

ANNEXURE-II**POST OF RESEARCH ASSISTANT IN EVALUATION****AND APPLIED RESEARCH DEPARTMENT****(POST GRADUATE DEGREE STANDARD COVERING ALL THE SUBJECTS
REFERRED IN THE RULES)****Subject Code: 213****Unit - I:**

Indian Economy – Growth and development: Agriculture: Area, Yield, And Production, marketing and sales. Rural Development – Industry: Input and output – Service Sector: Types of service sector, skilled labour, semi-skilled labour and unskilled labour – Changing Sectoral contributions – Industrial Policy Changes – FDI – Infrastructure: Public Health – Education – drinking water – sanitation – Public transport – Banking and financial services – housing facilities – Nutrition – Investment – Public Private Participation – Inclusive growth. Human Development: Concepts, Trends and Issues – Employment, unemployment, under employment and disguised unemployment – concepts, measurement and Trends – Employment in Organized and unorganized sector – Strategies for Employment Generation. Poverty: Concepts, measurement and Trends, Fiscal Policy – FRBM Act – Goods and Service Tax (VAT) – Fiscal Federalism – Paralleleconomy in India – Inflation: Definition, trends, estimates, consequences and remedies – RBI – Monetary and Fiscal policy – Banking Sector Reforms – India's foreign trade, composition, direction and recent changes in trade policy – Balance of payments – India and WTO requirements – Global Financial Crisis and its Impact on India. Index number: Consumer price index – Whole Sale price Index. Time series analyses – Moving average Method

Unit - II:

Primary data collection – Field Investigation – Census method – Sampling Method – Direct personal observation – Interview method – Indirect oral interview – Information through agencies – Mailed Questionnaires and scheduled sent through enumerator. Secondary data collection – Books – Journals – Government (Ministry) Records and reports from government agencies – Bibliography – Autography – Web site – News Paper – Periodicals, etc. Evaluation and preparation of the report and components of evaluation Report: Executive summary – background and purpose – statement of the problem – objectives and Hypotheses – evaluation methods (Statistical methods used in the study) – result and discussion of the result – conclusion and recommendation – reference or bibliography – appendices.

Unit – III:

Econometrics - definition, methodology, Data – meaning and types of data such as cross-section, time-series and panel data, primary & secondary data – advantages & disadvantages, Variables – meaning and types such as quantitative and qualitative variables, measurement scales of variables such as ratio, interval, ordinal and nominal – simple examples. Correlation – simple and multiple correlation, properties of correlation coefficients, Karl Pearson's and Spearman's rank correlation coefficients, Simple numerical problems - Simple & multiple linear regression model – introduction, assumptions, least squares principle, least squares estimators, properties of regression coefficients (Gauss-Markov theorem), interpretation of regression output – R² & adjusted R², regression coefficients with t-values and level of significance, Simple numerical problems - advantages of regression analysis over correlation analysis, Functional forms of regression

models – log-linear, log- lin and lin-log models and computation of elasticity, computation of simple and compound growth rates - simple numerical examples.

Unit - IV:

Econometric Problems: heteroscedasticity, multicollinearity and autocorrelation – definition and consequences. Dummy variables: definition, generation of dummy variables, problem of dummy variable trap, cautions in using dummy variables, inclusion and interpretation of dummy variables in the regression. Qualitative response regression models – linear probability, logit and probit models – an introduction. Basics of time-series: additive and multiplicative models, determination of trend by free drawing, moving average methods, and seasonal indices, definition of stationarity, tests for stationarity and transformation of non-stationary series into stationary series.

Unit - V :

Compilation and Tabulation of data Collected - Classification – Types of Classification – Formulation of discrete and continuous frequency distribution (uni-variate and Bi- variate). Pictorial Representation of data: Bar diagrams – Pie diagrams – Histogram – Ogives and Lawrence Curve Measures of Location – Mean, Median, Mode, Harmonic Mean and Geometric Mean – Quartiles - Measures of variation: Range, Quartile deviation, Mean deviation, Variance and Standard deviation. Coefficient of variation, skewness and Kurtosis. (All the calculation of measures are for both grouped and ungrouped data) Probability and Distribution: Introduction to probability: Random Experiments, Sample Space and events, Definition of probability. Classical, Empirical and Axiomatic approach to probability; Addition and Multiplication Theorem, Conditional probability and Baye's Theorem. Random Variables and Distribution function – Mathematical Expectation and conditional Expectation. Convergence in Probability – Weak Law of large Numbers and strong law of large Number – Central limit Theorem – Discrete distributions: Binomial, Poisson. Continuous Distributions: Normal Distribution Chi-Square, t and F distributions and their properties.

Unit - VI:

Application of Statistical Methods - Sampling Theory: Introduction to the theory of Sampling: Sampling designs – Simple Random Sampling with and without replacement - Systematic, Stratified, Ratio and Regression Sampling methods , Sampling and non – sampling errors – Cluster sampling, Purposive Sampling Quota Sampling. Testing of Hypothesis: Introduction to Testing of Hypothesis: Simple, Null and Alternative hypotheses, composite hypothesis, two kinds of Errors – Critical Region – Power function. Testing of significance using chi-square, t and F tests.(simple problems) ANOVA- One way and Two way classifications. Application of Statistical Methods through MS-Excel – Language : Over view of MS-Excel: Construction of charts and diagrams – Sorting – Filtering – Removing duplicates – Calculation of Measures of Central tendency, Measures of dispersion, correlation Regression and curve fitting using – Excel.

UNIT - VII:

Theory of Consumer Behavior - Utility and its measurement - Indifference curve analysis and Consumer's surplus. Demand and supply functions - Elasticity of demand and supply - Factors affecting demand and supply. National Income - Concepts and measurement. Classical and modern theories of Employment. Consumption function - Investment and savings. Concept of Multiplier and Accelerator. Inflation - Nature, Effects and controlling mechanisms. Monetary policy and Fiscal policies and Role of RBI. Types of Market Structure - perfect

competition, monopoly, monopolistic. Competition, oligopoly and price determination. Agricultural marketing - Characteristics of Agricultural products and constraints in marketing agricultural produce. Marketable and Marketed surplus estimation. Estimation of price spread and Marketing Efficiency. Market integration, Marketing Intelligence and Marketing Acts. Institutions in Agricultural Marketing - Regulated Markets, Cooperatives, Commodity Boards, Contract Farming, Commodity Exchanges, Farmers' Markets and Farmers Producers Organizations. Commission on Agricultural Costs and Prices - Agricultural Price fixation and price support programs and policies. Price forecasting. Supply chain Management and logistics. Development planning in India - Agriculture in five year plans. Land tenure and reforms. Unemployment, Poverty and inequality. Food and nutritional security. Population policies. Income distribution - Social Choice Theory - Public goods

- Welfare economics. Rural Indebtedness. Financial Institutions and Credit Flow to Rural/ Priority Sector. Agricultural Lending - Direct and Indirect Financing - Financing through Co- operatives, Commercial Banks and RRBs - Role of Lead Bank and NABARD - District Credit Plan. Credit linked Rural Development Programs - RIDF. Micro- Financing - Role of MFI's, NGO's, and SHG's. Credit Inclusion-Credit Widening

- Credit Deepening. Risk in agriculture and different Crop Insurance Programs - Agricultural project preparation - project cycle - Costs and benefit analysis - Discounted and Undiscounted Measures - Sensitivity analysis. Technical feasibility of economic viability of projects. Use of Network techniques - Project monitoring and evaluation. Forms of production functions - Returns to scale vs Economies of scale. Cost of cultivation vs Cost of Production - Cost concepts - Fixed Cost, Variable cost, Average Cost and Marginal cost. Efficiency Measures - Technical and Economic Efficiency. Financial statements and ratio analysis. Partial and complete budgeting and their applications.

UNIT - VIII:

Concepts, Classification and Problems of Natural Resource Economics. Economy and Environment interaction. Resource scarcity - Limits to Growth - Measuring and mitigating natural resource scarcity-scarcity indices. Malthusian and Ricardian Scarcity. Theory of optimal extraction of exhaustible and renewable resources. Property rights - Issues in natural resource management - private property, common property and open access resources - Collective action in common property resource management. Land use planning - optimal management of land, water, forests and fisheries. Resource mapping - GIS and remote sensing applications. Environmental problems and quality of environment - Economics of the environment -Theory of externality. Sources and types of pollution - air, water, solid waste, land degradation - Environmental and economic impacts. Economics of pollution control - efficient reduction in environmental pollution. Environmental regulation - Economics instruments and indirect instruments (command and control policies). Environmental legislations in India. Concept of sustainable development - Indicators of sustainability. Environmental Accounting - resource accounting methods. Climate change and its impacts - mitigation efforts and international treaties. International Trade and Comparative Advantage. Terms of Trade and Instruments of Trade Policy - Tariffs and Non tariffs. Balance of Trade vs Balance of payments. Exchange Rates. International Organizations - IMF, IBRD, IDA, IFC. WTO. Fundamental vs. Applied Research - Qualitative vs Quantitative Research. Research Prioritization - Identification of Research Problems and Prioritization. Research Process. Trade-off between scope and cost of the study. Research Design and Techniques. Hypothesis - Meaning - Characteristics - Types of Hypothesis and Testing. Setting of Objectives and Hypothesis. Sampling Theory and Sampling Design. Sampling Error. Sampling methods - Probability and Non-Probability methods.

Interviewing Techniques – Questionnaire vs Interview schedules and Field Problems – Methods of Conducting Survey. Types of data – Primary and Secondary data. Sources of Secondary Data and Data collection techniques. Types of questions in interview schedule – Structured, Unstructured, Open Ended and Closed-Ended Questions. Data coding and data entry. Data Tabulation and Validation of Data. Data Processing. Application of Analytical tools to data – Simple and Multiple regression and problems in estimation – Multicollinearity, Heteroscedasticity and Autocorrelation. Optimization Models – Linear Programming: Concepts and theories. Problem formulation – Minimization and Maximization problem (Primal and Dual solutions). Sensitivity analysis. LP in farm planning and regional planning. Risk Programming and dynamic programming techniques.

Unit - IX:

Nature and Scope of Sociology, Sociology as a Science. Individual and Society. Social Process: Competition, conflict, Co-operation, Accommodation, Assimilation, Social control. Social Institutions: Family and Marriage. Theoretical Perspectives:- Structural Functional Perspective: August Comte, Herbert Spencer, Max Weber, Emile Durkheim, R.K. Merton. Conflict Perspective: Karl Marx, Ralf Dahrendorf and L. A. Coser. Caste System in India: Origin of the caste system; cultural and structural views about caste; mobility in caste; change and persistence of caste in modern India; views of Gandhi and Ambedkar about caste system. Class Structure in India: Agrarian and industrial class structure; emergence of middle class. Rural Social Structure: Village Social Structure and Importance of Village Studies. Peasant society and agrarian systems; land tenure systems, social consequences of land reforms and green revolution. Agrarian unrest and movements in India. Rural social problems in India: poverty, unemployment, indebtedness, farmer's suicide and bonded labour. Strategies of rural development programmes. Tribal Societies in India: Type and distinctive features of tribal communities in India and their geographical spread. Problems of tribal communities: land alienation, poverty, indebtedness, health and nutrition, education, Integration and issues of tribal identity. Tribal development policies after independence.

Unit - X:

Socio- religious reform movements: Bhakthi Movements, Arya Samaj, and Ram Krishna Mission. Backward Class Movements: Satya Sadhak Samaj, Sri Narayanguru Dharma Paripalana Movement (SNDP), Self-respect movement, Dalit Movements, Political Mobilization of Backward Classes. Women in Indian society: Socio-cultural interpretation of women in India. Demographic profile of women. Problems of Women in India: dowry, domestic violence, discrimination, female infanticide, honor killing, sexual harassment. Women empowerment programmes and SHGs. Social Research: Meaning of Social Research, Scope and Importance of Social Research. Types of Research, Research Process: Identification and formulation of research problem. Methods of Research: Descriptive and Explorative methods. Sampling Methods, Methods of Data Collection. Tools of Data Analysis: Univariate and Bivariate Statistics, Chi-square Test. Application of ICT in Social Research. Evaluation Research: Meaning and aims of evaluation research. Types of evaluation and their purpose. Levels of measurement: population-based vs. program-based. Sources of data. Study designs. Impact Assessment Research: Programmes and policy evaluation research. Environmental impact assessment research. Research Report Writing: Organization of a research report: Title, Abstract, Introduction, Experimental Details or Theoretical Analysis, Results, Discussion, Conclusions and Summary, References. Quality of good research report. Significance of research report.

Unit – XI:

Public Administration Theory and Principles - Public Administration: Meaning and scope and significance – Public vs Private Administration – Approaches to the study of Public Administration-Comparative Public Administration – Development Administration - New Public Administration – New Public Management - Principles of Organization and Administration – Classical theories – Human Relation theories – Modern theories of administration – Bureaucratic culture-Administrative Responsibility and Ethics.

Unit – XII:

Public Administration in Practice - Public Financial Administration: Budgetary process and accountability, Union – State financial relations in India – Good Governance: Social welfare schemes in Tamil Nadu, Women Empowerment schemes in Tamil Nadu, Health care Policy in Tamil Nadu – E. Governance : ICT application in government – IT parks in Tamil Nadu – District administration: e-governance in Districts, THAI scheme, Pudhuvazhvu scheme – Special Economic Zones – Panchayat Raj: Rural Development programmes in Tamil Nadu, Environmental protection in Tamil Nadu – Administrative reforms: Personnel and Administrative Reforms, Urban Governance: Urban Local bodies in Tamil Nadu, Jawaharlal Nehru National Urban Renewal Mission (JNNURM) in Tamil Nadu – Tamil Nadu Urban Development Project – Human Rights governance: the Tamil Nadu State Human Rights Commission- Social Science Research: Meaning, nature and scope of social science research- Qualities of good researcher-Types of social science research: Historical-Descriptive-Empirical-Experimental-Qualitative-Quantitative-Hypothesis-Variables-Sampling: Probability and Non-Probability sampling – Methods of Data Collection: Primary and Secondary data- Observation-Schedule- Survey-Interview-Questionnaire-Measurement- Data Analysis-Tabulation-Inferences- Research Design and Report.

Unit – XIII:

Social work research - Scientific Method: Objectivity, Scientific attitude, Ethics in research; Types of Research: Applied and Pure, Quantitative and Qualitative, Mixed methods, Participatory, Action research, Evaluative, Field based research. Research as a method in Social Work. Research process: Classification of Variables, Concepts, Constructs, identifying and formulating research problem, research questions, defining objectives, hypotheses. Research Designs: Exploratory, Descriptive, Diagnostic, Experimental, Evaluative and Participatory. Sampling Methods : Probability and Non- probability sampling techniques. Data Collection: Types of data, data collection methods, Questionnaire, Interview Schedule, Interview Guide, Observation (Participatory and non participatory) Qualitative Research techniques: FGDs, In-depth interview, Transcription, Themes, Illustrative quotes. Appreciative inquiry technique. Photo voice technique. Social Audits. Triangulation and Iteration.

Unit – XIV:

Project evaluation - Project identification and formulation – Classification of projects, Project objectives, Project life cycle and phases, Project Planning and Organization. Project feasibility analysis (Financial, Technical) Market Survey, Demand analysis, Forecasting and Projection. Terms of reference: Area of study, documents needed, process, time frame, Team members. Evaluation design; Types of Evaluation; Project design: Time management, sequencing and scheduling, Network Analysis, CPM and PERT, Logical Framework Approach (LFA), Problem Analysis and Problem Tree. Log Frame Matrix, Social Cost – Benefit analysis, Environmental Impact Assessment, Legal aspects and clearance. Factors

such as efficiency, effectiveness and sustainability of the project. Project appraisal and Implementation: Project Appraisal methods: (Financial, Technical) Project Financing, Project Resource mobilization, Negotiation, Decision making, Project control and Monitoring techniques, Project evaluation: Tools of Evaluation: Ladder of Life (UN tool). Community impact assessment, Holistic World View Analysis, Vulnerability Assessment, Impoverishment assessment, FGDs and Reporting on Evaluation.

UNIT - XV:

Basics and Major areas of Management - Concept and Foundations of Management - Managerial Functions - Planning and decision making, Organizing, co-ordination and control - Role of Manager - Managerial skills - Management of innovation - Personality Theories and Determinants - Meaning and Process of perception - Motivation Concepts, Theories and Applications. Leadership - Theories and Styles - Quality of Work Life (QWL) - Quality Circles (QC) - Management of Conflicts in Organizations - Demand analysis and forecasting - cost functions - Break-Even-Analysis - Theory of firm-profit maximization and sales maximization - Pricing decisions under different market structures. National income- GNP, GDP, Gross Domestic savings - Monetary and Fiscal policies - Business cycle. Fundamentals of operations management - Aggregate production planning, capacity planning - plant design - process planning - plant size and scale of operations - Management of facilities - Production control - Supply chain management - Quality management - statistical process control-role and importance of material management - Modern production concepts - JIT, Kaizen, Japanese 5's framework. Nature and scope of financial management - finance function- valuation concepts and Valuation of securities- financing decisions-sources of finance- cost of capital and capital structure - Investment decisions - Capital budgeting - Working capital management - Dividend decisions. Marketing Management - evolution and scope - Marketing strategy formulation and components of marketing plan - Segmenting and targeting the market - Positioning and differentiating of the market - Analyzing competition - Analyzing consumer markets - Industrial buyer behavior - Marketing research - Product strategy - Pricing strategies - Designing and managing Marketing channels - Building customer satisfaction - Ethics in marketing - Consumer protection - Concepts and policies of HRM - HRM functions - Future challenges of HRM-Human resource planning - Job analysis - Job evaluation - Recruitment and selection - Training and development - Promotion and transfer - compensation - performance appraisal and 360 degree feedback - HR audit - Handling of sexual harassment in the work place-current trends and issues in HRM. Nature and scope of strategic management - Strategic intent, vision, objectives and policies - Process of strategic planning and implementation - Environmental analysis and internal analysis - SWOT analysis - Tools and techniques for strategic analysis - Impact matrix - The experience curve - BCG matrix - Balanced Score Card - Du Pont's control model.

UNIT - XVI:

Research methodology and management information system - Research - meaning, scope and objectives-types of research - research design-Data collection and Tabulation - Questionnaire design - Scaling technique - sources of secondary data- Sampling - Probability - Correlation and Regression Analysis - Tests of Significance - Normal distribution, Chi-square, F and t tests, ANOVA, time series and forecasting decision theory, index numbers - Multi-Variant analysis, Factor analysis - Discriminate analysis - report writing - Types of Report - structure of the Report - Guidelines for Report writing . Conceptual foundations of information systems - Types of information systems - Element of information system - Data Vs. Information - information requirement at various levels - data processing - data base - Data Entry -Development and Management - Systems

analysis and design – Trends in information technology – Flexibility in information systems – User involvement – Evaluation of information systems – Security and ethical challenges.

Unit – XVII :

Algebra and Differential Equations - Groups: Groups – Sub groups – Normal subgroups and quotient subgroups – Homomorphisms – Automorphisms – Cayley's Theorem – Rings: Rings - Special class sub rings - Homomorphisms – Ideals and Quotient Rings – Vector Spaces: Basic Concepts – Linear Independent and Bases – Inner Product spaces – ODE: ODE with constant coefficients – ODE with variable coefficients – Higher order ODEs – PDE: First order PDE - Second order PDE – Elliptic, parabolic, and hyperbolic PDEs.

Unit – XVIII :

Analysis - Real Analysis: Properties of monotonic functions - Functions of bounded variations – Total variations – Additive property of total variation – Total variation on $[a,x]$ as a function of x - Continuous functions of bounded variations – Infinite Series: Absolute and conditional convergence – Dirichlet's test and Abel's test Rearrangement of series – Riemann's theorem on conditionally convergent series.– Complex Analysis: Differentiability and Cauchy-Riemann Equations – Harmonic Functions – Power Series as an Analytic Function – Complex Integrations – Cauchy Integral Formula – Morera's Theorem – Existence of Harmonic Conjugate – Taylor's Theorem – Conformal mappings – Functional Analysis: Metric Spaces – Convergence, completeness and Baire's Theorem - Continuous mappings - Space of continuous functions - Euclidean and Unitary spaces - Topological Spaces: Basis for a Topology – The Product Topology – The Metric Topology – Connected Spaces – Connected Subspaces of the Real Line – Components and Local Connectedness. Decision Making: Basic Statistics: Moments
– Mean – Variance – Standard deviations – Linear regression – Rank correlations – Attributes – Index Numbers. Linear Programming Problem: Graphical Methods – Travelling Salesman Problem – Assignment Problem – Simplex Methods.

Unit - XIX:

Anthropology, meaning scope and relationship with other disciplines particularly social sciences, humanities etc. Main branches, their scope, The nature of culture, The nature of society: concept of society, society and culture, social institutions, social stratification Marriage: Definition and universality, Family, Kinship, Economic organization: meaning, scope, and relevance of economic anthropology, Religion Research methods in Anthropology - Field work tradition in Anthropology - Distinction between techniques, methods, methodology - Tools of data collection, observation, interview, schedules, case study, genealogy etc.

Unit - XX:

Evolution of the Indian culture and civilization: Palaeolithic, Neolithic, Harrappan cultures; Tribal cultures of India, Brief ethnographic details of Tribes of Tamil Nadu. Caste system in India: Structure and characteristics, theories of origin of caste, Dominant caste. Indian village: Indian village as a social system, peasant cultures. Cultural change in Indian Society: Sanskritization, Westernization, Modernization, Post Modernism, Globalization ; Problems of the tribal communities a) poverty b) low literacy c) health Development of forest policy and Tribals Constitutional safe guards for ST/SC, Role of Anthropology in Tribal and Rural development. Demographic profile of India – Ethnic and Linguistic elements in the Indian population and their distribution. Gender issues in Tamil Nadu.

Annexure-IIA
For the post Research Assistant in Tamil Nadu Town and Country
Planning Department

SOCIOLOGY
PG DEGREE STANDARD

Subject Code: 368

UNIT-I: INTRODUCTION TO SOCIOLOGY

Definition and Meaning of Sociology, Basic concepts: Society, Community, Culture, Association, Socialization, Individual and Society, Environment and Heredity, Social Institutions: Family, Marriage, Education, Religion, Caste, Class, and Politics.

UNIT – II: SOCIAL PROCESSES, SOCIAL CHANGE, AND SOCIAL CONTROL

Associative and dissociative processes, Difference between Associative and dissociative processes. Features, causes, sources and impact of social change; Advancement of technology and media for social change, Theories of social change; Meaning, purposes, types, and agencies of social control.

UNIT-III: SOCIOLOGICAL THEORIES

Law of Three stages; Social Statics and dynamics, Positivism, Theory of Evolution, Organic Analogy, Social Darwinism, Social facts, Suicide, Division of labour. Social action, ideal types, bureaucracy and *The Protestant Ethic and the Spirit of Capitalism*, Historical materialism, Social Change, Class struggle, alienation. Social structure, Social personality, Structuration and modernisation, deconstruction.

UNIT-IV: RURAL AND URBAN SOCIOLOGY

Rural: Rural - urban contrast. Characteristics of Rural society. Agrarian class structure. Panchayatraj system. Rural development programmes. Rural industries and Rural Entrepreneurs. Skill development of rural entrepreneurs.

Urban: Meaning, Characteristics of urbanisation and its impact. Ecological processes. Urban sociological theories- Karl Marx, Ferdinand Tonnies, Georg Simmel, Max Weber, Robert Park, Louis Wirth and Ernest Burgess, Homer Hoyt, Harris and Ullman.

UNIT-V: SOCIOLOGY OF SOCIALLY EXCLUDED

Social exclusion- meaning, definition, features; Groups at the risk of being excluded; Three paradigms of social exclusion (solidarity, specialization and monopoly); Agents, forces, and Processes - globalization, international organizations, nation states, elites, excluded groups and individuals. The culture of marginalised communities - SC, ST, Nomadic Castes and Tribes and De-notified Tribes, transgender, religious minorities, differently abled, aged, HIV/AIDS.

Constitutional Provisions, Implementation, and Impact on Marginalized.

UNIT – VI CONTRIBUTION OF INDIAN SOCIAL REFORMERS

Contributions of Mahatma Gandhi, Bharathiar, EVR Periyar, Anne Besant, Raja Ram Mohan Rai, Jyotiba Phule, Savitriba Phule, Muthulakshmi, Ambedkar, Mother Teresa.

UNIT-VII: CHILDREN WITH DIFFICULT CIRCUMSTANCES

Sex preference, Female Infanticide, Girl child, Neglected, Orphan, Abandoned, Street Children, Child Abuse, Child Trafficking, Child Prostitution, Child Beggary, Child Labour, Children with Disabilities (Cwd), Child Marriage.

UNIT-VIII: Constitutional Privileges towards Children

Children Related Policies and Acts: Constitutional Provisions for Children in India; Children in Five Year Plans; National Policy for Children (1974 and 2013); Development and Features of Legislations - Child Care and Protection in India; National policy for children – Salient features, priority areas and gaps. Current policies and trends - Child Welfare; Children Acts – JJ Act, Protection of Children, from Sexual Offences Act (POCSO), 2012, Child Labour (Abolition and Prohibition) Act 1986 , The Prohibition of Child Marriage Act 2006 – Bonded Labour (Abolition) Act 1976, and other relevant acts.

UNIT-IX: AFFIRMATIVE ACTIONS FOR CHILD WELFARE

Institutional services:- *Short-stay homes for needy children from vulnerable sections of the society. Residential facilities for the destitute children. Foster home. Facilities/services for placement of children of unmarried mothers, Juvenile homes.*

Non- Institutional services:- Anganawadi, Day-care centers, Crèches, Child Guidance centers, Services through nursery/primary school, **Services for children in need of special care** - Schools for mentally retarded children. Schools for blind, deaf and dumb and physically handicapped. Adoption services for destitute children

UNIT-X: CHILDREN AND STAKEHOLDERS

Children Stakeholders: Ministry of Women and Child Development: Roles and Functions - Central and State Level Commission for Protection of Child Rights in India; Roles and Functions National Institute of Public Cooperation and Child Development; Powers and functions of Directorate of Social Defence and District Child Protection Office; Roles and Functions of Civil Society and civil society organisations

SOCIAL WORK
P.G DEGREE STANDARD

SUBJECTCODE: 370

UNIT-I: SOCIAL WORK PROFESSION

Definition and meaning; historical evolution of Social Work – UK, USA and India; Growth of Social Work as a Profession; Social Work concepts, methods, fields; international and national professional bodies/ forums; status and problems of the profession in India.

Social Work ideologies: socialism, marxism, equality, equity, social justice and humanitarianism; Indian socio-cultural and religious thought, social reforms purusharthas; Gandhian Social Work; contributions of religions Hinduism, Buddhism, Jainism, Islam and Christianity; Rights based approach.

Philosophy of Social Work Profession – values, beliefs, principles and code of ethics; Social Work theories; International Social Work – basic concepts, Global Agenda and Global standards for practice; Human Rights and Social Work; Constitutional safeguards; India as a welfare state; role and contributions of voluntary organizations, INGOs, NGOs and CSOs.

UNIT-II: FUNDAMENTALS OF SOCIOLOGY AND PSYCHOLOGY

Sociology: Definition, meaning, scope and relevance to social work; basic sociological concepts: Society-meaning, definition and types, structure, features; social institutions; concept of social system and sub system, classification of social systems, culture: concept, characteristics, social stratification, social processes-social control, social change in India, social movements, crime and delinquency; social problems-poverty, inequality, casteism, causes and consequences.

Psychology: Definition, meaning and scope, Psychology and Social Work; lifespan, phases of human growth and development, (Erik Erikson and Freud) needs, tasks and challenges, influence of hereditary and environment; psychological processes for understanding behaviour, intelligence, sensation, emotions, learning, memory, attitudes, behaviour, perceptions and prejudices; life events and their impact on behaviour.

UNIT-III: DIRECT METHODS OF SOCIAL WORK PRACTICE-I

Social Case Work: Historical development, CW as a direct method of Social Work, definition and meaning, philosophy, values, principles, skills, components of social case work, case work relationship; empathy, skills in building relationship, transference and counter transference; difference between casework, counseling and psychotherapy for different target groups, the helping process, approaches: Skills-referrals, interview, observation, collateral contact; types of recording, application of CW in various settings; limitations of the method.

Social Group Work: Definition of group, types, and characteristics of groups; Historical development of GW as a direct method in Social Work, definition and meaning, purpose, objectives, values, skills, principles of GW, phases of group work process-group processes and dynamics-stages in group development, the influence of new comers on group processes, isolation, rejection in groups, group-bond, subgroups, clique, dyad, triad, group norms, group membership, group

cohesiveness, group pressure, group morale, leadership, team building, decision making, problem solving, conflict management, communication; role clarity in a group; use of sociometry; Group Work models; social goals model, remedial model, reciprocal model, Application in various settings; types of recording in Group Work.

UNIT-IV: DIRECT METHODS OF SOCIAL WORK PRACTICE-II

Community Organisation: Definition, philosophy, principles, goals, scope of CO; community as a social system; subsystems; types and characteristics community power structure, community dynamics, evolution of CO as a direct method in social work, community organization models: Rothmansocial planning, locality development and social action; Murray Ross-general content, specific content and process objective; process and skills in community organisation.

Social Action: Concept, definition, aims and objectives, scope, social action as a method in social work, paradigm of five elements: causes, change agent, change target, change channels, change strategy, strategies and tactics for social action: channels topology; skills of a social activist, models and approaches to social action: Paulo Freire- Martin Luther King ,Saul Alinsky, social action movements in India- Narmada Bachao Andolan, Chipko movement, Dalit movements, women's movements, Contemporary Social Reforms movement

UNIT-V: INDIRECT METHODS OF SOCIAL WORK PRACTICE-I

Social Work Research: Definition, objectives, scope, characteristics and functions- scientific method, concepts, variables, types of research, research as an indirect method of social work, qualitative methods – case study, Ethnography, Grounded, Theory, Content Analysis, Narrative, SWOC; quantitative research Methods-Tools and techniques in qualitative data collection: Observation, focus group discussion, unstructured in-depth Interview; iteration, triangulation and saturation. Mixed Methods: problem formulation: formulation of hypotheses; typology of research designs; ethical issues; sampling: definition, types, techniques: probability and nonprobability sampling; sampling errors; data sources; types of data-nominal, ordinal, discrete numeric, continuous, sources of data; methods, tools and techniques of data collection, classification and coding, tabulation, analysis and interpretation-research reporting.

Statistics: Meaning, definition, limitations and uses- frequency distribution construction of frequency tables-diagrammatic and graphical representation; measures of central tendency – mean, median, mode, measures of dispersion-standard deviation, variance, quartile range, measures of correlation and regression; tests of significance: hypothesis testing; Type I & Type II errors, Level of confidence, degrees of freedom Chi square, 't' test, reliability and validity methods; Scales: Rating scales, Attitude scales-Likert, Thurston, Guttman; using software for data analysis;

UNIT-VI: INDIRECT METHODS OF SOCIAL WORK PRACTICE-II

Social Work Administration: Concept, definition, characteristics, Social work Administration as an indirect method of Social work; Organizational structure, boards and committees: executive: functions and qualities - administrative process: policy formation, planning, decision making, coordination,

communication; Human Resource Management: selection of staff, orientation, placement, service conditions, promotions, discipline, welfare programmes for staff-financial administration: budgeting, accounting, bookkeeping and fund-raising-office administration: office management and maintenance of records-supervision, evaluation and public relations; Central Social Welfare Board, State Social Welfare Board, Nehru Yuvak Kendra, Ministry of Social Defence Department of Social Welfare; Role of Voluntary Agencies, Board, Trustee, Committees, Executives –Roles and Functions; Laws related to NGOs; Registration of organizations: Tamil Nadu Societies Registration Act 1975, Trust Act 2001, Foreign Contribution (Regulation) Act 1976, Tax Exemptions and Foreign grants; Role and contribution of international funding organizations; Project and Project Cycle Management; Project Proposal Writing, Overview of Logical Framework Analysis; Types and Steps, Format; Fund-Raising (Types, Methods, Skills); Monitoring and Evaluation of Projects.

UNIT-VII: SPECIALIZATION IN HEALTH CARE AND SOCIAL WORK

Health-definition and concept; Healthcare approaches: patient as a person, psychosomatic approach, holistic approach. Problem assessment process: Rehabilitation, definition, types and principles, levels-prevention, promotion and tertiary; rehabilitation therapies; gender dimensions in disability, rehabilitation in various settings – UN convention on the rights of persons with disabilities; policies and programmes; Community –Based Rehabilitation.

Community health; definition, health indicators, disease, sickness/illness, definition of public health, changing concepts, primary healthcare: preventive, curative and social medicine. wellbeing, HDI; Communicable and non-communicable diseases: causes, prevention and treatment, Primary Health Care; Health Education; Skills of Social Worker in healthcare.

Concept of mental health; magnitude of mental health problems, changing trends in mental healthcare; psychiatric assessment: common mental disorders (as per ICD 10); mental health and Well Being; definition,

history and scope of psychiatric social work, changing perspectives of psychiatric social work, application of methods in psychiatric settings-theory and models; psychoanalytical, psycho social, transactional analysis, family therapy, crisis intervention, behaviour therapy, rational emotive therapy, group therapy & strengths based approach; counselling: definition, principles, goals, approaches and techniques- CBR and Community Mental Health, Mental Health Act 2018.

UNIT-VIII: SPECIALIZATION IN RURAL AND URBAN COMMUNITY DEVELOPMENT

Rural Community development: definition, philosophy, objectives, scope; history of RCD; Rural development: need and importance, approaches, power structure, caste and untouchability, poverty and indebtedness; land reform measures, Farm laws, agricultural laborers, marginal and small famers; water shed management;

Development Administration: Organization and administration of rural, tribal and urban development from block to National levels. Panchayat systems and local self-government in India; rural development programmes and policies; implementation strategies, PMERG, SUMCY, PMKVY tribal communities: Adivasis, Indigenous, aborigines; tribal social systems and structures; types, characteristics, tribal social systems and structures; belief systems, culture-indigenous vs. mainstream, Atrocities against SC/ST and Constitutional Provisions for the safeguard of SC/ST.

Urban Community development: definition, philosophy and objectives, history of UCD, scope; Slums: definition, causes, characteristics, functions, classification, approaches, theories and culture of slums; in and out migration, urbanization, urbanism: theories of urbanization, Unorganized/Informal sectors; urban services and urban deficiencies; 74th amendment and salient features of Nagarpalika Act; structure and functions of Urban Development Agencies: Urban Development Programmes: role of community development worker; rural, tribal and urban policies; tools and techniques for development practice; Application of social work methods in rural, tribal and urban communities, Role of CSR in Community Development.

Disaster: Definition, types, problems, Disaster Management and its process.

UNIT-IX: SPECIALIZATION IN FAMILY AND CHILD SOCIAL WORK

Family: Definition, concept, characteristics, types, functions, family patterns; marriage: forms, functions, changing situations in marriage, challenges, separation and divorce; assessment of family needs; laws on family and marriage;
Gerontology and Geriatric Care: Definition, Theories of Aging, Dimensions of Aging, disabilities; Interventions with older persons; Policies and programmes for senior citizens -NPOP and Maintenance and Welfare of Parents and Senior Citizens Act 2007, stress management of caregivers, Role of government and non-governmental services, institutional and non-institutional;, hospice & palliative care.

Youth: Definition, demographic profile; Youth Policy–2014; needs of youth; impact of westernization, modernization, urbanization and globalization; problems of youth; programmes for rural/urban youth, career counselling, Organisations and Movements in India.

Women: Sex and gender, gender identity; gender stratification; sex ratio in India; feminism: concept, meaning and definition and types; empowerment: concept, definition, types; GDI, GEM; Constitutional provisions and protective laws for women; special initiatives and programmes for women, national and state commissions;

Convention on elimination of all forms of discrimination against women and girls (CEDAW) 1982, micro finance and self-help groups (SHGs), challenges of Indian women Status of Women in India, Problems of Women, Cyber Security.

Children: Demography; Constitutional safeguards; UNCRC, Post 2015 Development Agenda; Common Problems of Children-School Dropouts, Truancy, street children, child labour, child abuse, child trafficking, child prostitution, Child marriage, Teenage Pregnancy, Children and Gaming Addiction, Social Media and related problems, disabled children, the girl child; Child services: mechanisms, National commission for protection of child rights/ State commission for protection

of child rights, District Child protection Unit; Legislations for Protection of Children- POCSO, JJ Act, Information Technology Act-2000; Approaches: Adoption – sponsorship and foster care, Institutional Care; application of Social work methods in Family and Child setting.

UNIT-X: SPECIALIZATION IN INDUSTRIAL RELATIONS, LABOUR WELFARE AND SOCIAL WORK

Industrial Relations-Concept, characteristics, Industrial Relations at plant and shop floor level, Industrial conflicts: concepts of industrial peace; cause and consequence of industrial conflict, strikes and lock-outs; conflict resolution, mediation, conciliation: arbitration and adjudication; statutory and non-statutory machinery for prevention and settlement of disputes. Trade Unions: Trade unionism in India, role in Industrial relations.

Labour Welfare: Concept, definition, philosophies, need, objectives, principles, scope and limitations of labour welfare; Historical development of labour welfare in India. Statutory and Non-Statutory Welfare Provisions: Industrial Counseling- Pre-retirement, Quality of work life. Social security, social security measures; Standardization, Wage policy, Wage incentives, bonus and profit sharing. Collective Bargaining: Meaning, goal, phases, prerequisites, principles, strategies and negotiation skills, factors influencing collective bargaining, Role of Social worker in industrial setting.

HR System Concept and functions - HRM, HRD & HR; evolution, Asian trends; HRD system and sub-systems; elements, goals, importance of HRD in Industry; 360 Degree feedback; leadership and leadership development; mentors & modeling; Organizational commitment CSR in HR.

STATISTICS
(POST GRADUATE DEGREE STANDARD)

CODE: 410

Unit - I: Probability and Random Variables

Introduction to probability: Random experiments, sample space and events, definition of probability - classical, empirical and axiomatic approaches to probability; addition and multiplication theorem, conditional probability and Bayes' theorem. Random variables and distribution function, distribution function of a random vector - Mathematical expectation and conditional expectation Markov inequality - Chebyshev's inequality - Convergence in probability - Convergence in distributions - Weak and strong laws of large numbers - Central limit theorems (Lindeberg-Levy, Liapunov's and Lindeberg-Feller).

UNIT - II: Distribution Theory

Introduction to distributions: Marginal and conditional distributions - Generating functions: MGF, PGF and CGF - Characteristic functions. Discrete distributions: Binomial, Poisson, Negative binomial, uniform and Hyper geometric distribution. Continuous distributions: Uniform, Normal, Cauchy, Beta, Gamma, Exponential, Weibull, Pareto and Log-Normal. Sampling distributions: t , F and Chi-square distributions and their properties.

UNIT- III: Estimation Theory

Introduction to estimation theory: Consistency, unbiasedness, sufficiency, efficiency and completeness. Theorems and Inequalities: Cramer-Rao inequality, Chapman-Robbins inequality, Rao-Blackwell, Lehman-Scheffe, Neyman-Fisher factorization theorems with examples. Methods of Estimation: Methods of moments, maximum likelihood, minimum chi-square and least squares, Bayesian estimation (with examples) - Confidence intervals for large and small samples.

UNIT - IV: Testing of Hypothesis and Non-Parametric tests

Introduction to Testing of Hypothesis: Null and alternative hypotheses, simple and composite hypotheses, two type of errors - Critical region - Size and level of a test - Power function. Tests: Most powerful test, Neyman-Pearson lemma: UMP and unbiased tests - MLR property and its uses for construction of UMP test. Non-Parametric tests: Run test, Median test, Sign test, Mann-Whitney test, Wilcoxon test, Kolmogorov-Smirnov test (one and two sample test procedures), Kruskal-Wallis test and SPRT Test.

UNIT - V: Regression Analysis

Simple and Multiple regression models: Description of data model - Estimation and testing of hypothesis on regression coefficients - Adequacy measures - Predicted values and standard error - Evaluation of fit - Analysis of residuals. Multicollinearity and its effects on inference and forecasting - Selection of variables - Forward selection and backward elimination procedures (step-wise method). Introduction to Generalized Linear Models: Components of GLM - Logistic regression model - Fitting and interpretation.

UNIT – VI: Sampling Theory

Introduction to the theory of Sampling: Sampling designs – estimation procedures – properties of estimators – SRSWR and SRSWOR and their properties.

Systematic and Stratified Sampling methods, Ratio and Regression estimators, estimation under double sampling – Sampling and non-sampling errors – Cluster sampling – Two stage and Multistage sampling – Randomized response techniques - Sample survey organizations – CSO and NSO.

UNIT – VII: Design of Experiments

Contrasts: Linear and orthogonal contrasts – Linear models: Fixed, random and mixed effect models.

Principles of experimental designs – Construction and analysis of CRD, RBD, LSD, 2^n and 3^n factorial experiments - Partial and complete confounding – BIBD – PBIBD - Split plot design - Youden Square design – Lattice design.

UNIT – VIII: Statistical Quality Control (SQC)

Introduction to statistical process and product control: Control charts – Shewhart control charts for variables and attributes: X-bar, R, S, p, np, c and u charts – CUSUM charts – OC curve for control charts.

Acceptance sampling: Sampling inspection – AOQL, LTPD, producers' and consumers' risks - Single, double, multiple and sequential sampling plans for attributes and variables – OC, ASN, ATI and AOQ curves. Implementing six sigma – over view and implementations.

UNIT – IX: Time series and Index numbers

Concepts of time series, additive and multiplicative models, decomposition into components, determination of trend by free hand method, moving averages, fitting of mathematical curves, seasonal indices and the estimate of the variance for random components, autoregressive, moving averages and ARIMA models.

Definition, construction, interpretation and limitations of index numbers - Laspeyre's, Paasche's, Marshall-Edgeworth, Dorbish-Bowley, Fisher's index numbers and their comparisons for ideal index number - Construction for cost of living index and wholesale price index.

UNIT – X: Machine Learning Techniques through R and Python Languages

Overview of R Language – Defining the R project – Objects and data structures – Graphics using R language – Calculation of measures of central tendency, dispersion, correlation and fitting of regression lines (Linear and logistic).

Overview of Python Language – Regular expressions – Scientific libraries: Numpy, Scipy, Matplotlib and Pandas.

Machine Learning: Supervised learning – Classification (KNN and Naive Bayes) and Regression (Linear and Logistic) techniques – Unsupervised learning (Clustering methods).

**ECONOMICS
(PG Standard)**

Code: 411

UNIT - I

Theory of consumer behavior-Indifference curve analysis-Revealed preference theory-Hicks revision of Demand theory-Modern Utility Analysis of choices involving risk or Uncertainty- Neumann-Morgernstern –Friedman Savage and Morkowitz Hypothesis- Modern theory of the firm: Baumol's sales Maximisation model, Cyert and March model-Economics of information: Principles of information-Asymmetry, Adverse selection and moral hazard.

UNIT- II

Theory of cost and Production –Cobb Douglas ,CES ,Translog production function –Embodied and disembodied technical progress-Derivation cost function from production function-Price and Output determination under Oligopoly market-Advances in Distribution theory-Marginal productivity theory-Product Exhaustion theory –Theory of Distribution in imperfect product and factor market.

UNIT - III

General equilibrium analysis-Walrasian General equilibrium-Stoper - Samuelson theorem-Rybczynski theorem – Welfare Economics-Pareto optimal conditions-Social Welfare Maximization – Kaldor's compensation Principle-Arrow's Impossibility theorem- Second Best theorem-Rawl's theory of social justice-Input-Output analysis.

UNIT - IV

Measurement of Aggregate income, Expenditure and circular flow –Rules of computing GDP-Green GDP-Measurement of CPI –Measurement of unemployment -Kuznet's consumption puzzle-Fisher's inter-temporal choice model-Stock market and Tobin's 'Q' theory – Mundell-Fleming model-Fiscal and monetary policy operation under fixed and floating exchange rate regimes- New classical and New Keynesian Business cycle theories.

UNIT - V

Structural transformation and Economic Growth in India-Approaches to Economic development-Optimal growth, Steady-State equilibrium and inclusive Growth-Harrod Domar model- Balanced and Unbalanced Growth model-A.K Sen's Growth theory – Ambedkar's growth model-New Growth theory-Endogenous and Exogenous Growth Theories-Theory of Modernisation, Theory of Dependency, Theory of World System and Theory of Globalization.

UNIT - VI

Role of money in different economic systems-Fisher's Quantity theory of money-Don Patinkin's Real Balance effect-Keynesian Theory of money-

Baumol's approach-Tobin's theory- money supply - Creation of money and Creation of Credit-Role of RBI and commercial Banks-monetary policy-Role NBFIs.

UNIT - VII

Composition and Direction of Foreign trade-Basis of International Trade-Balance of payment Equilibrium and disequilibrium-BOP adjustment mechanism-Foreign Direct Investment-Terms of trade-Foreign Exchange rate determination-FERA-FEMA -GATT-WTO-TRIPS-TRIMS-International Financial Institutions ; IBRD-IMF-ADB-New International Economic Order(NIEO).

UNIT - VIII

Fiscal functions-Sources of Public revenue-Direct and Indirect taxes -GST-Public Expenditure-Growth and effects of Public expenditure-Public Debt and Debt Management-Financial administration-Fiscal federalism-Centre and State financial relation-Local finance-Fiscal policy-Compensatory fiscal policy and functional finance.

UNIT - IX

Economic Development-Leading issues in India and in Tamil Nadu-Human Development Index-Gender Related Human Development Index -Progress in Human Development in India-Multi-Dimensional poverty-Poverty and Growth-Reforms on Poverty-India's demographic transition-Population policy in India-Unemployment and employment perspective-Characteristics of Indian labour market-employment policy in India-Issues and problems of migrant labourers -Agriculture prospects and problems-Trends in Agricultural productivity-Green Revolution-Land reforms and effects-Second Green Revolution -Industrialisation in India-Performance of MSMEs-Large scale industries in India-New Industrial Policy of 1991-Rationalisation of Disinvestment-New Direction of policy on Public sector.

UNIT - X

Planning-Objectives and achievements at national and state level-Development Strategy in India-Failures of Five Year Plans in India- NITI AAYOG-Privatisation, Liberalisation and Globalisation in India- MNCs -Global financial crisis and its impact on Indian economy-Environmental degradation and sustainable development -Issues and Challenges.

GEOGRAPHY**POST GRADUATE DEGREE STANDARD****CODE : 412****UNIT-I : Geomorphology**

Origin and Evolution of Earth – Internal Structure of the Earth – Endogenic Process: Plate Tectonics, Earthquake, Volcanism, Exogenic Process: Weathering and Mass Wasting, Cycle of Erosion: W.M Davis, Penck, L.C. King, Erosional, Transportational and Depositional Process and Landforms : Fluvial, Glacial, Aeolian, Coastal and Karst, Applications of Geomorphology in Water Resource Management, Mineral Exploration and Landform Mapping from Satellite Imageries.

UNIT –II : Climatology

Atmosphere, Origin, Structure and Composition, Heat Budget, General Circulation of Atmosphere, Atmospheric Stability: Distribution of Temperature and Pressure, Wind: Factors and Types, Humidity, Cloud and Precipitation - Cyclones, Anticyclone and Tornado, Climatic Classification: Schemes of Koppen and Thornthwaite, Significance of Indian Climatic types and Agro Climatic Planning, Application of Remote Sensing in Climatic Data Analysis and Weather Forecasting.

UNIT –III : Oceanography and Hydrology

Ocean Relief Features, Sub-Marine Morphology of Atlantic, Pacific and Indian Ocean, Temperature, Salinity, Waves, Tides and Currents, Ocean Deposits and Coral Reefs - Marine Resource Potential of India and Coastal Zone Management Practices in India, Hydrological Cycle - Significance and Water Balance, Ground Water: Aquifer – Aquifer Types – Ground Water Level – Ground Water Authority and Ground Water Recharge.

UNIT – IV : Geography of Resources

Resources: Classification, Distribution and Production of Paddy, Wheat, Sugarcane, Cotton, Tea, Coffee, Oil seeds and Millets, Major Producers of the World, Cattle, Sheep, Poultry and Fishing, Mineral Distribution and Production: Iron Ore, Copper, Bauxite, Hydro Carbon and Atomic Minerals, Location Factors and Distribution of Industries: Automobile, Electrical and Electronics, Software and Pharmaceutical, Transport: Surface, Water and Air, Major Industrial Corridors of World and Trade: Trade Policy – Trade Balance – Export Processing Zones.

UNIT –V : Biogeography

Eco System: Components, Food Chain, Food Web, Tropic Level, Ecological Winds and Ecotones, Genesis of Soils, Classification and Distribution of World Soil, Major Soil Types of World: Problems and Management, Floral and Faunal

Regions, Major Biomes of the World, Endangered Species and Conservation Measures, Biodiversity and Sustainable Development.

UNIT - VI : Population and Settlement Geography

Growth and Distribution of World Population – Demographic Attributes, Causes and Consequences of Migration – Concepts of Over, Under and Optimum Population – World Population Problems and Policies – Social well being, Health Indicators and Quality of Life – Sources of Population Data – Types and Patterns of Rural and Urban Settlements – Concept of Primate City and Rank – Size Rule – Rural – Urban Fringe – Slums – Satellite Towns, Problems and Remedies of Urbanization and Smart Cities.

UNIT - VII : Geospatial Technology

Cartography: Geoid, Projection, Polyconic – UTM (Universal Transverse Mercator), Maps: Map Types, Generalization, Symbolization and Design, Remote sensing: Types of Satellites, Resolution: Spatial, Spectral, Radiometric and Temporal, Digital Image Processing: Geometric and Radiometric Corrections, Enhancement, Image Classification, GIS: Components, Spatial and Non-Spatial Data, Data Models: Raster, Vector and TIN (Triangular Irregular Network). Analysis: Attribute, Object, Layer, GNSS (Global Navigational Satellite System): Components: Space and Control Segment, Major Global and Regional Systems – IRNSS (Indian Regional Navigation Satellite System), Geospatial Data Source: Survey of India OSM (Open Series Maps), Spatial Data Products: Bhuvan Portal, Watershed Atlas, Bhukosh (GSI), NSDI (National Spatial Data Infrastructure), TNGIS (Tamil Nadu Geographical Information System) and National Geospatial Policy of India.

UNIT - VIII : Regional Development and Planning

Region: Concepts – Regionalization – Classifications – Growth Pole Model – Regional Imbalances – Regional Development Strategies: Command Area – Watershed – Drought – Hill Area – Backward Area and Tribal Area Development Programme, Central and State Schemes for Planning and Regional Development and Geopolitical Significance of India in Regional Development.

UNIT - IX : Quantitative Techniques and Models in Geography

Geographic Data Sources: Demographic Data – Census – NFHS (National Family Health Survey) – Population Register – National Sample Survey Data - G-Return – NIC (National Information Centre), IMD (Indian Metrological Department), PWD (Public Works Department), State and Central Disaster Authorities – NDMA (National Disaster Management Authority) and SDMA (State Disaster Management Authority), Analysis: Regression – Correlation – Factor – Hierarchical – Location, Allocation – Interpolation - Network –

Centrophobic – Nearest Neighbour and Cluster, Models: Gravity Model for Migration, Central Place Theory for Urban and Locational Theory for Industries.

UNIT - X : Geography of India and Tamil Nadu

Major Physical Divisions, Drainage, Climate, Soil, Natural Vegetations and Animals, Major Industrial Corridors and Trade Centers, Energy Resources: Conventional and Non-Conventional, Distribution and Utilization, Ground and Surface Water Potential, Utilization, Inter Basin Water Transfer and Agricultural Regions of India, Geospatial Appraisal of Health Care, Public Distribution Services, Education and Transport Network and Human Development Index.

MATHEMATICS
(POST GRADUATE DEGREE STANDARD)

CODE: 413

UNIT - I. ALGEBRA

Groups - Subgroups - Normal subgroups - homomorphisms - Isomorphism - Cayley's theorem - Cauchy's theorem - Sylow's theorem - Finite abelian groups - Rings - Euclidean rings - Polynomial rings - Polynomial over the rational field - Polynomials over Commutative rings - Division rings - Frobenius theorem. Field: Finite fields - Wedderburn's theorem, Extension Fields - Roots of Polynomials - Elements of Galois theory - Solvability of radicals - Linear Transformations: Canonical forms - Nilpotent transformations

UNIT - II REAL ANALYSIS

Limit, Continuity, types of discontinuities, infinite limits, function of bounded variation, metric spaces. Riemann Integral - Fundamental theorem of calculus - mean value theorem. Riemann - Stieltjes Integral, Infinite series and infinite products, sequences of functions, Fourier series and Fourier Integrals. Outer measure, measurable sets and Lebesgue measures, measurable functions. Littlewood's three principles. Lebesgue Integral of bounded function over a set of finite measure. Integration of a non negative function. General Lebesgue Integral.

UNIT - III COMPLEX ANALYSIS

Local properties of analytic functions - Removable singularities Taylor's theorem - Zeros and poles, local mapping - maximum principle - Harmonic functions - Definitions & basic properties - mean value property - Poisson's formula - Schwarz's theorem - reflection principle - power series expansions - Weierstrass's theorem - Taylor's series, Laurent's series.

UNIT - IV TOPOLOGY

Topological spaces & continuous functions, metric topology, Connectedness, compactness, countability and separation axiom, Fundamental group and covering spaces.

UNIT - V FUNCTIONAL ANALYSIS:-

Fundamentals of normed Linear spaces, bounded Linear maps on Banach spaces, open mapping theorem, converse of Riemann - Lebesgue Lemma, spaces of bounded linear maps, weak and weak convergence, compact linear maps, geometry of Hilbert space, Approximation and optimisation, Bounded operators of Hilbert spaces, spectrum of bounded operators on Hilbert spaces.

UNIT- VI DIFFERENTIAL EQUATIONS:-

Linear differential equations of higher order - Linear dependence and Wronskian basic theory - solutions in power series - Introduction to second order linear equations with ordinary points. Legendre equations

and Legendre polynomial, Second order equations with regular singular points, Bessel equations. Partial differential equations; first order, complete Integral, general Integral, singular Integral, Compatible systems of first order equation, Charpit's method. Partial differential equations of second order - Linear and partial equations with constant coefficients Laplace equation - Elementary solutions of Laplace equation.

UNIT - VII DIFFERENTIAL GEOMETRY

Curves, analytic representation, arc length, tangent, osculating plane, Curvature, torsion, formula of Frenet, Contact, natural equations, helices, involutes & evolutes, Elementary theory of surfaces - Analytic representation - first & second fundamental forms, normal - tangent form, developable surfaces, Euler's theorem, Dupin's indicatrices - Conjugate directions, Triply orthogonal system of surface

Fundamental Equations: Gauss, Gauss - Weingarten, Codazzi, Curvilinear, Co-ordinates in space. Geodesics on surfaces Geodesic curvature, Geodesics, Geodesic Coordinates, surfaces of constant curvature, rotation of surfaces of constant curve.

UNIT - VIII MECHANICS AND FLUID DYNAMICS:-

STATICS:- Equilibrium of a system of particles, work and potential energy, friction, common tenets principles of virtual work - stability of equilibrium of forces in three dimensions. DYNAMICS:- Rectilinear motion - motion with constant acceleration motion under gravity - motion along an inclined plane - motion under gravity in a resisting medium Impulsive forces & Impact, Principles of Conservation of Linear momentum, Collision of two smooth spheres - Direct Impact of sphere on a fixed plane - Projectiles - Circular motion of a particle, Central orbits, moment of inertia, motions of a rigid body about a fixed axis - K.E. of rotation - moment of momentum - motion of a circular disc - hoop or a sphere rolling down an inclined plane. Compressible flow; effects of compressibility, Linearized theory, thermodynamical consideration, energy equation, plane shock waves, oblique shockwaves, Prandtl-Meyer expansion - Navier-Stokes equation - dissipation of energy - diffusion of vorticity condition of no slip - steady flow between concentric rotating cylinder - steady viscous flow in tubes of uniform cross section - uniqueness theorem.

UNIT IX PROBABILITY & MATHEMATICAL STATISTICS: -

Probability of an event, Bayes's theorem, - Random Variables Discrete & continuous distributions - Expected values & functions. Moment generating function and Characteristic functions - Chebyshev's inequality statements of uniqueness theorem & inverse theorems on characteristic functions.

STANDARD DISTRIBUTIONS:

Binomial, Poisson, normal & uniform Sampling distribution of Statistics based on normal distribution - Chi square concept of bivariate distributions, Correlation and regression, Linear prediction, rank

Correlation Coefficient, Partial & multiple Correlation. Sample moments & their functions. Notion of sample - statistic - Chi square - distribution, t, Fisher's distributions - distribution of regression coefficients.

SIGNIFICANT TESTS:

Concepts - parametric tests for small & large samples - Chi-square test
- test of Independence by contingency table - theory of hypothesis testing
- Power function
- Most powerful tests - Uniformly most powerful test - unbiased tests.

UNIT - X OPERATIONS RESEARCH

Origin & Development of operation's research, Nature & Characteristics of O.R. Models in O.R. General Solution methods for O.R. models, uses and limitations of O.R.

LINEAR PROGRAMMING: Formulation of problem, graphical solutions, standard form. Definition of basic solution, degenerate solution, simplex method, Definition of artificial variable. TRANSPORTATION PROBLEM: Definition, solutions to transportation problem - initial feasible solution - optimal test - Degeneracy - Travelling salesman problem.

ASSIGNMENT PROBLEM: Hungarian Method

PAPER -II
SYLLABUS FOR WRITTEN EXAMINATION
Part-A

கட்டாய தமிழ்மொழி தகுதித் தேர்விற்கான பாடத் திட்டம்

(கொள்குறி வினாவிற்கான தலைப்புகள்)

பத்தாம் வகுப்பு தரம்

1. பிரித்தெழுதுதல் / சேர்த்தெழுதுதல்.
2. எதிர்ச்சொல்லை எடுத்தெழுதுதல்.
3. பொருந்தாச் சொல்லைக் கண்டறிதல்.
4. பிழைதிருத்தம் (i) சந்திப்பிழையை நீக்குதல் (ii) மரபுப்பிழைகள், வழுவ்ச் சொற்களை நீக்குதல் / பிறமொழிச் சொற்களை நீக்குதல்.
5. ஆங்கிலச் சொல்லுக்கு நேரான தமிழ்ச் சொல்லை அறிதல்.
6. ஒலி மற்றும் பொருள் வேறுபாடறிந்து சரியான பொருளையறிதல்.
7. ஒரு பொருள் தரும் பல சொற்கள்.
8. வேர்ச்சொல்லைத் தேர்வு செய்தல்.
9. வேர்ச்சொல்லைக் கொடுத்து / விணைமுற்று, விணையெச்சம், விணையாலணையும் பெயர், தொழிற்பெயரை / உருவாக்கல்.
10. அகரவரிசைப்படி சொற்களை சீர் செய்தல்.
11. சொற்களை ஒழுங்குப்படுத்தி சொற்றொடராக்குதல்.
12. இரு விணைகளின் பொருள் வேறுபாடு அறிதல்.
(எ.கா.) குவிந்து-குவித்து
13. விடைக்கேற்ற வினாவைத் தேர்ந்தெடுத்தல்.
14. எவ்வகை வாக்கியம் எனக் கண்டெழுதுதல் - தன்விணை, பிறவிணை, செய்விணை, செய்ப்பாட்டு விணை வாக்கியங்களைக் கண்டெழுதுதல்.
15. உவமையால் விளக்கப்பெறும் பொருத்தமான பொருளைத் தேர்ந்தெழுதுதல்
16. அலுவல் சார்ந்த சொற்கள் (கலைச்சொல்)
17. விடை வகைகள்.
18. பிறமொழிச் சொற்களுக்கு இணையான தமிழ்ச் சொற்களைக் கண்டறிதல் (எ.கா.) கோல்டு பிஸ்கட் - தங்கக்கட்டி.
19. ஊர்ப் பெயர்களின் மரூஉவை எழுதுக (எ.கா.) தஞ்சாவூர் - தஞ்சை
20. நிறுத்தற் குறிகளை அறிதல்.
21. பேச்சுவழக்கு, எழுத்துவழக்கு (வாரான் - வருகிறான்).
22. சொற்களை இணைத்து புதிய சொல் உருவாக்கல்.
23. பொருத்தமான காலம் அமைத்தல்
(இறந்தகாலம், நிகழ்காலம், எதிர்காலம்).
24. சரியான வினாச்சொல்லைத் தேர்ந்தெடு.
25. சரியான இணைப்புச் சொல்

- (எனவே, ஏனெனில், ஆகையால், அதனால், அதுபோல).
26. அடைப்புக்குள் உள்ள சொல்லைத் தகுந்த இடத்தில் சேர்க்க.
 27. இருபொருள் தருக.
 28. குறில் - நெடில் மாற்றம், பொருள் வேறுபாடு.
 29. கூற்று, காரணம் - சரியா? தவறா?
 30. கலைச் சொற்களை அறிதல் :-
எ.கா. - Artificial Intelligence - செயற்கைநுண்ணறிவு
Super Computer - மீத்திறன் கணினி
 31. பொருத்தமான பொருளைத் தெரிவு செய்தல்
 32. சொற்களின் கூட்டுப் பெயர்கள் (எ.கா.) புல் -புற்கள்
 33. சரியான தொடரைத் தேர்ந்தெடுத்தல்
 34. பிழைதிருத்துதல் (ஒரு-ஓர்)
 35. சொல் - பொருள் - பொருத்துக
 36. ஒருமை-பன்மைபிழை
 37. பத்தியிலிருந்து வினாவிற்கான சரியான விடையைத் தேர்ந்தெடு.

PAPER – II – Part - B
GENERAL STUDIES (DEGREE STANDARD)
(Code No. 003)
OBJECTIVE TYPE

UNIT-I: GENERAL SCIENCE

- (i) Scientific Knowledge and Scientific Temper - Power of Reasoning - Rote Learning vs Conceptual Learning - Science as a tool to understand the past, present and future.
- (ii) Nature of Universe - General Scientific Laws - Mechanics - Properties of Matter, Force, Motion and Energy - Everyday application of the Basic Principles of Mechanics, Electricity and Magnetism, Light, Sound, Heat, Nuclear Physics, Laser, Electronics and Communications.
- (iii) Elements and Compounds, Acids, Bases, Salts, Petroleum Products, Fertilisers, Pesticides.
- (iv) Main concepts of Life Science, Classification of Living Organisms, Evolution, Genetics, Physiology, Nutrition, Health and Hygiene, Human Diseases.
- (v) Environment and Ecology.

UNIT-II: CURRENT EVENTS

- (i) History - Latest diary of events - National symbols - Profile of States - Eminent personalities and places in news - Sports - Books and authors.
- (ii) Polity - Political parties and political system in India - Public awareness and General administration - Welfare oriented Government schemes and their utility, Problems in Public Delivery Systems.
- (iii) Geography - Geographical landmarks.
- (iv) Economics - Current socio - economic issues.
- (v) Science - Latest inventions in Science and Technology.
- (vi) Prominent Personalities in various spheres - Arts, Science, Literature and Philosophy.

UNIT-III: GEOGRAPHY OF INDIA

- (i) Location – Physical features - Monsoon, Rainfall, Weather and Climate - Water Resources - Rivers in India - Soil, Minerals and Natural Resources - Forest and Wildlife - Agricultural pattern.
- (ii) Transport - Communication.
- (iii) Social Geography – Population density and distribution - Racial, Linguistic Groups and Major Tribes.
- (iv) Natural calamity – Disaster Management – Environmental pollution: Reasons and preventive measures – Climate change – Green energy.

UNIT-IV: HISTORY AND CULTURE OF INDIA

- (i) Indus Valley Civilization - Guptas, Delhi Sultans, Mughals and Marathas - Age of Vijayanagaram and Bahmani Kingdoms - South Indian History.
- (ii) Change and Continuity in the Socio-Cultural History of India.
- (iii) Characteristics of Indian Culture, Unity in Diversity – Race, Language, Custom.
- (iv) India as a Secular State, Social Harmony.

UNIT-V: INDIAN POLITY

- (i) Constitution of India - Preamble to the Constitution - Salient features of the Constitution - Union, State and Union Territory.
- (ii) Citizenship, Fundamental Rights, Fundamental Duties, Directive Principles of State Policy.
- (iii) Union Executive, Union Legislature – State Executive, State Legislature – Local Governments, Panchayat Raj.
- (iv) Spirit of Federalism: Centre - State Relationships.
- (v) Election - Judiciary in India – Rule of Law.
- (vi) Corruption in Public Life – Anti-corruption measures – Lokpal and Lok Ayukta - Right to Information - Empowerment of Women - Consumer Protection Forums, Human Rights Charter.

UNIT-VI: INDIAN ECONOMY

- (i) Nature of Indian Economy – Five year plan models - an assessment – Planning Commission and Niti Ayog.
- (ii) Sources of revenue – Reserve Bank of India – Fiscal Policy and Monetary Policy - Finance Commission – Resource sharing between Union and State Governments - Goods and Services Tax.
- (iii) Structure of Indian Economy and Employment Generation, Land Reforms and Agriculture - Application of Science and Technology in Agriculture - Industrial growth - Rural Welfare Oriented Programmes – Social Problems – Population, Education, Health, Employment, Poverty.

UNIT-VII: INDIAN NATIONAL MOVEMENT

- (i) National Renaissance – Early uprising against British rule - Indian National Congress - Emergence of leaders – B.R.Ambedkar, Bhagat Singh, Bharathiar, V.O.Chidambaranar Jawaharlal Nehru, Kamarajar, Mahatma Gandhi, Maulana Abul Kalam Azad, Thanthai Periyar, Rajaji, Subash Chandra Bose, Rabindranath Tagore and others.
- (ii) Different modes of Agitation: Growth of Satyagraha and Militant Movements.
- (iii) Communalism and Partition.

UNIT-VIII: History, Culture, Heritage and Socio - Political Movements in Tamil Nadu

- (i) History of Tamil Society, related Archaeological discoveries, Tamil Literature from Sangam Age till contemporary times.
- (ii) Thirukkural : (a) Significance as a Secular Literature
(b) Relevance to Everyday Life
(c) Impact of Thirukkural on Humanity
(d) Thirukkural and Universal Values - Equality, Humanism, etc
(e) Relevance to Socio - Politico - Economic affairs
(f) Philosophical content in Thirukkural
- (iii) Role of Tamil Nadu in freedom struggle - Early agitations against British Rule - Role of women in freedom struggle.
- (iv) Evolution of 19th and 20th Century Socio-Political Movements in Tamil Nadu - Justice Party, Growth of Rationalism - Self Respect Movement, Dravidian Movement and Principles underlying both these Movements, Contributions of Thanthai Periyar and Perarignar Anna.

UNIT-IX: Development Administration in Tamil Nadu

- (i) Human Development Indicators in Tamil Nadu and a comparative assessment across the Country – Impact of Social Reform Movements in the Socio - Economic Development of Tamil Nadu.
- (ii) Political parties and Welfare schemes for various sections of people – Rationale behind Reservation Policy and access to Social Resources - Economic trends in Tamil Nadu – Role and impact of social welfare schemes in the Socio - Economic Development of Tamil Nadu.
- (iii) Social Justice and Social Harmony as the Cornerstones of Socio-Economic Development.
- (iv) Education and Health Systems in Tamil Nadu.
- (v) Geography of Tamil Nadu and its impact on Economic growth.
- (vi) Achievements of Tamil Nadu in various fields.
- (vii) e-Governance in Tamil Nadu.

UNIT-X: APTITUDE AND MENTAL ABILITY

- (i) Simplification – Percentage - Highest Common Factor (HCF) - Lowest Common Multiple (LCM).
- (ii) Ratio and Proportion.
- (iii) Simple interest - Compound interest - Area - Volume - Time and Work.
- (iv) Logical Reasoning - Puzzles-Dice - Visual Reasoning - Alpha numeric Reasoning – Number Series.
