Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems.

Thermodynamics - System & Control volume; Property, State & Process; Exact & Inexact differentials; Work - Thermodynamic definition of work; Displacement work; Temperature, Definition of thermal equilibrium and Zeroth law; Temperature scales; Various Thermometers- Definition of heat; examples of heat/work interaction in systems- First Law for Cyclic & Non-cyclic processes; Concept of total energy E; Various modes of energy, Internal energy and Enthalpy.

Material Engineering - Crystal Structure, Imperfection in solids, critically resolved shear stress, Mechanical Property measurement: Tensile, compression and torsion tests; Young's modulus, relations between true and engineering stress-strain curves, generalized Hooke's law, yielding and yield strength, ductility, resilience, toughness and elastic recovery; Hardness: Rockwell, Brinell and Vickers and their relation to strength.

Fluid Mechanics - Definition of fluid, Newton's law of viscosity, Units and dimensions- Properties of fluids, mass density, specific volume, specific gravity, viscosity, compressibility and surface tension, Control volume- application of continuity equation and momentum equation, Incompressible flow, Bernoulli's equation and its applications.

Strength of Materials - Beams and types transverse loading on beams- shear force and bend moment diagrams- Types of beam supports, simply supported and over-hanging beams, cantilevers. Theory of bending of beams, bending stress distribution and neutral axis, shear stress distribution, point and distributed loads.

Manufacturing processes - Casting and molding: Metal casting processes and equipment, casting defects and residual stresses, Introduction to bulk and sheet metal forming, plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk forming and sheet forming, principles of powder metallurgy.

Theory of Machines - Classification of mechanisms- Basic kinematic concepts and definitions- Degree of freedom, mobility- Grashof's law, Kinematic inversions, Limit positions- Mechanical advantage- Transmission angle- Description of some common mechanisms.

Computer Aided Design (CAD) - CAD cycle for product design, CAD workstations - data communications - input/output devices, display technology, CAD software. Transformations, Homogenous Representation, Concatenated Transformation, Mapping of Geometric Models, Inverse

Transformations. Geometric modeling: Wireframe modeling, Surface modeling: Representation of curves and surfaces, Solid modeling techniques.

Machine Design -Definition, Design requirements of machine elements, Design procedure, Standards in design, Selection of preferred sizes, Indian Standards designation of carbon & alloy steels, Selection of materials for static and fatigue loads, Design against Static Load, Modes of failure, Factor of safety, Principal stresses, Stresses due to bending and torsion, Theory of failure.

Automobile Engineering -Basic Concepts-Air standard cycles and fuel-air cycles Assumptions, Otto, Diesel & Dual cycles, comparison of cycles, fuel air cycle, Valve Timing diagram, Actual engine cycle. S.I. Engines- Theory of Carburetion, Types of carburetors, Electronic fuel injection system, GDI, Combustion in spark Ignition engines, stages of combustion, flame propagation, rate of pressure rise, abnormal combustion, Phenomenon of Detonation in SI engines, effect of engine variables on Detonation, Combustion chambers, rating of fuels in SI engines, Additives.



SYLLABUS FOR MICROBIOLOGY

Historical Perspective: Discovery of microbial world; Landmark discoveries relevant to the field of microbiology; Controversy over spontaneous generation; Role of microorganisms in transformation of organic matter and in the causation of diseases.

Methods in Microbiology: Pure culture techniques; Theory and practice of sterilization; Principles of microbial nutrition; Enrichment culture techniques for isolation of microorganisms; Light-, phase contrast-and electron-microscopy.

Microbial Taxonomy and Diversity: Bacteria, Archea and their broad classification; Eukaryotic microbes: Yeasts, molds and protozoa; Viruses and their classification; Molecular approaches to microbial taxonomy.

Prokaryotic and Eukaryotic Cells: Structure and Function: Prokaryotic Cells: cell walls, cell membranes, mechanisms of solute transport across membranes, Flagella and Pili, Capsules, Cell inclusions like endospores and gas vesicles; Eukaryotic cell organelles: Endoplasmic reticulum, Golgi apparatus, mitochondria and chloroplasts.

Microbial Growth: Definition of growth; Growth curve; Mathematical expression of exponential growth phase; Measurement of growth and growth yields; Synchronous growth; Continuous culture; Effect of environmental factors on growth.

Control of Micro-organisms: Effect of physical and chemical agents; Evaluation of effectiveness of antimicrobial agents.

Microbial Metabolism: Energetics: redox reactions and electron carriers; An overview of metabolism; Glycolysis; Pentose-phosphate pathway; Entner-Doudoroff pathway; Glyoxalate pathway; The citric acid cycle; Fermentation; Aerobic and anaerobic respiration; Chemolithotrophy; Photosynthesis; Calvin cycle; Biosynthetic pathway for fatty acids synthesis; Common regulatory mechanisms in synthesis of amino acids; Regulation of major metabolic pathways.

Microbial Diseases and Host Pathogen Interaction: Normal microbiota; Classification of infectious diseases; Reservoirs of infection; Nosocomial infection; Emerging infectious diseases; Mechanism of microbial pathogenicity; Nonspecific defense of host; Antigens and antibodies; Humoral and cell mediated immunity; Vaccines; Immune deficiency; Human diseases caused by viruses, bacteria, and pathogenic fungi.

Chemotherapy/Antibiotics: General characteristics of antimicrobial drugs; Antibiotics: Classification, mode of action and resistance; Antifungal and antiviral drugs.

Microbial Genetics: Types of mutation; UV and chemical mutagens; Selection of mutants; Ames test for mutagenesis; Bacterial genetic system: transformation, conjugation, transduction, recombination, plasmids, transposons; DNA repair; Regulation of gene expression: repression and induction; Operon model; Bacterial genome with special reference to *E.coli*; Phage λ and its life

cycle; RNA phages; RNA viruses; Retroviruses; Basic concept of microbial genomics.

Microbial Ecology: Microbial interactions; Carbon, sulphur and nitrogen cycles; Soil microorganisms associated with vascular plants.



SYLLABUS FOR PHARMACEUTICAL SCIENCES

Natural Products:

Pharmacognosy & Phytochemistry – Chemistry, tests, isolation, characterization and estimation of phytopharmaceuticals belonging to the group of Alkaloids, Glycosides, Terpenoids, Steroids, Bioflavonoids, Purines, Guggul lipids. Pharmacognosy of crude drugs that contain the above constituents. Standardization of raw materials and herbal products. WHO guidelines. Quantitative microscopy including modern techniques used for evaluation. Biotechnological principles and techniques for plant development, Tissue culture.

Pharmacology:

General pharmacological principles including Toxicology. Drug interaction. Pharmacology of drugs acting on Central nervous system, Cardiovascular system, Autonomic nervous system, Gastro intestinal system and Respiratory system. Pharmacology of Autocoids, Hormones, Hormone antagonists, chemotherapeutic agents including anticancer drugs. Bioassays, Immuno Pharmacology. Drugs acting on the blood & blood forming organs. Drugs acting on the renal system.

Medicinal Chemistry:

Structure, nomenclature, classification, synthesis, SAR and metabolism of the following category of drugs, which are official in Indian Pharmacopoeia and British Pharmacopoeia. Introduction to drug design. Stereochemistry of drug molecules. Hypnotics and Sedatives, Analgesics, NSAIDS, Neuroleptics, Antidepressants, Anxiolytics, Anticonvulsants, Antihistaminics, Local Anaesthetics, Cardio Vascular drugs – Antianginal agents Vasodilators, Adrenergic & Cholinergic drugs, Cardiotonic agents, Diuretics, Anti-hypertensive drugs, Hypoglycemic agents, Antilipidemic agents, Coagulants, Anticoagulants, Antiplatelet agents. Chemotherapeutic agents – Antibiotics, Antibacterials, Sulphadruugs. Antiprotozoal drugs, Antiviral, Antitubercular, Antimalarial, Anticancer, Antiamoebic drugs. Diagnostic agents. Preparation and storage and uses of official Radiopharmaceuticals, Vitamins and Hormones. Eicosanoids and their application.

Pharmaceutics:

Development, manufacturing standards Q.C. limits, labeling, as per the pharmacopoeial requirements. Storage of different dosage forms and new drug delivery systems.

Biopharmaceutics and Pharmacokinetics and their importance in formulation. Formulation and preparation of cosmetics – lipstick, shampoo, creams, nail preparations and dentifrices. Pharmaceutical calculations.

Pharmaceutical Jurisprudence:

Drugs and cosmetics Act and rules with respect to manufacture, sales and storage. Pharmacy Act. Pharmaceutical ethics.

Pharmaceutical Analysis:

Principles, instrumentation and applications of the following: Absorption spectroscopy (UV, visible & IR). Fluorimetry, Flame photometry, Potentiometry. Conductometry and Polarography. Pharmacopoeial assays. Principles of NMR, ESR, Mass spectroscopy. X-ray diffraction analysis and different chromatographic methods.

Biochemistry:

Biochemical role of hormones, Vitamins, Enzymes, Nucleic acids, Bioenergetics. General principles of immunology. Immunological. Metabolism of carbohydrate, lipids, proteins. Methods to determine, kidney & liver function. Lipid profiles.

Microbiology:

Principles and methods of microbiological assays of the Pharmacopoeia. Methods of preparation of official sera and vaccines. Serological and diagnostics tests. Applications of microorganisms in Bio Conversions and in Pharmaceutical industry.

Clinical Pharmacy:

Therapeutic Drug Monitoring Dosage regimen in Pregnancy and Lactation, Pediatrics and Geriatrics. Renal and hepatic impairment. Drug – Drug interactions and Drug – food interactions, Adverse Drug reactions. Medication History, interview and Patient counseling.



SYLLABUS FOR PHYSICS

Mathematical Methods of Physics

Dimensional analysis; Vector algebra and vector calculus; Linear algebra, matrices, Cayley Hamilton theorem, eigenvalue problems; Linear differential equations; Special functions (Hermite, Bessel, Laguerre and Legendre); Fourier series, Fourier and Laplace transforms; Elements of complex analysis: Laurent series-poles, residues and evaluation of integrals; Elementary ideas about tensors; Introductory group theory, $SU(2)$, $O(3)$; Elements of computational techniques: roots of functions, interpolation, extrapolation, integration by trapezoid and Simpson's rule, solution of first order differential equations using Runge-Kutta method; Finite difference methods; Elementary probability theory, random variables, binomial, Poisson and normal distributions.

Classical Mechanics

Newton's laws; Phase space dynamics, stability analysis; Central-force motion; Two-body collisions, scattering in laboratory and centre-of-mass frames; Rigid body dynamics, moment of inertia tensor, non-inertial frames and pseudoforces; Variational principle, Lagrangian and Hamiltonian formalisms and equations of motion; Poisson brackets and canonical transformations; Symmetry, invariance and conservation laws, cyclic coordinates; Periodic motion, small oscillations and normal modes; Special theory of relativity, Lorentz transformations, relativistic kinematics and mass-energy equivalence.

Electromagnetic Theory

Electrostatics: Gauss' Law and its applications; Laplace and Poisson equations, boundary value problems; Magnetostatics: Biot-Savart law, Ampere's theorem, electromagnetic induction; Maxwell's equations in free space and linear isotropic media; boundary conditions on fields at interfaces; Scalar and vector potentials; Gauge invariance; Electromagnetic waves in free space, dielectrics, and conductors; Reflection and refraction, polarization, Fresnel's Law, interference, coherence, and diffraction; Dispersion relations in plasma; Lorentz invariance of Maxwell's equations; Transmission lines and wave guides; Dynamics of charged particles in static and uniform electromagnetic fields; Radiation from moving charges, dipoles and retarded potentials.

Quantum Mechanics

Wave-particle duality; Wave functions in coordinate and momentum representations; Commutators and Heisenberg's uncertainty principle; Matrix representation; Dirac's bra and ket notation; Schroedinger equation (time-dependent and time-independent); Eigenvalue problems such as particle-in-a-box, harmonic oscillator, etc.; Tunneling through a barrier; Motion in a central potential; Orbital angular momentum, Angular momentum algebra, spin; Addition of angular momenta; Hydrogen atom, spin-orbit coupling, fine structure; Timeindependent perturbation theory and applications; Variational method; WKB approximation; Time dependent perturbation theory and Fermi's Golden Rule; Selection rules; Semi-classical theory of radiation; Elementary theory of scattering, phase shifts, partial waves, Born approximation; Identical particles, Pauli's exclusion principle, spin-statistics connection; Relativistic quantum mechanics: Klein Gordon and Dirac equations.

Thermodynamic and Statistical Physics

Laws of thermodynamics and their consequences; Thermodynamic potentials, Maxwell relations; Chemical

potential, phase equilibria; Phase space, micro-and macrostates; Microcanonical, canonical and grand-canonical ensembles and partition functions; Free Energy and connection with thermodynamic quantities; First-and second-order phase transitions; Classical and quantum statistics, ideal Fermi and Bose gases; Principle of detailed balance; Blackbody radiation and Planck's distribution law; Bose-Einstein condensation; Random walk and Brownian motion; Introduction to nonequilibrium processes; Diffusion equation.

Electronics Semiconductor device physics, including diodes, junctions, transistors, field effect devices, homo and heterojunction devices, device structure, device characteristics, frequency dependence and applications; Optoelectronic devices, including solar cells, photodetectors, and LEDs; High-frequency devices, including generators and detectors; Operational amplifiers and their applications; Digital techniques and applications (registers, counters, comparators and similar circuits); A/D and D/A converters; Microprocessor and microcontroller basics.

Experimental Techniques and data analysis

Data interpretation and analysis; Precision and accuracy, error analysis, propagation of errors, least squares fitting, linear and nonlinear curve fitting, chi-square test; Transducers (temperature, pressure/vacuum, magnetic field, vibration, optical, and particle detectors), measurement and control; Signal conditioning and recovery, impedance matching, amplification (Op-amp based, instrumentation amp, feedback), filtering and noise reduction, shielding and grounding; Fourier transforms; lock-in detector, box-car integrator, modulation techniques. Applications of the above experimental and analytical techniques to typical undergraduate and graduate level laboratory experiments.

Atomic & Molecular Physics

Quantum states of an electron in an atom; Electron spin; Stern-Gerlach experiment; Spectrum of Hydrogen, helium and alkali atoms; Relativistic corrections for energy levels of hydrogen; Hyperfine structure and isotopic shift; width of spectral lines; LS & JJ coupling; Zeeman, Paschen Back & Stark effect; X-ray spectroscopy; Electron spin resonance, Nuclear magnetic resonance, chemical shift; Rotational, vibrational, electronic, and Raman spectra of diatomic molecules; Frank – Condon principle and selection rules; Spontaneous and stimulated emission, Einstein A & B coefficients; Lasers, optical pumping, population inversion, rate equation; Modes of resonators and coherence length.

Condensed Matter Physics

Bravais lattices; Reciprocal lattice, diffraction and the structure factor; Bonding of solids; Elastic properties, phonons, lattice specific heat; Free electron theory and electronic specific heat; Response and relaxation phenomena; Drude model of electrical and thermal conductivity; Hall effect and thermoelectric power; Diamagnetism, paramagnetism, and ferromagnetism; Electron motion in a periodic potential, band theory of metals, insulators and semiconductors; Superconductivity, type – I and type -II superconductors, Josephson junctions; Defects and dislocations; Ordered phases of matter, translational and orientational order, kinds of liquid crystalline order; Conducting polymers; Quasicrystals.

Nuclear and Particle Physics

Basic nuclear properties: size, shape, charge distribution, spin and parity; Binding energy, semi-empirical mass formula; Liquid drop model; Fission and fusion; Nature of the nuclear force, form of nucleon-nucleon potential; Charge-independence and charge-symmetry of nuclear forces; Isospin; Deuteron



SYLLABUS CONFLICT MANAGEMENT

Detailed Syllabus

UNIT I: Introduction to Peace and Conflict Studies:

1. Origin, Growth and Development of Peace Studies
2. Peace Research, Conflict Resolution Studies, Conflict Mapping: Tools and Techniques
3. Understanding Conflict: Theoretical Constructs
4. Sources of Conflict, Violent and Non-Violent Conflicts
5. Types of Conflict: Ethnic Conflict, Clash of Civilization and Environmental Conflict

UNIT II: Conflict Handling Mechanism: Applied Theories

1. Conflict Handling Mechanism: Force, Adjudication, Arbitration, Negotiation, Mediation, Reconciliation and Dialogue
2. Conflict Management to Conflict Transformation
3. Citizen's Diplomacy
4. Role of Civil Society and NGO's in Peace Processes
5. Gandhi's Way to Peace

UNIT III: Conflict and Community Development

1. Development and Conflict: Two-Way links
2. Issues of Governance and Development
3. Globalization: Contemporary Theories and Trends, Impact of Globalization on Indian Society and Culture
4. Conflict Sensitive Approach to Development and Capacity Building
5. Case of Naxal Violence: Land Reforms, Governance and Development

UNIT IV: Gender, Conflict and Development

1. Understanding Gender through Conflict Analysis Lenses
2. Impact of Armed Conflict and Political Violence on Women
3. Role of Women in Conflict Prevention
4. Development Challenges for Women in South Asia & Women Movements in India
5. Linking Gender, Conflict and Development.

UNIT V: Nonviolent Movements and Social Change

1. Nonviolent Movements in Global Perspective: Theory and Practice
2. Nonviolent Movements in India: Chipko Movement, Narmada Bachao Andolan, Water Conservation Movement and Anti-Corruption Movement
3. .Nonviolent Movement and Social Change

UNIT VI: International Organization & Conflict Resolution

1. Role of UN in Conflict Resolution
2. Agenda for Peace, Responsibility to Protect (R2P) and Beyond
3. Conflict Prevention, Peacemaking, Peace keeping, Peace building
4. Role of Multinational Organization in Peace building (ASIAN, SAARC, NATO, ECOWAS, AU, etc...)

SYLLABUS FOR PSYCHOLOGY