

Annexure III
Combined Technical Services Examination
Paper-I Syllabus

தமிழ் மொழி தகுதித் தேர்வு

பத்தாம் வகுப்பு தரம்

1. பிரித்தெழுதுதல் / சேர்த்தெழுதுதல்.
2. எதிர்ச்சொல்லை எடுத்தெழுதுதல்.
3. பொருந்தாச் சொல்லைக் கண்டறிதல்.
4. பிழை திருத்தம் (i) சந்திப்பிழையை நீக்குதல் (ii) மரபுப் பிழைகள், வழுவச் 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 / வினைமுற்று, வினையெச்சம், வினையாலணையும் பெயர், தொழிற் பெயரை / உருவாக்கல்.
10. அகர வரிசைப்படி சொற்களை சீர் செய்தல்.
11. சொற்களை ஒழுங்குப்படுத்தி சொற்றொடராக்குதல்.
12. இருவினைகளின் பொருள் வேறுபாடு அறிதல்.
(எ.கா.) குவிந்து-குவித்து
13. விடைக்கேற்ற வினாவைத் தேர்ந்தெடுத்தல்.
14. எவ்வகை வாக்கியம் எனக் கண்டெழுதுதல் - தன்வினை, பிறவினை, செய்வினை, செயப்பாட்டு வினை வாக்கியங்களைக் கண்டெழுதுதல்.
15. உவமையால் விளக்கப்பெறும் பொருத்தமான பொருளைத் தேர்ந்தெழுதுதல்
16. அலுவல் சார்ந்த சொற்கள் (கலைச் சொல்)
17. விடை வகைகள்.
18. பிறமொழிச் சொற்களுக்கு இணையான தமிழ்ச் சொற்களைக் கண்டறிதல் (எ.கா.) கோல்டு பிஸ்கட் - தங்கக் கட்டி.
19. ஊர்ப் பெயர்களின் மரூஉவை எழுதுக (எ.கா.) தஞ்சாவூர் - தஞ்சை
20. நிறுத்தற்குறிகளை அறிதல்.
21. பேச்சு வழக்கு, எழுத்து வழக்கு (வாரான் - வருகிறான்).
22. சொற்களை இணைத்து புதிய சொல் உருவாக்கல்.
23. பொருத்தமான காலம் அமைத்தல்
(இறந்தகாலம், நிகழ்காலம், எதிர்காலம்).
24. சரியான வினாச் சொல்லைத் 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 - செயற்கை நுண்ணறிவு
Super Computer - மீத்திறன் கணினி
31. பொருத்தமான பொருளைத் தெரிவு செய்தல்
32. சொற்களின் கூட்டுப் பெயர்கள் (எ.கா.) புல் - புற்கள்
33. சரியான தொடரைத் தேர்ந்தெடுத்தல்
34. பிழை திருத்துதல் (ஒரு-ஓர்)
35. சொல் - பொருள் - பொருத்துக
36. ஒருமை-பன்மை பிழை
37. பத்தியிலிருந்து வினாவிற்கான சரியான விடையைத் தேர்ந்தெடு.

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.

Paper II -Syllabus
1. Physical Education
(Post Graduate Degree Standard)

Subject Code: 356

Unit - I: Principles and Biological Basis of Physical Education

Definition, aim and objectives of physical education. Meaning of the terms Physical Training, Physical Culture. Philosophies of Education as applied to physical education- Idealism, Naturalism, Realism, Pragmatism, existentialism, Humanism. Biological basis of Physical activity-benefit of exercise, growth and exercise, exercise and well being sex and age characteristics of adolescent, body types, Hereditary traits, Muscle tone, athletic heart, Unsynchronized development, Reciprocal innovation, reflex arc, Vital capacity.

Unit - II: History and Psychological Basis of Physical Education

Physical Education in ancient Greece, Rome, and contemporary Germany, Sweden, Denmark and Russia. Olympic movement-Historical development of ancient and modern Olympic Games. Physical education in India. Psychological basis of Physical education-Play and play theories, general principles of growth and development, Principles of Motor-Skill acquisitions transfer of training effects.

Unit - III: Physiology and Athletic Injuries

Physiology of Muscular activity, Neurotransmission and Movement mechanism. Physiology of respiration. Physiology of blood circulation. Factors influencing performance in sports, bioenergetics and recovery process. Athletic injuries-their management and rehabilitation. Therapeutic modalities. Ergogenic aids and doping. Massage manipulation and therapeutic exercises.

Unit - IV: Biomechanical Analysis Movement and Sports Activities

Biomechanics: Meaning and Definition. Joints and their movement-planes and axes. Kinetics, Kinematics linear and angular levers. Laws of motion, principles of equilibrium and force, spin and elasticity. Posture, postural deformation and their correction. Muscular analysis of Motor movement. Mechanical analysis of various sports activities. Mechanical analysis of fundamental movements-(running, jumping, throwing, pulling and pushing).

Unit - V: Sports Psychology and Sociology

Learning process-theories and laws of learning. Motivation, theories and dynamic of motivation in sports. Psychological factors affecting sport performance: stress, anxiety, tension and aggression. Personality: Meaning, dimensions, theories, personality and performance. Group dynamics, team decision and leadership in sports. Sociometric. Media and Sports. Sociological basis of physical education-Socialization process, Social nature of men and physical activity, sports as cultural heritage of mankind, custom traditions and sport, competition and cooperation.

Unit - VI: Management and Curriculum Planning in Physical Education

Development of teacher education in Physical education. Professional courses in Sports and Physical education in India. Professional Ethics. Qualities and Qualification of Physical Educational Personnel. Principles of Curriculum planning. Courses content for academic and professional courses. Age characteristics of pupils and selection of activities. Construction of class physical education time table.

Types of Tournaments, Preparation of Fixtures for Knock out, League and Combination Tournaments.

Unit - VII: Health Education and Recreation

Health-Guiding principles of health and health education. Nutrition and dietary manipulation. Sports Nutrition. Health-related fitness- Components of Fitness, obesity and its management. Environmental and occupational hazards and first aid. Communicable diseases-their preventive and therapeutic aspect. School health programmes and personnel hygiene. Theories and Principles of recreation. Recreation Programme for various categories of people.

Unit - VIII: Sports Training

Characteristics and principles of sport training. Training and periodization. Training method and specific training programme for development of various qualities. Training Load Technical and tactic preparation for sports. Short-term and long term training plans. Sports talent identification -process and procedure. Preparing for competition- (build up competition, main competition, competition frequency , psychological preparation).

Unit - IX: Research and Statistics

Nature, scope and types of research. Formulation and selection of research problems. Sampling-process and techniques. Methods of research. Data collection-tools and techniques. Statistical techniques of data analysis-measure of central tendency and variability, correlation, normal probability curve, t-test, and f-test, chi square, z-test. Hypothesis formulation. Writing research report.

Unit-X: Tests, Measurement and Rules of Games and Sports

Meaning of the terms: test, measurement and evaluation. Construction and classification of tests. Criteria of test evaluation. Assessment of physical fitness, motor fitness, motor ability and motor educability. Skill test for Badminton, Basketball, Hockey, Lawn Tennis, Soccer, Volleyball. Testing psychological variables-Competitive Anxiety, Aggression, Team Cohesion, Motivation, Self Concept. Rules, Officiating and Measurements in the following games: Track and field, Basketball, Ball Badminton, Badminton, Cricket, Football, Handball, Hockey, Kabaddi, Kho-Kho, Tennis, Table Tennis, Volleyball.

2. Law

(Degree Standard)

Subject Code: 414

Unit-I: Constitutional Law and Human Rights

Defining Constitution, Constitutional Law, Constitutionalism, Transformative Constitutionalism – Constitutional Conventions - Salient features of the Indian Constitution, Concept of State – Writs - Judicial Review – Fundamental Rights – Directive Principles of State Policy–Fundamental Duties – Contractual and Tortious liability of the State – Compensatory Jurisprudence – Services – Administrative Tribunals – Right to Information – Role of Judiciary and Human Rights – National and State Human Rights Commissions.

Unit-II: Jurisprudence

Evolution of Law – Ancient India, Greek and Roman Civilization – Law, Morals, Ethics and Justice – Nature of law – Functions of Law - Rule of Law - Authority - Autonomy - Anarchy - Obligation - Opinion -

Dictum – Law as a Social Fact - Nature and Scope of Jurisprudence – From Police State to Welfare State.

Schools of Jurisprudence – Analytical – Historical – Philosophical – Sociological - Western Thoughts and Indian Jurisprudence – Social Transformation and Social Justice - Local Law & Global Law - Civil Law & Common Law - Cultural & Technical aspects - Micro & Macro aspects.

Definition of Law – Kinds of Law – Nature and Functions of State – State and Sovereignty – Relationship with Law and State - Sources of Law – Classical and Modern Sources – Convention, Custom, Legislation, Precedent and its kinds – Stare Decisis, Ratio Decidendi and Obiter Dicta - Administration of Justice – Complete Justice – Theories of Justice.

Meaning, Definition and kinds of Rights and Duties – Jural Correlatives and Jural Opposites - Person and its kinds – Status and Theories of Corporate personality - Title and its kinds – Ownership– meaning and its kinds – Possession – meaning and its kinds - Liability – meaning and its kinds – Negligence – meaning and its kinds – Obligation–meaning and its kinds – Law of Procedure – Elements of Judicial Procedure – Evidence - Property – Meaning and its kinds.

Application of Law and Interpretation of Law - Codification of Customary Law and Enforcement mechanism – Writ Remedies – Public Interest Litigation – Justice Delivery System – Judicial Activism and Judicial process.

Unit-III: Law relating to Industrial Relations

Industrial Disputes Act, 1947 – Definitions – Industry, Industrial Dispute, Workman – Appropriate Government - Authorities – Investigation and Dispute Settlement machineries – Conciliation - Arbitration – Adjudication – Reference of disputes – Conciliation Board – Conciliation Officer – Labour Court – Tribunal, National Tribunal – Court of Inquiry – Award–Settlement – powers of the adjudicatory authorities - Strike, Lock-out - Lay-off, Retrenchment, Closure and Transfer of undertaking - Unfair Labour Practices - Recovery of money due from an Employer – Penalties.

Trade Unions Act, 1926 – Definitions – Registration of Trade Unions – Members – Office Bearers – Rights and Liabilities – Privileges and Immunities – Recognition of Trade Union.

Industrial Employment (Standing Orders) Act, 1946– Appointment, Jurisdiction, Powers and Duties of Certifying officers – Procedure for certification of Standing Orders – Operation and Binding Effect of Certified Standing Orders – Modification – Appeal – Registration of Standing Orders – Temporary Application of Model Standing Orders – Interpretation of Standing Orders - Subsistence Allowance.

Misconduct – Domestic Enquiry and Disciplinary Proceedings – Appropriate Relief in case of Termination, Discharge, Dismissal.

Unit-IV: Law relating to Wages

Payment of Wages Act,1936 – Definitions - Obligations of the Employer–Deductions – Authorities– Settlement of Claims – Inspectors – Powers –Offences and Penalties.

Minimum Wages Act, 1948– Definitions – Fixation and Revision of minimum rates of wages – Methods – Committees and Advisory Boards – Settlement of Claims - Inspectors – Offences and Penalties.

Payment of Bonus Act, 1965– Definitions – Coverage – Kinds of Bonus – Eligibility and extent of bonus – Calculation of Bonus – Available and Allocable surplus – Set on and Set off – Forfeiture of Bonus – Recovery of Bonus – Powers and Functions of Inspectors.

Equal Remuneration Act, 1976– Definitions – Duty of employer – Work of same and similar nature –

Advisory Committee - Hearing and deciding claims and complaints – Inspectors – Penalties.

Unit-V: Law relating to Social Security

Employees' Compensation Act, 1923 – Definitions – Liability of the employer to pay compensation – Personal injury– Accident - Arising out of and in the course of employment – Doctrine of Notional Extension –Occupational disease – Notice and Claims –Determination and Distribution of Compensation – Commissioner – Powers and Functions.

Employees' State Insurance Act, 1948 – Definitions – ESI Corporation – Standing Committee – Medical Benefit Council – ESI Fund – Contributions – Benefits – Adjudication of Dispute and Claims – Penalties.

Employees' Provident Funds and Miscellaneous Provisions Act, 1952 – Definitions – Central and State Board of Trustees - Provident Fund Scheme – Family Pension Scheme – Deposit Linked Insurance Scheme – Contributions – Determination of Money due from Employees - Authorities under the Act – Powers and Functions – Offences and Penalties.

Maternity Benefit Act, 1961 – Definitions – Eligibility – Maternity Benefit and certain other benefits under the Act – Notice of Claim – Prohibition against Dismissal and Wage Deduction – Inspectors – powers and duties.

Payment of Gratuity Act, 1972 – Definitions – Payment of Gratuity – Eligibility – Amount of Gratuity – Forfeiture of gratuity - Determination of gratuity amount – Recovery of gratuity – Compulsory Insurance - Controlling authority – Offences and Penalties.

Factories Act, 1948 – Definitions – Registration – Provisions relating to Health, Safety and Welfare - Special provisions relating to hazardous processes – Working hours of Adults – Regulation of employment of women and children – Annual leave with wages – Penalties and Procedure.

Motor Transport Workers Act, 1961 – Definitions, Registration of motor transport undertakings – Inspectors – Certifying surgeons – Welfare and Health – Hours and Limitation of employment – Employment of young persons - Wages and leave – Penalties and Procedure.

Unit-VI: Administrative Law

Introduction to Administrative Law – Role of State from Laissez-Faire to Welfare State – Definition, Nature and Scope of Administrative Law - Relationship Between Administrative Law and Constitutional Law – Rule of Law - Doctrine of Separation of Powers - System of checks and balances –Classification of Administrative Actions.

Delegated Legislation – Need for Delegated Legislation – Delegated Legislation in India – Pre and Post Constitutional Period – Constitutionality of Delegated Legislation – Essential Legislative Function – Permissible and impermissible limits of Delegated Legislation - Control over Delegated Legislation – Judicial, Procedural and Legislative Control.

Need for Administrative Adjudication - Reason for growth of Administrative Tribunals - Procedure and powers of Administrative Tribunal – Tribunal under Constitution – High Court's Superintendence over Tribunals – Administrative Tribunals under Administrative Tribunals Act, 1985.

Principles of Natural Justice – Concept - Rule against Bias - Audi Alteram Partem – Exceptions to the Rule of Natural Justice

Judicial Review and Liability of the State - Judicial Review of Administrative Action through Writs - Kinds of Writs - Grounds for issue of Writs - Administrative Discretion - Nature and need of Administrative discretion - Grounds and Extent of Judicial Review of Administrative discretion – Doctrine of proportionality – Privileges and Immunities of Government in Legal Proceedings – Privilege to withhold documents – Miscellaneous Privileges of the Government - Notice, Limitation, Enforcement of Court Order - Binding nature of Statutes over the States action – Promissory Estoppel - Doctrine of Legitimate Expectation – Right to Information – Liability of State in Torts and Contracts.

Maladministration and Alternative Remedies - Ombudsman in England - Ombudsman in India – Lokpal – Lokayukta in States - Central Vigilance Commission.

Public Undertakings - Rights, Duties and Liabilities of Public Corporations - Controls over Public Corporations, Government Control, Parliamentary Control, Judicial Control, Public Control – Role of Ombudsman in Public Undertaking.

Unit-VII: Law of Contracts and Transfer of Property Act

Essentials of Contracts – Valid, Void, Voidable - Discharge of Contracts – Quasi Contracts Damages – Compensation – Indemnity – Guarantee – Bailment – Lien – Partnership Act and Limited Liability Partnership - Specific Relief Act.

Mortgage – Definition and Kinds – Rights and Liabilities of Mortgagor and Mortgagee – Doctrine of Equity of Redemption – Collateral Advantages – Doctrine of Marshalling, Contribution and Subrogation – Charge & Lease – Differences.

Unit-VIII: Company Law & Banking Law

Companies Act, 2013 - Definition - Characteristic of a Company - Types of Companies - Formation of a Company – Memorandum of Association, Articles of Association – Registration of charges – Formation of CSR Committee – Management of the company – AGM – Ordinary resolution & Special resolutions - Appointment & Qualification of Directors - Meeting of the Board and its powers – Quorum of the Board - Appointment of independent Directors – Duties of Director – Key Managerial personnel and promoter - Powers of Shareholders - Norms for accepting deposits from the Public – adjudicatory powers of Official Liquidator – procedure for merger and amalgamation – procedure for merging foreign company with an Indian company - process of rehabilitation and liquidation of the companies in case of financial crisis - Winding-up– Winding-up by Tribunals – Voluntary Winding-up.

National Company Law Tribunal and Appellate Tribunal.

Banking Law – Banker and Customer – Rights and Duties of Banker – Law relating to Loans, Advances and Investments by Banks.

Negotiable Instruments Act, 1881 - Definition and Characteristics – Parties to Negotiable instruments – Discharge and dishonor of instruments – Liability – Cheques – Civil and Criminal Liability for dishonor of cheque under Sec.138 to Sec.142 of the Amended Negotiable Instruments Act.

State Financial Corporation's Act, 1951 (SFCs Act) - Important Definitions viz., Board, Development Bank, Financial Corporation, Industrial concern - Powers and Duties of the Board – Rights available to Financial corporation to enforce securities in case of default - Power to call for repayment before agreed period - Special provisions for enforcement of claims by Financial Corporation - Procedure of District Judge in respect of applications –Recovery of amounts due to the Financial Corporation as an arrear of land revenue.

The Securitisation and Reconstruction of Financial Assets & Enforcement of Security Interest [SARFAESI] Act, 2002 - Important Definitions – Brief overview of the SARFAESI Act – Applicability of the SARFAESI Act - Features of SARFAESI Act – Procedure of the SARFAESI Act – Methods for recovery under SARFAESI Act – Enforcing security interests, i.e., seizing the assets pledged as collateral security for the loan – Significance of the SARFAESI Act – Shortcomings and lacunae in the SARFAESI Act – Central Registry - Recent amendments in SARFAESI Act.

Recovery of Debts and Bankruptcy Act, 1993 - The Debts Recovery Tribunals [DRTs] and Debts Recovery Appellate Tribunals [DRATs] - Jurisdiction, Powers and Authority of Tribunals – Procedure of Tribunals – Recovery of Debts determined by Tribunal – Insolvency and Bankruptcy Code, 2016.

Unit-IX: Procedural Law

Plaint, Written Statement – Suits in General – Admission – Execution – Reference, Review, Revision – Brief History about the Criminal procedure code – definition – Classes of Criminal Courts – Processes to compel appearance – Summons, warrant of arrest – Jurisdiction of Criminal Courts in Inquiries and Trials – Trial Procedure – Appeals, Reference in Criminal Cases – General provisions regarding execution – Levy of Fine – The Contempt of Courts Act, 1971.

Unit-X: Other Laws

Penal Code – General explanations – General exceptions – offences against property.

Indian Evidence Act, 1872 – Scope, object and applicability of Indian evidence act and exclusion – Relevance of facts and admissibility of facts – Facts which need not be proved – Judicial notice – Burden of Proof – Types of evidence – presumptions.

Family Law in India – Law of Marriage and Divorce: Hindu, Muslim & Christian Law and Recent Developments – Law of Adoption – Hindu Adoption with Special Reference to the Juristic Concept and Development of Case Laws – Changes brought by Hindu Adoption and Maintenance Act, 1956 – Hindu Minority and Guardianship Act – Maintenance – Contemporary Changes – Muslim Law of Legitimacy – Acknowledgement of Paternity.

Motor Vehicles Act, 1988 – State Transport undertakings – Accident Claims Tribunals – No Fault Liability – Offences, Penalties and Procedure, Insurance of Motor Vehicles against third party risks – Recent amendments.

Consumer Law - Consumer Protection Act and its developments - Consumer, Complaint, Complainant – Consumer Rights – Filing of Complaints – Consumer Redressal Forums – Jurisdiction, Powers and Functions – Recent Amendments.

3. Financial and Cost Accountancy (Post Graduate Degree Standard)

Subject Code: 434

Unit – I: Accounting

- Accounting Standards – GAAP - AS - applicability, interpretation, scope and compliance-IFRS-Ind AS 2, 10, 115, 16, 21, 20, 23, 37 & 38.
- Company Accounts - Presentation of Financial Statements as per Schedule III of Companies Act 2013 - Statement of Profit or Loss, Balance Sheet, Change in Equity, Cash flow statement

- Accounting of Banking, Electricity and Insurance Companies
- Accounting for Cooperative Societies
- Branch and Departmental Accounts (including foreign branches)
- Accounting for non-profit organisations and incomplete records
- Computerised Accounting System (ERP features and advantages)

Unit – II: Auditing

- Nature and scope and significance of auditing
- Audit Engagement, Audit Programme, Audit working papers , Audit notebook audit evidence and audit report
- Internal check, internal control and internal audit- industry specific
- Reporting requirements under companies act - report vs certificate, contents of the report and qualifications in the report.
- Cost audit and Secretarial audit
- Auditing of different types of undertaking - education, hospitals, cooperative societies, trusts.

Unit – III: Financial Management

- Meaning-objectives -scope of financial management
- Sources of Funds- Introduction of Financial Markets- Capital & Money Markets
- Tools for Financial Analysis - Ratio, Funds flow analysis, Cash flow analysis
- Cost of Capital, Capital Structure and Leverages
- Working Capital Management- Financing - Cash, Inventory, Receivables and Payables
- Capital Budgeting.
- Risk Management - risk measurement- risk analysis- Value at Risk(VAR)- Capital Adequacy Norms & Income Recognition Norms (NPA) in NBFCs.

Unit – IV: Taxation

- Direct Taxation- Residential Status- Heads of Income and Computation of Total Income under various heads- assessment of income of different persons - TDS/TCS/Advance Tax- Income Computation and Disclosure standards (Basic Concepts only) - Taxation as applicable to Government undertaking and Cooperative Societies. Due dates and compliances. Effects of non compliance and penalty. Tax audit provisions under I.T. Act
- Indirect Taxation- Canons of Taxation- Customs Law - Goods and Services Tax (GST) - CGST- SGST-IGST- Cess - Registration - Supply- Time of Supply- Value of Supply- Place of Supply- E-Invoicing, E-Way Bill, Input tax credit- Reverse Charge Mechanism (RCM) - Payment of Taxes, Penalties.

Unit – V: Commercial Law, Industrial Law & Company Law

- MSME Act 2006.
- Laws and Regulations relating to Cyber Security and Data Protection.
- Factories Act
- Payment of Gratuity Act
- Employees Provident Fund Act 1952
- Employees State Insurance Act 1948
- Payment of Bonus Act 1965

- Minimum Wages Act 1948
- Companies Act 2013-Promotion - Formation and related procedures – Types – Appointment and duties of Directors, Loans and Deposits, CSR, Salient features of Insolvency and Bankruptcy Code.

Unit – VI: Management Accounting

- Introduction to Management Accounting - Relationship between Management accounting and cost accounting- Decision Making tools
- Analysis and Interpretation of Financial Statements
- Learning Curve - concepts and its application

Unit – VII: Cost Management

- Life Cycle costing
- Target Costing
- Kaizen Costing
- Value analysis and Engineering
- Throughput Costing
- Business Process Re-engineering
- Back flush costing
- Activity Based Costing (ABC).

Unit – VIII: Decision Making Techniques

- Marginal Costing - CVP analysis - Profit Volume Graph- Decision involving alternative choices - Make or Buy; Evaluation of Orders; Multiple scarce: Product sales
- Pricing Decisions - New Product pricing- use of costs in pricing - sensitivity analysis - monopoly pricing - competitive pricing- Transfer pricing - Costing of Service Sectors
- Variance Analysis and Reporting- Material, Labour, Overheads, Turnover and Profit.

Unit – IX: Performance Evaluation & Improvement Tools

- Balanced Score Card
- Supply Chain Management
- Key Performance Indicators (KPI) like ROI, Economic Value Added (EVA).
- Bench Marking
- Six sigma, Statistical Quality Control
- Plan-Do-Check Action
- Management Information Systems (MIS)
- Total Productivity Management (TPM) and Total Quality Management (TQM)
- SWOT analysis
- Profitability Analysis.

Unit – X: Business Valuation

- Meaning of Value, Valuation and Business Valuation
- Valuation Methods - Non Discounted cash flow method- Discounted Cash Flow Method - Free Cashflow Method, Net Present Value Method (NPV)- Profitability Index Method(PI) - Internal Rate of Return Method (IRR)
- Valuation of Inventory

- Valuation of Investments
- Valuation of Intangibles
- Valuation of Human Resources
- Valuation of Equity

4. Agriculture (Post Graduate Degree Standard)

Subject Code: 285

Unit- I: Crop Production Principles and Practices

Weather and crop production – Agro – ecological zones and geographical distribution of crop plants in Tamil Nadu Cropping systems – different types and their importance in food production - Package of practices followed for field crops and cropping systems in Tamil Nadu - Production technologies for ornamentals, vegetables, fruits, spices, Plantation crops, indoor and Medicinal plants - Role of growth regulators in vegetables and fruit production.

Unit - II: Water and Weed Management Principles and Practices

Water Management - Integrated water management - common area management - Different efficiencies in irrigation management-Irrigation management under constraints of irrigation water. Weed management - Important weeds and their distribution in Tamil Nadu - Integrated weed management practices.

Unit - III: Cropping Systems and their Management

Tillage and Dry land agriculture - Tillage Management under wet and dry land agriculture water harvesting techniques - Technologies for increasing agricultural production in rainfed agriculture. Agroforestry - Waste land development: Problems and Prospects in Tamil Nadu-Farm forestry, Agroforestry, Social forestry, Natural forestry.

Unit - IV: Soil Management for Sustainable Agriculture

Soil types of Tamil Nadu and their important physico - chemical properties and their management-problem soils - management - soil fertility management - Integrated Nutrient management.

Unit – V: Seed Production-Principles, Practices and Policies

Seed production in Vegetatively propagated crops - Seed processing – Dormancy Seed treatment - Seed pelleting - Seed Certification - Certified seed production - Seed Act, New seed policy - seed storage - seed industry - Management of physiological disorders in crop plants for improving seed health and quality.

Unit - VI: Principles and Practices in Crop Improvement and Crop Biotechnology

Germplasm - crop genetic resources – Innovative breeding methods such as Mutation breeding - Marker assisted selection and breeding - Transgenic technology and applications.

Unit - VII: Principles and Practices in Pest Management

Pest - Definition – categories of pests including invasive pests - Pests control and pest management - natural, artificial – IPM – Principles, components and integration - Ecological aspects of IPM – various IPM methods - IPM for important pests and nematodes of crops - Role of parasitoids, predators, and entomopathogens (NPV, Bt, Fungus) in IPM – Bio intensive and biotechnological pest management

methods -Store grain pest management.

Unit - VIII: Principles and Practices in Plant Disease Management

Bacterial, fungal and viral diseases in major crops – Disease Surveillance – Assessment and forecasting integrated disease management for important plants – Integrated Disease management – Role of antagonistic organisms. Biotechnological approaches in disease management.

Unit - IX: Farming Systems and Management

Farming systems-Integrated farming systems - Farm planning and budgeting. Farm business management - farm management - principles and decision making - Management of resources - land, labour, capital and machinery -Farm financial management - Agricultural marketing management - world trade concept - economic liberalisation – GATT – IPR issues in agriculture.

Unit - X: Transfer of Technology

Use of modern agricultural information systems – ICT for effective Transfer of technology – importance of ToT in agricultural development - Principles of farm journalism - participatory technology development.

5. Statistics (Degree Standard)

Subject Code: 418

Unit I: Descriptive Statistics

Uses, scope and limitations of Statistics - Collection, Classification and Tabulation of data - Diagrammatic and Graphical representations - Measures of location, dispersion, skewness and kurtosis – Correlation and regression – Curve fitting – Linear and quadratic equations by the method of least squares.

Unit II: Probability Theory

Probability - Addition, Multiplication and Baye's Theorems and their applications. Tchebychev's inequality - Random variables – Univariate and Bivariate – Probability distributions – Marginal and conditional distributions – Mathematical expectations – Moments - Moment generating functions – Characteristic function and cumulant generating functions.

Unit III: Probability Distributions

Discrete distributions – Binomial, Poisson, Geometric and Hypergeometric Continuous distributions – Uniform, exponential, normal, Gamma and Beta - Sampling distributions and standard error - student's 't', Chi-square and F statistic – Distributions and their applications.

Unit IV: Estimation Theory

Estimation – Point estimation – properties of estimators - Neyman Fisher Factorization theorem, Cramer–Rao inequality, Rao–Blackwell theorem, Lehmann-Scheffe theorem (without proof) –MLE and method of moments estimation – Minimum Chi-square – Interval estimation for population mean and variance based on small and large samples.

Unit V: Tests of Hypotheses

Hypothesis testing – Null and Alternative – Types of errors – Level of Significance - Power of test, Neyman Pearson lemma, UMP and Likelihood ratio tests, Test procedures for large and small samples – Independence of attributes, Chi-square test – Goodness of fit.

Unit VI: Sampling Theory and Design of Experiments

Simple random sampling – Stratified, systematic, cluster (Single stage) - Estimation of mean and variance in SRS – Sample Survey Organisation – CSO and NSO – Sampling and non-sampling errors.

Analysis of Variance – Principles of design - CRD, RBD and LSD – Factorial experiments 2^2 , 2^3 and 3^2 (without confounding) - Missing plot techniques.

Unit VII: Statistical Quality Control and Operations Research

Concept of SQC – Control charts – \bar{X} , R, p and np charts - Acceptance sampling plan – Single and double – OC curves, ASN, ATI and AOQ - Attributes and Variables plan.

OR Models – Linear Programming problems – Simplex method - Primal and dual – Transportation and Assignment problems – Network, CPM and PERT.

Unit VIII: Time Series and Index Numbers

Time series – Components of time series – Trend and Seasonal Variations - Determination and elimination.

Index Numbers – Construction and uses – Simple and weighted index numbers – Reversal tests – Construction and uses of cost of living index numbers.

Unit IX: Vital Statistics

Vital Statistics – Importance-Collection - Mortality and its measurements -Life table construction and uses – Fertility and its measurements.

Unit X: Statistical Computing using MS-Excel and SPSS

Introduction to MS-Excel – MS-Excel Options using Excel Shortcuts - Link the Data in Rows, Columns and Sheet - Functions: Logical Functions - Math and Statistical Functions – Charts-Plotting Density Function and Distribution Function. Understanding on the usage of Statistical Package SPSS.

6. Economics (Degree Standard)

Subject Code: 416

Unit-I: Micro Economics

Definitions and Scope of Micro Economics – Importance of Micro Economics - Is Economics Positive or Normative - Law of Demand - Utility Analysis - Elasticity of Demand - Theory of Consumer Behaviour – Consumer Equilibrium - Consumer Surplus – Indifference Curve Analysis – Theory of Production - Definition – Production Function – Factors of Production – Least Cost Combination – Marginal Rate of Substitution – Laws of Returns – Returns to Scale – Producers Equilibrium – Producers Surplus – Economics of Scale – Cost and Revenue Curves in the Short-run and Long-run – Price and Output Determination under different Market Structures – Perfect and Imperfect Competitions – Theory of Distribution – Rent, Wages, Interest and Profit – Welfare Economics – Different concepts of Social Welfare.

Unit-II: Macro Economics

Definition, Nature and Scope of Macro Economics – Circular flow of income - National Income - Definition, Concepts – Computation of National Income - Difficulties in calculating National income. J.B.Says' Law of Market - Keynesian Theory of Employment - Consumption Function and Investment Function - Multiplier - Accelerator - Inflation - Deflation - Trade Cycle.

Unit-III: Monetary Economics

Barter Economy – Evolution of Money - Functions of Money - Classifications of Money- Significance of Money in Modern Economic life, Value of Money - Quantity Theory of Money – Cambridge Version – Fisher and Friedman - Keynesian Critique - Components of Money Supply and Demand – Functions of Commercial Bank and Central Bank - Monetary Policy - Functions of Money Market - Capital Market.

Unit-IV: Public Finance

Nature and Scope of Public Finance – Principle of Maximum Social Advantage – Theory of Social Goods – Public Expenditure – Causes and Growth – Principles of Taxation – Canons of Taxation – Types of Taxation – Incidence and Shifting of Taxation – Public Debt – Sources and Methods of repayment - Management of Public Debt – Budget – Techniques – Types of Budgets – Fiscal Policy.

Unit-V: International Economics

Importance of International Trade – Basis of Trade – Classical Theory of International Trade - Ricardo's Comparative Cost Theory of International Trade – Heckscher-Ohlin Theory of International Trade - Exchange Rate – Balance of Trade and Balance of Payment – Difficulties – Measures – Free Trade vs Protection – International Liquidity – International Institutions – IMF and SDR – IBRD, WTO – UNCTAD.

Unit-VI: Indian Economy – I

Meaning of Economic Development and Economic Growth - Difference between Economic Growth and Economic Development - Indicators of Development- Features of Indian Economy and Tamil Nadu Economy - Obstacles of Development - Economic and Non-economic Factors - Agriculture - Role and Importance - Low Productivity - Causes – Measures - Green Revolution - Land Reforms - Development in India and Tamil Nadu - Economics of Planning: Meaning and Objectives of Economic Planning – Types of Planning - Five Year Plans in India - Objectives of Indian Plans and Failures & Achievements - Industry – MSME and Large scale Industries - Development in India and Tamil Nadu - Industrial policy – 1948-1991 and 2022 - Trade Unions - Industrial Disputes – Measures to settle Industrial Disputes.

Unit-VII: Indian Economy – II

Population – Causes for the growth of Population – Measures to control Population – Population Policy – Poverty – Causes, Alleviation Programmes in India and Tamilnadu – Rural Industrialisation – SIDCO – DIC – Industrial Estates – Role of Transport.

Unit-VIII: Descriptive Statistics

Different data types – Nominal, ordinal, binary and categorical data types

Diagrammatic representation of data – Standard charts, curves diagrams and plots including box plots - Statistical measures – Measures of central tendency – Measures of dispersion - Regression and Correlation coefficient.

Unit-IX: Sampling Methods and Statistical Test

Official Statistical System in India - Sampling versus Census – preparation of schedules and questionnaires - Probability and non-probability sampling method including simple random sampling, systematic sampling, stratified sampling, cluster sampling. Single proportion, equality of two proportions (large sample) - single mean, equality of two population means (small and large samples) - single variance and equality of two variances - independence of attributes.

Unit-X: Ethics in Research

Scientific Methods - Types of Research – Research Process – Research Designs – Basics in Computers.

7. Mathematics (Degree Standard)

Subject Code: 419

Unit-I: Algebra and Trigonometry

Theory of Equations: Relations between roots and Coefficients – Complex roots-Irrational roots – Related roots Transformations of equations- Reciprocal equations.

Summation of Series: Binomial, Exponential and Logarithmic series theorems - Summation of finite series using method of differences - Simple problems.

Expansion of $\sin(x)$, $\cos(x)$, $\tan(x)$ in terms of x – Expansion of $\sin(nx)$, $\cos(nx)$, $\tan(nx)$, $\sin^n x$, $\cos^n x$ - Hyperbolic and Inverse Hyperbolic functions - Simple problems.

Matrix Theory: Symmetric - Skew Symmetric – Hermitian - Skew Hermitian - Orthogonal and Unitary Matrices - Rank of a matrix - Consistency and solutions of Linear Equations – Cayley Hamilton Theorem - Eigen values and Eigen Vectors.

Unit-II: Calculus

Differential Calculus: n^{th} derivative - Leibnitz's theorem and its applications - Partial differentiation - Total differentials – Jacobians - Maxima and Minima of functions of two and three independent variables - necessary and sufficient conditions - Lagrange's method – simple problems.

Curvature - radius of curvature in Cartesian coordinates - polar coordinates - equation of a straight line, circle and conic - p-r equations –evolutes - envelopes - Methods of finding asymptotes of rational algebraic curves with special cases.

Integral Calculus: Methods of integration - Properties of definite integrals - Reduction formulae - Simple problems.- Double Integrals - triple integrals - applications to area, surface and volume - Beta and Gamma functions - properties and simple problems.

Unit-III: Differential Equations and Laplace Transforms

First order but of higher degree equations – solvable for p, solvable for x, solvable for y, Clairaut's form – simple problems.

Second order differential equations with constant coefficients with particular integrals for $e^{ax}, x^m, \cos mx, \sin mx, e^{ax} \cos mx, e^{ax} \sin mx$. Method of variation of parameters - Total differential equations - simple problems.

Partial Differential equations: Formation of P.D.E by eliminating arbitrary constants and arbitrary functions – First order P.D.E - complete integral - Singular integral - general integral - Charpit's method - standard types $f(p,q)=0, f(x,p,q)=0, f(y,p,q)=0, f(z,p,q)=0$ and $f(x,p)=f(y,q)$ - Clairaut's form and Lagrange's equations - $Pp+Qq=R$ – simple problems.

Laplace transform - inverse Laplace transform (usual types) - applications of Laplace transform to solution of first and second order linear differential equations (constant coefficients) – simple problems.

Unit-IV: Vector Calculus, Fourier Series and Fourier Transforms

Vector Differentiation: Gradient, divergence, curl, directional derivative, unit normal to a surface.

Vector integration: line, surface and volume integrals - Applications of Gauss, Stokes and Green's Theorems – simple problems.

Fourier Series: Expansions of periodic function of period 2π - expansion of even and odd functions - half range series.

Fourier Transform - Fourier integral transform (Complex form, no derivation) - sine and cosine transforms - simple properties of Fourier Transforms - Convolution theorem - Parseval's identity.

Unit-V: Algebraic Structures

Groups, subgroups, cyclic groups and properties of cyclic groups – simple problems - Lagrange's Theorem - Normal subgroups – Homomorphism - Automorphism - Cayley's Theorem - Permutation groups.

Vector Spaces: Definition and examples - linear dependence and independence - dual spaces - inner product spaces.

Linear Transformations: Algebra of linear transformations - characteristic roots – matrices - canonical forms - triangular forms.

Unit-VI: Real Analysis

Sets and Functions: Sets and elements - Operations on sets – functions - real valued functions – equivalence – countability - real numbers - least upper bounds.

Sequences of Real Numbers: Definition of a sequence and subsequence - limit of a sequence - convergent sequences - divergent sequences - bounded sequences - monotonic sequences - operations on convergent sequences - operations on divergent sequences – superior limit and inferior limit - Cauchy sequences.

Series of Real Numbers - Convergence and divergence - series with non-negative numbers - alternating series - conditional convergence and absolute convergence - tests for absolute convergence - series whose terms form a non-increasing sequence.

Limits and metric spaces: Limit of a function on a real line - metric spaces - limits in metric spaces.

Continuous functions on Metric Spaces: Functions continuous at a point on the real line – reformulation - functions continuous on a metric space - open sets - closed sets - discontinuous functions on the real line.

Rolle's theorem - Law of mean - Fundamental theorems of calculus - Taylor's theorem.

Sequences and Series of Functions: Point wise convergence of sequences of functions - uniform convergence of sequences of functions.

Unit-VII: Complex Analysis

Analytic functions: Functions of a complex variable – limits - theorems of limits – continuity – derivatives - differentiation formula - Cauchy-Riemann equations, sufficient conditions - Cauchy - Riemann equations in polar form - Harmonic functions.

Complex Integrals: Definite integrals – Cauchy's theorem – Cauchy's integral formula – Formula for higher derivatives.

Series expansions: Taylor's series - Laurent's series -Zero's of analytic functions- Singularities.

Poles and Residues: Poles - Residues – Cauchy's residue theorem - Evaluation of improper real integrals - Integrals involving trigonometric functions.

Unit-VIII: Dynamics

Kinematics of a particle – velocity – acceleration - relative velocity - angular velocity -Newton's laws of motion - equation of motion - rectilinear motion under constant acceleration - simple harmonic motion.

Projectiles: Time of flight - horizontal range - range in an inclined plane - Impulse and impulsive motion - collision of two smooth spheres - direct and oblique impact - simple problems.

Central forces: Central orbit as plane curve - p-r equation of a central orbit - finding law of force and speed for a given central orbit -, finding the central orbit for a given law of force.

Moment of inertia: Moment of inertia of simple bodies - theorems of parallel and perpendicular axes - moment of inertia of triangular lamina - circular lamina - circular ring - right circular cone - sphere.

Unit-IX: Operations Research

Linear programming – formulation – graphical solution – simplex method Big-M method – Two-phase method-duality- primal-dual relation – dual simplex method – revised simplex method – Sensitivity analysis. Transportation problem – assignment problem.

Sequencing problem – n jobs through 2 machines – n jobs through 3 machines – two jobs through m machines – n jobs through m machines

PERT and CPM: project network diagram – Critical path (crashing excluded) – PERT computations.

Inventory models: Basic concepts - EOQ models (a) Uniform demand rate infinite production rate with no shortages , (b) Uniform demand rate - Finite production rate with no shortages – Classical newspaper boy problem with discrete demand – purchase inventory model with one price break.

Game theory: Two-person Zero-sum game with saddle point – without saddle point – dominance – solving $2 \times n$ or $m \times 2$ game by graphical method.

Unit-X: Statistics

Statistics: Measures of central tendency – measures of dispersion – skewness- kurtosis.

Sample space: Events - Definition of probability – Addition and multiplication laws of probability – Independence – Conditional probability – Bayes theorem – simple problems.

Random Variables (Discrete and continuous) - Distribution function – Expected values & moments – Moment generating function – probability generating function – Examples. Characteristic function – Uniqueness and inversion theorems – Cumulants - Chebychev's inequality – Simple problems.

Concepts of bivariate distribution – Correlation - Rank correlation coefficient – Concepts of partial and multiple correlation coefficients – Regression - Method of Least squares for fitting Linear, Quadratic and exponential curves - simple problems.

Standard distributions – Binomial, Poisson, Normal and Uniform distributions – Simple problems.

8. Home Science
(Post Graduate Degree Standard)

Subject Code: 341

Unit-I: Food Science and Technology

Composition, nutritive value, changes during cooking of various foods - cereals, legumes, vegetables, fruits, milk and milk products, flesh foods- egg, fish and meat, fats and oils and sugars. Importance of fermented foods, use of enzymes in food industry, genetically modified foods and organic foods.

Unit- II: Human Nutrition

Energy- Unit, Determination of Total energy requirements, Energy balance. Carbohydrate, Fat and Protein in Human Nutrition- Sources, Classification, Functions, digestion, absorption, utilization and metabolism. Significance of dietary fiber, glycemic index, protein quality. Health effects of saturated and unsaturated fatty acids. Vitamins and Minerals in Human Nutrition- Sources, functions and deficiencies and excess of Fat soluble vitamins, Water soluble vitamins, Macro minerals, Microminerals and Trace elements. Significance of antioxidants in human nutrition.

Unit - III: Normal and Therapeutic Nutrition

Physiological changes affecting nutrient needs during pregnancy, lactation, infancy upto old age. Recommended Dietary allowances and meal planning. Nutritional concerns in pregnancy, infancy, early childhood, school going children, adolescents, adults and old age Therapeutic Nutrition- Etiology, symptoms, clinical features and dietary modifications for Fevers, Obesity, Gastrointestinal diseases, Diabetes Mellitus, Renal diseases, Cardiovascular diseases, Cancer and Inborn errors of metabolism.

Unit- IV: Food Microbiology and Food Safety

Contamination and spoilage of plant and animal foods, food borne infection and intoxication. Safe handling of food. Methods of Food Preservation. Food Adulteration nature of adulterants, method of evaluation of adulterants. Food safety- quality analysis, application of HACCP in food safety. Role of national and international agencies in food safety.

Unit- V: Institution and Entrepreneurship Management

Principles and functions of management, tools of management –organization chart, Job Description, Job Specification and Work Schedule. Personnel Management- recruitment, selection and training of employees. Financial management- Elements of cost, cost control and pricing. Labour laws related to employees – Industrial Dispute Act, Factories Act, Minimum Wages Act, Shops and Establishments Act. : Entrepreneur - Definition - Qualities and skills - Functions of an entrepreneur - Motivational and discouraging factors of entrepreneurship. Problems and constraints faced by women entrepreneurs. Assistance by Institutions for entrepreneurs - SSI and SISI, SIDCO. ITCOT, SIPCOT. NABARD and IDBI.

Unit- VI: Public Health Nutrition

Etiology, clinical features and preventive strategies for Under nutrition – PEM, anaemia, Vitamin A deficiency, Iodine deficiency disorders. Over nutrition - Obesity, Diabetes and Cardiovascular diseases. Nutrition Intervention programmes- ICDS, Midday meal programme. Role of National and International Organizations in Health Care. Nutritional Assessment- Anthropometric, Biochemical, Clinical, Diet Survey, Biophysical Methods, Functional Indices and Vital Statistics. Nutrition education- Objectives, Principles and Methods.

Unit- VII: Human Development and Family Dynamics

Pre natal development characteristics of physical, motor, social, cognitive, language and emotional development from infancy to old age. Childhood ailments, characteristics and problems of adolescents, adulthood and the aged. Family- Types of family and family structure in India. Characteristics and functions of the family. Stages and adjustments in family life cycle. Individual roles, rights and responsibilities within the family. Critical family situation. Marriage- motives of marriage, factors influencing marital adjustments. Sex education.

Unit – VIII: Textiles and Fabrics

Art and design in textiles – ancient and modern. Methods of printing- Hand printing- Block, Stencil, batik, tie and dye. Machine printing- Roller printing, screen printing. Dyes- classification. Fabric Construction- weaving, types of weaves. Fabric finishes- basic and special finishes. Care and maintenance of garments.

Unit- IX: Consumer and The Market

Definition, rights and responsibilities of consumer. Types and functions of market, buying practices, buying aids- branding, labeling and packaging. Problems of the consumer. Consumer organizations, consumer redressal, laws for consumer protection, consumer education- need, objectives and methods.

Unit- X: Research Methodology

Objectives and types of research, selection of research problems. Research ethics. Research Design- types, Sampling methods, Tools of data collection, pilot study. Processing of data- coding, classification, editing. Presentation, interpretation and report writing.

9. Psychology (Post Graduate Degree Standard)

Subject Code: 372

Unit-I: Developmental Psychology

Prenatal, Infancy, Childhood – Characteristics, Periods, Hazards, Developmental Tasks. Physical, Cognitive, Social, Emotional, Moral Development
Adolescences - Characteristics, Hazards, Developmental Tasks, Physical, Cognitive, Social, Emotional, Moral Development
Adulthood - Characteristics, Developmental Tasks, Vocational & Marital Adjustment, Hazards,

Physical, Emotional and Social Changes.

Middle age - Characteristics, Developmental Tasks, Vocational & Marital Adjustment, Hazards, Physical, Emotional and Social Changes.

Old age - Characteristics, Developmental Tasks, Hazards, Physical, Emotional and Social Changes, Graceful Aging and Death and Adjustments.

Unit-II: Personality - Theories and Applications

Personality - Definition, Levels of Personality Analysis, Sources of Personality Data, Role of Personality Theory, Personality Assessments

Approaches - Psychodynamic, Dispositional, Biological, Intra-psychic, Cognitive, Experiential, Social and Cultural. Eastern Perspective – Yoga and Hindu Tradition, Zen Buddhism, Sufism and Islamic Tradition. Applications of Various approaches of Personality.

Unit-III : Bio Psychology

Introduction to Neuron and Nervous System – Brain and its functions – Endocrine Glands – Characteristics, Major Endocrine glands, Hormone Characteristics and Functions. State of Consciousness. Physiology of Motivation and Emotions. Research Methods in Bio Psychology.

Unit-IV : Cognitive Psychology

Cognitive Psychology - Nature, History, Cognitive Neuro Science and Applications – Perception - Definition, Nature & Theories. Attention – Processing Capacity in Selective Attention, Models of Selective attention. Pattern Recognition and Consciousness. Memory Structure and Processes – Types and Process of Memory, Theories of neurocognition. Mental Representation – Models, Mental Imagery - and Cognitive Psychology, Cognitive maps, Storing and Retrieval, Theories of retrieval, Forgetting, Cognitive Development - Life Span Development and Theories.

Unit-V: Advanced Social Psychology

Social Psychology – Definition, Perspectives, Social Perception, Social Cognition, Attitudes, Social Identity, Prejudice - Causes and Effects. Interpersonal Attraction - Close relationships, Social Influence, Pro Social Behaviour, Aggression – Nature, cause and control, Groups and Individual behaviour. Social Psychology in Action.

Unit-VI : Health Psychology

Health Psychology – Definition & Scope. Historical Perspective on health & healing. Factors influencing Health. General approaches to health – Models and theories of health, Psychological approaches to health. Health enhancing behaviour - Eating behaviour & health, Maintaining healthy weight, Healthy relationships – Sexuality, Intimacy, Communication, Anger.

Health compromising behaviour- Smoking –Tobacco and its biological & psychological effects, Tobacco related damage to health, quitting smoking and related therapies.

Alcohol – biological and social effect, Use and abuse, Interventions for alcoholism. Stress and Coping – Types of stressors, Theories of stress, types of coping, stress management techniques. Cardiovascular Disease, Psychoneuroimmunology.

Unit-VII: Psychopathology

Mental disorders – Models, Diagnostic classification system. Theoretical approaches of Psychopathology. Assessment – Clinical interviews, MSE, MMSE, Case history, Clinical observations. Tests- Intelligence, Neuropsychological testing, Developmental and Educational testing – Organic disorders – Disorders of childhood and adolescence, Anxiety, Trauma, Stress related and Somatoform disorders, Disorders of adult personality, gender and behaviour -Impulse control disorder, Substance use and addictive disorder, Sexual dysfunctions, Mood- Disorder, Schizophrenia and other psychotic disorder. Ethics in clinical practice.

Unit-VIII: Organizational Behaviour and Human Resource Management

Organizational Behaviour- Definition, Nature & scope, Approaches. Perception, Attitude, Learning, Attribution, Motivation – Definition, theories and applications in organizations. Communication, Leadership and theories, Change process. Group and Teams, Conflict process, Power and politics. Human Resource Management – Definition, Nature and Scope, Human Resource Planning, Job Analysis, Recruitment, Selection and Placement Compensation, Performance and Management, Training and Development, Grievance, Discipline and Risk Management, Recent Trends in Human Resource Practices.

Unit-IX: Counselling and Therapy

Counselling – Origin, Scope and Structure – Steps in Counselling - Factors affecting counselling process, Skills for an effective counsellor –Factors of Counsellee – Early Theories of Counselling - Contemporary Theories of Counselling, Individual Counselling - Nature, Process and Benefits, Group Counselling – Nature, Scope and Limitations – School Counselling - Nature Role of Teacher, School Counsellor, Counselling and School Curriculum, Vocational Counselling - Theories, Process, Counselling in Specific areas – Family, Marriage, Women, Weaker Section, drug addicts, Delinquents – Review of Counselling - Counselling Evaluation, Monitoring, Evaluation - Approaches, Types, Techniques.

Unit-X: Research Methodology

Research - Objectives, Types, Significance, Steps in research process, Ethics in Research. Research problem – Review of literature, Measurement, Variables and Hypothesis, Sampling techniques – Non experimental Method – Observational Research, Interviewing, Focus groups, Survey, Case study. Experimental Method – Single factor design, Factorial Design, Standardization of psychological test. Parametric and Non-Parametric statistics. Qualitative Research Methods and analysis. Reporting research in Psychology.

10. Sociology (Post Graduate 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, Savitri 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

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.

11. Child Development (Post Graduate Degree Standard)

Subject Code: 374

Unit 1: Growth and Development

- 1.1. Principles of Growth and Development
- 1.2. Factors affecting growth and Development
- 1.3. Domains of development and its interrelatedness
- 1.4. Heredity - Environment Interaction

Unit 2: Theories of Human Behaviour and Development

- 2.1. Evolutionary and biological theories – Gesell’s maturational developmental theory, Ethological theory, Brofenbrenner’s ecological theory, Vygotsky socio- cultural theory
- 2.2. Learning and behavioural theories – Pavlov’s Classical conditioning, Skinner’s operant conditioning, Watson behaviourism, Bandura’s social learning theory
- 2.3. Language theories – Behaviourist perspective, Nativist perspective and Interactionist perspective
- 2.4. Cognitive theories – Piaget’s Cognitive theory, Information Processing
- 2.5. Psycho-analytic theories – Freud’s psycho-analytic theory, Erikson’s psycho- social theory
- 2.6. Moral development theories – Piaget’s moral theory, Kohlberg’s moral theory

Unit 3: Stages / Periods of Child Development

- 3.1 Five stages of child development and its characteristics – Prenatal, Infancy and Toddlerhood, Early childhood, Late childhood and Adolescence
- 3.2 Havighurst’s Developmental Tasks – Infancy to Adolescence
- 3.3 Concept and importance of developmental milestones

Unit 4: Prenatal Development and Birth

- 4.1 Conception - Structure of Ovum and Sperm, process of fertilization

- 4.2 Prenatal development – the period of ovum, embryo and foetus
- 4.3 Factors influencing / debilitating prenatal development
- 4.4 Genetic counseling- Meaning and importance
- 4.5 Signs and symptoms of pregnancy
- 4.6 Prenatal diagnostic methods – amniocentesis, fetoscopy, chorionic villus sampling, ultrasound, maternal blood analysis, cordocentesis.
- 4.7 Stages of child birth and Types of delivery
- 4.8 Birth complications – Oxygen deprivation, preterm and low birth weight infants, post term infants, still birth

Unit 5: Infancy and Toddlerhood (Birth to Two Years)

- 5.1 Neonates - appearance, adaptations/adjustments; New born reflexes, APGAR Scale
- 5.2 Physical development-body growth, brain development, motor development, perceptual development
- 5.3 Cognitive development-Sensori-motor stage
- 5.4 Language development - receptive and expressive language
- 5.5 Emotional development - development of basic emotions, recognizing and responding to the emotion of others, the emergence of complex emotions, temperament
- 5.6 Social development - Development of attachment and its four phases

Unit 6: Early Childhood (2-6 Years) and Late Childhood (6-12 Years)

- 6.1 Physical development - body growth and brain development, motor development, handedness
- 6.2 Cognitive development - The Preoperational stage and the Concrete Operational stage
- 6.3 Language development - vocabulary development, grammatical development, pragmatics, Bilingualism, Multilingualism
- 6.4 Emotional development – self understanding, changes in complex emotions, improvements in emotional self-regulation, understanding others
- 6.5 Social development - peer relations, peer groups, friendships
- 6.6 Foundations of moral development and sex differences
- 6.7 Habit formation - principles, importance and methods
- 6.8 Common behaviour problems during childhood period

Unit 7: Early Childhood Care and Education (ECCE)

- 7.1 ECCE- Definition, Concept, Significance, Objectives and Scope of (ECCE)
- 7.2 Current trends in ECCE - Global and Indian context
- 7.3 Types of ECCE settings
- 7.4 ECCE professionals - Professionals working with children and working for children, prerequisites and characteristics of professionals
- 7.5 Play and its characteristics. Role of play in overall development of children and teacher's role.
- 7.6 Importance of Parental involvement in Early learning

Unit 8: Adolescence

- 8.1 Physical development - Puberty, Growth spurt, Primary and secondary sexual characteristics, Psychological impact of physical changes
- 8.2 Cognitive development - Formal operational thought
- 8.3 Psychological development - Self concept, Self esteem, Interest and Attitude

- 8.4 Identity paths according to James Marcia
- 8.5 Moral development - Sex differences,
- 8.6 Social development - Peer relationship and friendship, Parent adolescent relationships and conflict, Sibling relationship
- 8.7 Physiological and psychological problems and challenges, management strategies

Unit 9: Children with Diverse Needs

- 9.1 Definition, classification (RPWD Act), causes, characteristics and remedial measures for children with special needs
- 9.2 Definition, classification and characteristics, enrichment measures for Gifted children
- 9.3 Children in difficult circumstances – Child prostitutes, trafficked children, street children, refugee children and child victims of war/natural calamities, Juvenile delinquents, Abused children
- 9.4 Gender and societal disparities – Infanticide, foeticide, girl child, children of prostitutes and AIDS affected parents

Unit 10: Guidance and Counselling

- 10.1. Meaning, definition and scope and approaches of guidance and counseling
- 10.2. Physical and mental health counselling
- 10.3. Educational, vocational and career guidance
- 10.4. Child welfare and advocacy

12. Food and Nutrition (Post Graduate Degree Standard)

Subject Code: 380

Unit-I: Human Physiology

a) Cell and its Organelles – structure and functions.

Tissues – classification & functions.

Blood – composition, functions of blood and blood cells, blood groups & blood coagulation.

Cardiovascular physiology – structure and functions of heart, homeostasis of circulating body fluid, ECG, Echocardiogram, ECMO - Extracorporeal Membrane Oxygenation.

b) Respiratory system – Organs, structure & functions, Exchange of gases in lungs and tissues.

Endocrine system – pituitary, Thyroid, pancreas, adrenal medulla, adrenal cortex – hormones & functions.

Gastrointestinal physiology – parts, functions, digestion & absorption.

c) Excretory system – Kidney and nephron – structure & Functions, skin – structure & functions.

Reproductive system – Male & female reproductive organs & functions, menstrual cycle. Development of foetus.

d) Nervous system – Central nervous system & peripheral nervous system & functions.

Special senses – Eye, Ear, Nose, Tongue – structure & functions.

Immune system – Type of immunity – innate & acquired, antigen – antibody reaction, cell mediated immunity.

Unit II: Nutritional Biochemistry

a) Carbohydrates – classification, structure, functions, digestion & absorption. Metabolism – glycolysis, TCA, cycle, HMP shunt, Glycogenesis, glycogenolysis, Gluconeogenesis. Dietary sources, deficiency & Toxicity. Inborn errors of metabolism

Energy – BMR, direct & indirect calorimetry,

b) Lipids – classification, structure, characteristics, functions. Digestion, absorption & Metabolism

Fatty acids – types, synthesis & catabolism.

Dietary sources, deficiency & toxicity, Inborn errors of metabolism

Proteins & aminoacids – classification, structure, functions, digestion & absorption. Synthesis of proteins and catabolic pathways. Dietary sources, deficiency & Toxicity. Inborn errors of aminoacid metabolism

Nucleic acids & Nucleotides – Types, structure, functions & Metabolism.

c) Vitamins – Water soluble & fat soluble vitamins – structure, functions, absorption, storage & transportation. Dietary sources, deficiency & Toxicity.

Minerals – Macro & micro minerals – functions, Dietary sources, deficiency & Toxicity. Water & Electrolyte balance.

Fiber – Types, Functions and Sources.

d) Biochemical Techniques – Chromatography, Electrophoresis, Colorimetry, Spectrophotometry, Flame photometry. HPLC, AAS –Instrumentation, principles & applications.

Interpretation of the results of blood and urine analysis.

Unit III : Food Safety and Food Microbiology

a) Micro organisms important in food microbiology – moulds, yeast, Bacteria, viruses and algae.

b) Contamination and spoilage of foods – cereals & cereal products, sugar & sugar products, vegetables and fruits, meat and meat products, fish, sea foods, egg, poultry, milk & milk products.

c) Preservation of foods – Principles, Methods – High temperature, Low temperature, use of chemicals, radiation. Application of ohmic heating and high pressure processing.

d) Food borne illness – Bacterial and non bacterial food poisoning and infection.

Food safety – food sanitation and Hygiene, Examination of water for bacteria. Type of Food hazards, HACCP Principles.

Unit IV : Food Service Management

a) Principles of management – Functions, tools of management – Tangible and intangible resources.

b) Organisation chart - structure, function, work improvement techniques. Personal management – concept & approaches of personal management, Recruitment, orientation, training and performance appraisal.

c) Resource management – classification, characteristics, factors affecting use of resources, resource conservation.

d) Leadership – importance, style, skills of administrators. Communication -methods, importance and barriers to communication.

Unit V: Research Methodology and Applied Statistics

a) Research – Meaning, objectives, Types, Significance. Research Problem – Meaning, selection, Techniques involved.

Research Design – Meaning & Types, Features of a good research design

b) **Data collection** – Primary and Secondary data – collection techniques.

Data preparation—Editing, coding, classification, tabulation, diagrammatic & graphical representation, Data cleaning & adjusting.

c) **Sampling design** – pilot study, Types, Methods of survey – sample and census. Research ethics, ICMR guidelines for human subjects and animal related studies. Plagiarism check.

d) **Descriptive statistics** – Measure of Central Tendency, Measures of dispersion.

Correlation – Types, Interpretation of correlation co-efficient. Regression Analysis, Association of Attributes.

Probability – Rules and application.

Theoretical distributions – Normal & binomial distributions – characteristics & applications.

Test of significance – Procedure, Small & Large sample tests - t-test, F-test, chi square test, ANOVA. SPSS software in data analysis.

Unit VI : Advanced Food Science

a) Cereals, Pulses and Millets

Structure, Composition, Processing and Nutritive Value Rice and Rice Products, Starch Cookery – Dextrinisation and Gelatinisation Milling- Dry and Wet milling - Enrichment, Parboiling and Baking.

Wheat and wheat Products Gluten Formation and Factors affecting gluten formation

Pulses – milling, Soaking, Germination, Decortication, Fermentation, Pulse protein concentrates, toxic constituents in Pulses.

Millet and millet Products - cleaning & Dehusking, Milling and Sorting and parboiling, Bioavailability and toxicity

b) Sugar and Jaggery

Properties, Stages of Sugar Cookery, Crystallisation, Crystalline and Noncrystalline.

Palm and Sugarcane Jaggery – Economic importance and Health benefits.

c) Vegetables, Fruits, Fats and oils, Nuts and oil seeds

Composition, effect of Cooking on pigments – chlorophylls, Carotenoids, Anthocyanins, Flavanoids, Tannins and Betalins.

Processing and preservation of vegetables and fruit products - Freezing, Heat Blanching, Canning, Ascorbic acid dip, Sulphur dioxide Dip, Sugar syrup, Vacuum treatment concentration and drying. Nutritive value and Browning reactions of fruits and vegetables.

Fats and oils – role of fat in cookery, rancidity, changes of fat on heating.

Nuts and oil seeds, Nutritive value, importance, classification, toxins

d) Selection, processing, preservation, transportation, composition, Nutritive value, changes during cooking and spoilage of

Meat and Meat products, Eggs and Poultry, Fish and other sea foods, Milk and Milk Products

e) Recent trends in Food Science and Technology

Genetically Modified Foods, Biofortification, Food Packaging and Food safety, Space Foods and Nano Foods

Unit VII – Community Nutrition

a) Nutrition and National Development

Meaning of Community, Family, Village and Block. Definition of Nutrition, Optimum Nutrition, Malnutrition – Under Nutrition and Over nutrition. Nutritional and National Development. Nutritional problems confronting India. Human Life cycle – RDA for Indians. Prevalence of Malnutrition in India. National and International Organizations in Combating Malnutrition in the Community. WHO, FAO, UNICEF, ICMR, ICAR, NIN, ICDS, SNP, AMP, CFTRI, Role of PHC and ESI in health care.

b) Assessment of Nutritional status in the community

Direct and Indirect Methods. Anthropometry, Biochemical Assessment, Clinical Assessment, Biophysical Examination, Functional Assessment, Dietary Assessment and Vital Statistics.

c) Nutritional Deficiency Disorders

Protein energy Malnutrition, Nutrition and Anemia, Iodine deficiency disorders, Vitamin – A and D Deficiency disorders. Latest Immunisation Schedule.

d) Nutrition Education

Meaning, scope, methods, Teaching Aids used in Nutrition Education, Mass Communication Media used in Nutrition Education, Planning conducting and evaluation of Nutrition education programme.

Unit VIII: Nutrition through Life Cycle

a) Pregnancy preconceptual Nutrition – Physiological changes, energy cont of pregnancy, problems & complications, of nutritional requirement teenage pregnancy, risk factors for poor pregnancy, nutritional problems.

Lactation – Physiology of lactation, efficiency of milk products, nutritional and immunological components of breast milk, myths, special foods and nutritional requirements.

b) Infants – Growth and development, Nutritional requirements, feeding problems in normal and premature infants, weaning, significance, supplementary foods.

Preschool – Nutritional and food requirements, physiological development, neuromuscular, hematological, behavioral characteristics, Malnutrition-vitamin A, PEM, overweight problem.

c) School children - growth, feeding school children, feeding problems, under weight, hyper activity, dental caries, packed lunch and nutritional requirements

Adolescence- Growth and developmental changes, factors affecting menarchial age, peer group influence, psychological problems and challenges.

Malnutrition- anemia, goiter, obesity and nutritional requirements, PCOD and its management.

d) Adult- Nutritional requirements, problems in menopause and its management.

Geriatrics - Physiological and psychological changes, eating problems, meeting nutritional requirements.

Unit IX : Therapeutic Nutrition

a) Introduction to Diet therapy and Therapeutic Nutrition

Diet therapy: Principles of Diet Therapy, nutritional care process, Basic concepts of diet therapy and planning a diet. Therapeutic adaptations of normal diet.

Routine Hospital Diets: clear fluid, full fluid, soft and normal diet, Pre-operative and post-operative diets.

Special feeding techniques – Parenteral and enteral feeding

Dietitian: Role of dietitians in Nutritional care, planning and diet counseling

b) Diseases of GI Tract

Aetiology, symptoms, complications and principles of diet management in peptic ulcer, gastritis, constipation, intolerance, Inflammatory Bowel Disease, Irritable Bowel Syndrome (IBS), Gastroesophageal reflux disease (GERD).

Fevers and infections – Typhoid, Malaria and Tuberculosis – Causes, Symptoms, metabolic changes and dietary management in fevers and infection.

Liver - Nutritional care for diseases of Liver and biliary system: Jaundice, Cirrhosis of liver, Viral Hepatitis, Hepatic Encephalopathy, Role of alcohol in liver disease.

Diseases of Gall Bladder and Pancreas – Cholelithiasis, Cholecystitis, Cholecystectomy, Acute and chronic Pancreatitis – Aetiology, symptoms, complications and principles of diet management

c) Diet in Diabetes Mellitus and cancer

Dietary management of Diabetes mellitus – Prevalence, Types, Etiology and Signs and Symptoms, Factors affecting normal blood Glucose levels, Impaired glucose homeostasis, Diagnostic test for diabetes, Complications of diabetes – macro-vascular and micro-vascular Management of Diabetes, Dietary management of diabetes.

Cancer – Carcinogenesis – pathogenesis and progression of cancer, Types, Symptoms, Diagnosis. Chemotherapy, Radiation and Surgery Etiology clinical signs and symptoms of Kidney diseases – Glomerulonephritis, Nephrotic Syndrome, Acute Renal Failure (ARF), Chronic Renal Failure (CRF), End Stage Renal Disease (ESRD) –Dialysis and kidney Transplant.

d) Dietary management in cardiovascular disease – Etiology, Types, symptoms, complications, diagnostic test and principles of diet management for hyperlipidemia, Hypertension, Atherosclerosis, Ischemic Heart Disease, Congestive Cardiac Failure. Acute and Chronic heart disease.

Role of fat in development of atherosclerosis – High fibre, low fat, sodium restricted diet. Nutrient and drug interaction in cardio vascular diseases.

Diet in surgical conditions and Burns. Classification, Complication, Dietary management

Malabsorption syndrome – Restricted diets – Lactose, Sucrose, gluten etc

Allergies – Food allergy and intolerance – Mechanism, factors influencing, symptoms, tests for allergy, Nutritional care and Elimination and skin disorder

Weight Management

Obesity, Aetiology, assessment, types, complications and principles of diet management.

Under Weight: Aetiology, limitations, complications and principles of diet management

Unit X: Financial and Marketing Management

a) Introduction to Financial and Marketing Management

Nature, Scope and objectives – financial function – profit vs wealth maximization – Roles and responsibilities of a financial Manager / corporate financial officer – Marketing function

Classification of markets - Difference between Marketing and selling – Product, Price, Place, Promotion, People, Process and physical Environment

b) Financial Decisions

Sources and Types of capital - Cost of different types of capital – capital budgeting, cash budgets, break even analysis – Management of working capital

Roles and responsibilities of a Financial Manager, Corporate Financial Manager

c) Capital Investment Decisions

Planning and control of Capital Expenditure – Capital budgeting process -Cost of Capital and its application in Capital Budgeting decisions Pricing Policies – Importance of Pricing, Factors affecting pricing, Wholesale and retail Pricing, Food and Beverage costing and Pricing

Financial Accounting

Simple and double entry book keeping, Management accounting and decision making Working capital Management – Concept – Need and Influencing factors

– Estimation - working capital – Inventories and receivables Management – Management of cash

d) Pricing and Branding

Pricing - Meaning – Objectives of pricing – factors influencing pricing and decisions – Impact on decision making – Procedure for price determination

Branding - Definition – Types – Importance – Merits and Demerits of branding - Difference between branding and labelling – packaging and labelling – Types of labelling – labelling strategies

13. Social Work (Post Graduate Degree Standard)

Subject Code: 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: Rothman- social 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 non- probability 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, Thurstone, 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, co-ordination, 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 farmers; 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, pre-requisites, 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.

14. Rehabilitation Science (Post Graduate Degree Standard)

Subject Code: 381

Unit I: Introduction to Rehabilitation

- 1.1 Concept, Nature and Meaning of Rehabilitation,
- 1.2 History of Rehabilitation,
- 1.3 Need and significance of Rehabilitation Services,
- 1.4 Issues and Challenges in Rehabilitation Services
- 1.5 Competencies, Ethics and Attitudes of Rehabilitation Professionals

Unit II: Introduction to Disability

- 2.1 WHO International Classification of Impairments, Disabilities and Handicaps
- 2.2 Classification of Disabilities based on RPwD Act, 2016
- 2.3 Influence of Labelling, Stereotypes and Stigma on Disability
- 2.4 Historical Perspectives of Disabilities
- 2.5 Models of Disability Rehabilitation Services – Institutional, Home based Integrated, Community Rehabilitation Services and Inclusion

Unit III: Rehabilitation of Persons with Sensory Disabilities

- 3.1 Definition, signs and symptoms, classifications, causes, Characteristics and prevention of Visual Impairment, Hearing impairment, Speech and Language Disability
- 3.2 Early Identification and Assessment of Sensory disabilities
- 3.3 Misconceptions of Sensory Disabilities
- 3.4 Interventional Services for Persons with Sensory disabilities – Therapeutic, educational, vocational and Adaptive and Assistive devices in the services of Persons with Sensory Disabilities
- 3.5 Role of Family and community involvement in Rehabilitation Services of Persons with Sensory Disabilities

Unit IV: Rehabilitation of Persons with Locomotor Disability

- 4.1 Definition, signs and symptoms, classifications, causes, Characteristics and prevention of Dwarfism, Leprosy Cured person , Acid Attack Victims, Cerebral Palsy, Muscular Dystrophy
- 4.2 Early Identification and Assessment of Locomotor disabilities
- 4.3 Misconceptions of Locomotor Disabilities
- 4.4 Interventional Services for Persons with Locomotor disabilities - Therapeutic, educational, vocational and Adaptive and Assistive devices in the services of Persons with Locomotor Disabilities
- 4.5 Role of Family and community involvement in Rehabilitation Services of Persons with Locomotor Disabilities

Unit V: Rehabilitation of Persons with Chronic Neurological Disorder and blood disorders

- 5.1. Definition, signs and symptoms, classifications, causes, Characteristics and prevention of Multiple Sclerosis, Parkinson's Disease, Haemophilia, Thalassemia, and Sickle Cell Disease
- 5.2. Early Identification and Assessment of Chronic Neurological Disorder and blood disorders
- 5.3. Misconceptions of Chronic Neurological Disorder and blood disorders
- 5.4. Interventional Services for Persons with Chronic Neurological Disorder and blood disorders - Therapeutic, educational, vocational and Adaptive and Assistive devices in the services of Persons with Chronic Neurological Disorder and blood disorders
- 5.5. Role of Family and community involvement in Rehabilitation Services of Personswith Chronic Neurological Disorder and blood disorders

Unit VI: Rehabilitation of Persons with Intellectual Disability and Mental Behaviour

- 6.1. Definition, signs and symptoms, classifications, causes, Characteristics and prevention of Intellectual Disability, Mental Illness, Autism Spectrum Disorder, Specific Learning Disabilities
- 6.2. Early Identification and Assessment of Intellectual Disability and Mental Behaviour
- 6.3. Misconceptions of Intellectual Disability and Mental Behaviour
- 6.4. Interventional Services for Intellectual Disability and Mental Behaviour - Therapeutic, educational, behavioural, vocational and Adaptive and Assistive devices in the services of Persons with Intellectual Disability and Mental Behaviour
- 6.5. Role of Family and community involvement in Rehabilitation Services of Persons with Intellectual Disability and Mental Behaviour

Unit VII: Rehabilitation of Persons with Multiple Disabilities

- 7.1. Definition, signs and symptoms, classifications, causes, Characteristics and prevention of Multiple Disabilities
- 7.2. Early Identification and Assessment of Multiple Disabilities
- 7.3. Misconceptions of Multiple Disabilities
- 7.4. Interventional Services for Persons with Multiple Disabilities - Therapeutic, educational, vocational and Adaptive and Assistive devices in the services of Persons with Multiple Disabilities
- 7.5. Role of Family and community involvement in Rehabilitation Services of Persons with Multiple Disabilities

Unit VIII: Rehabilitation of Persons with Behavioural Disorders

- 8.1 Definition, signs and symptoms, classifications, causes, Characteristics and prevention of Psychosomatic disorders, Addiction, substance abuse, criminal behaviours, delinquency, personality disorders and media addiction
- 8.2 Early Identification and Assessment of Behavioural Disorders
- 8.3 Misconceptions of Behavioural Disorders
- 8.4 Interventional Services for Persons with Behavioural Disorders - Therapeutic, educational, vocational and Adaptive and Assistive devices in the services of Persons with Behavioural Disorders
- 8.5 Role of Family and community involvement in Rehabilitation Services of Persons with Behavioural Disorders

Unit IX: Compendium of Schemes and Services in Rehabilitation

- 9.1 Role of National Institutes and Centres in Rehabilitation Services
- 9.2 Central Public Sector Enterprises – NHFDC and ALIMCO
- 9.3 Schemes of the Department – Divyangjan : DDRS, ADIP, SIPDA, DDRCs
- 9.4 Other Schemes – Scholarship, Accessible India Campaign, Awareness Generation and Publicity Scheme, National Fund for PwDs , National Trust Schemes, Swavlamban Group Mediclaim Policy for PwDs, New Initiative Schemes in progress
- 9.5 National and State Awards for Empowerment of PwDs

Unit X: Legislations and Policies Governing the Rights of PwDs

- 10.1 International Declarations - Universal Declaration of Human Rights (1948), World Declaration for Education for All (1990)
- 10.2 International Conventions - Convention Against Discrimination (1960), Convention on Rights of Child (1989), UNCRPD (2006).
- 10.3 International Frameworks - Salamanca Framework, (1994) Biwako Millennium Framework of Action (2002)
- 10.4 National Commissions and Policies – Kothari Commission (1964), National Education Policy (1968), National Policy on Education (1986), Revised National Policy on Education (1992), National Curricular Framework (2005), National Policy for Persons with Disabilities (2006) Universal Design for Learning
- 10.5 National Acts and Programmes (RCI Act 1992, PwD Act 1995, National Trust 1999, RPwD Act, 2016) and IEDC 1974, SSA 2000, RTE 2006, RMSA 2009, HEPSN, TEPSN (2012), IEDSS 2013, RUSA 2013, Samagraha Shiksha Abiyan 2018,

15. Mechanical Engineering / Production Engineering / Manufacturing Engineering (Degree Standard)

Subject Code: 399

Unit – I: Mechanics, Kinetics and Dynamics

Statics of Particles, Equilibrium of Rigid bodies, Mechanism of Deformable Bodies, Properties of Surfaces and Solids, Centroid, Centre of Gravity, Dynamics of Particles, Elements of Rigid Body Dynamics, Basics of Mechanisms, Kinematics of mechanisms, gyroscope, Gears and Gear Trains, Fly Wheels and Governors, Balancing of Rotating and Reciprocating Masses, Friction in Machine Elements, Force Analysis, Balancing, Single Degree Free Vibration, Forced Vibration, mechanisms for Vibration Control, Effect of Damping, Vibration Isolation, Resonance, Critical Speed of Shaft.

Unit – II: Strength of Materials and Design

Stress, Strain and Deformation of Solids, Combined Stresses, Theories of Failures, Transverse Loading on Beams, Stresses in Beams, Torsion, Deflection of Beams, Energy Principles, Thin Cylinders and Thick Cylinders, Spherical Shells, Fundamentals of Design for Strength and Stiffness of Machine Members, Design of Shafts and Couplings, Design for Static and Dynamic Loading, Design of Fasteners and Welded Joints, Reverted Joints, Design of Springs, Design of Bearings, Design of Flywheels, Design of Transmission Systems for Flexible Elements, Spur Gears and Parallel Axis Helical Gears, Bevel Gears, Worm Gears and Crossed Helical Gears, Design of single and two stage speed reducers, Design of cam, Clutches and Brakes, Design of Piston and Connecting Rods.

Unit - III: Fluid Mechanics and Turbo Machinery

Fluid properties, fluid statics, manometry, buoyancy, control volume analysis of mass, momentum and energy, fluid acceleration, differential equations of continuity and momentum, Bernoulli's equation, Dimensional Analysis, viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends. Turbomachinery: Pelton wheel, Francis and Kaplan turbines - impulse and reaction principles – velocity diagrams, pumps and its applications-Valves and Types - Theory of Jet Propulsion- Pulse Jet – Ram Jet Engines, Online Continuous Flow Monitoring System.

Unit – IV: Thermal Engineering and Thermodynamics

Basic concepts, Zeroth, First and Second laws of thermodynamics, thermodynamic system and processes, Carnot cycle. irreversibility and availability, behaviour of ideal and real gases, thermodynamic relations, properties of pure substances, calculation of work and heat in ideal processes, analysis of thermodynamic cycles related to energy conversion, Fuel and combustion, Fuels Characteristics, Emissions and Controls, Testing of IC Engine-Renewable sources of Energy.

Power Engineering: Steam Tables, Rankine, Brayton cycles with regeneration and reheat. I.C. Engines: air-standard Otto, Diesel cycles. Refrigeration and air-conditioning: Vapour refrigeration cycle, heat pumps, gas refrigeration, Reverse Brayton cycle; moist air: psychometric chart, basic psychometric processes.

Unit – V: Heat and Mass Transfer

Modes of heat transfer - one dimensional heat conduction, resistance concept, electrical analogy, unsteady heat conduction, fins dimensionless parameters in free and forced convective heat transfer, various correlations for heat transfer in flow over flat plates and through pipes, thermal boundary layer, effect of turbulence, radiative heat transfer, black and grey surfaces, shape factors, network analysis; heat exchanger performance, LMTD and NTU methods.

Basic Concepts of Mass transfer, Diffusion Mass Transfer, Fick's Law of Diffusion Steady state Molecular diffusion, Convective Mass Transfer, Momentum, Heat and Mass Transfer Analogy, Convective Mass Transfer Correlations, Radiative Heat Transfer.

Unit – VI: Materials Science and Metallurgy

Constitution of alloys and phase diagrams, Iron – Iron Carbide Phase Diagram - steels, cast iron, phase transformations- diffusion-TTT diagram, ferrous and nonferrous alloys, heat treatment of ferrous and non-ferrous metal, surface modification techniques, powder metallurgy, non-metallic materials, mechanical properties and testing, crystal defects and strengthening mechanisms, conducting and semi conducting materials, magnetic and dielectric materials, Engineering ceramics, Engineering and commodity polymers, composites, nano-materials.

Unit – VII: Production Technology

Foundry Technology- types of pattern, cores, moulding and casting methods, Solidification, design of castings, defects, Melting Furnaces, Hot and Cold working, Metal Forming Processes - types, Defects and Remedies, Sheet Metal Operation, metal joining processes, types and design of weldment, welding metallurgy, welding defects, Casting, Welding Inspection (NDT), Manufacturing of Thermo Setting and Thermo Plastic Products, Metal cutting, Cutting Tool Nomenclature, Machinability machine tools - center lathe, drilling, milling, grinding, gear cutting and broaching, Machining Time Calculation, unconventional machining processes, Micro Manufacturing, CNC machine tools, Manual Part Programming - Machining and Turning Centre.

Unit – VIII: Metrology and Quality Control

Limits, Fits and Tolerance, Linear and angular measurements, Interferometry, laser interferometers - Types, Computer Aided Inspection, Basic concept of CMM - Types of CMM, Machine vision, Form measurement-Straightness- Flatness, Roundness, Surface finish measurement, contact and non-contact method, Measurement of power, flow and temperature. Statistical quality control, control charts, acceptance sampling, reliability, TQM, 5S, ISO standards.

Unit – IX: CAD / CAM / CIM / FEA

Fundamentals of Computer Graphics, Geometric Modeling, Visual Realism, Assembly of Parts, CAD Standards, Fundamentals of CIM, Production Planning and Control, Computer Aided Process Planning, Cellular Manufacturing, Flexible Manufacturing System and Automated Guided Vehicle System, Group Technology, Production Flow Analysis, Industrial Robotics, Additive Manufacturing, Just in Time(JIT), lean manufacturing, One Dimensional Problems in FEA, Two Dimensional Scalar Variable Problems, Two dimensional vector variable problems, Isometric Parametric Formulation.

Unit – X: Industrial Engineering and Management

Work study - Techniques, Method study and work measurements - objectives - basic procedure, machine loading and scheduling, product sequencing, inventory control - E O Q - quantity discounts, ABC Analysis material handling systems, operations research, Linear Programming, simplex method, Transportation model, Assignment model CPM and PERT, Queuing Models. Management theory and practice, planning -Decision making, Organising, staffing, Motivation, Leadership, controlling, control techniques, Industrial Safety - Standards – OSHA.

16. Public Administration (Post Graduate Degree Standard)

Subject Code: 391

Unit-I: Introduction:

1. Meaning, Nature, Scope and importance of Public Administration.
2. Politics - Administration Dichotomy.
3. Evolution of Public Administration and its Present Status.
4. New Public Administration - New Public Management.
5. Impact of Liberalisation, Privatisation and Globalisation on Public Administration.
6. Good Governance.

Unit -II: Organisation and Management

1. Meaning and Importance of Organisation

2. Bases of Organisation
3. Principles of Organisation - Hierarchy, Span of Control, Unity of Command, Centralisation Vs Decentralisation, Delegation.
4. Theories of Organisation - Classical Theory, Scientific Management Theory, Bureaucratic Theory, Human Relations Theory, System Theory
5. Meaning, Nature and importance of Management.
6. Principles of Management.
7. MBO (Management by Objectives), Participative Management

UNIT-III: Administrative Behaviour

1. Process and Techniques of Decision – making
2. Communication
3. Morale
4. Motivation – Motivation Theories
5. Leadership – Leadership Theories
6. Public – Private Partnership.

UNIT-IV: Personnel Administration

1. Meaning, Nature, Scope and Importance of Personnel Administration.
2. Manpower Planning
3. Recruitment
4. Performance Appraisal
5. Training – Skill Development
6. Bureaucracy and Civil Services
7. Civil Service Associations
8. Retirement
9. Corruption in Public Service
10. Administrative Ethics

Unit -V: Comparative Public Administration and Development Administration

1. Meaning, Nature, Scope and importance of comparative public administration.
2. Approaches to the study of comparative public administration
3. Ecological and systems approaches
4. Riggs model of comparative public administration: Prismatic Society-Industria Agraria model.
5. Comparative Administrative Systems: UK-USA-France and Switzerland.
6. Sustainable Development and Goals
7. Sustainable Governance
8. Social welfare Programmes and five year Plans in India
9. Social Welfare Programmes in Tamil Nadu
10. Poverty Alleviation Programmes.

Unit -VI: Public Policy

1. Meaning, nature and importance of public policy
2. Policy science and public policy
3. Approaches to public policy
4. Theories and models of public policy making: Harold Lasswell - Charles Lindblam - Y.Dror
5. Policy Making Process: Formulation-implementation - Evaluation

6. Policy making Institutions: Legislature- Executive - Judiciary - Higher Educational Institutions and NGOs
7. Role of media, civil society and pressure groups in policy making.

Unit-VII: Administrative Law

1. Meaning, nature and Scope of Administrative Law
2. Growth of Administrative Law
3. Sources of Administrative Law
4. Meaning and Importance of Delegation Legislation
5. Judicial Remedies and Judicial Review
6. Administrative Tribunals
7. Citizen Rights
8. Public Interest Litigation

Unit - VIII: Administrative Responsibility

1. The concept of Responsibility and Control
2. Executive Control over Administration
3. Parliamentary control over Administration
4. Judicial Control over Administration
5. Public Control over Administration
6. Media control over Administration

Unit-IX: Indian Administration

I. Introduction

- I. Evolution of Indian Administration
 - (a) Kautilya
 - (b) Maurya
 - (c) Mughal Period
 - (d) British Period
- II. Constitutional Framework of Indian Administration
 1. Framing of the Indian Constitution
 2. Fundamental Rights and Duties
 3. Directive Principles of State Policy
 4. Parliamentary Democracy
 5. Democratic Socialism

Unit X: Union Government

1. President
2. Vice-President
3. Prime Minister and Council of Ministers
4. Central Secretariat
5. Cabinet Secretariat
6. Ministries and Departments
7. Lok Saha and Rajya Sabha
8. The supreme court and Rule of Law.

Unit XI: Public Services:

1. **All India Services:-** The UPSC – Conduct of Examination – Recruitment procedures – Reforms in Examination System for All India Services – Training – Initial Training, On the Job Training – Training Senior Civil Servants – Promotion – Pay scales – Retirement – Re- appointment.
2. **Central Services:-** The Recruitment to Central Services – Training of Central Service Personnel – Promotion and Pay Scales – On the Job Training – Deputation – Retirement – Re-appointment.
3. **State Service:-** State Services in India – State Services in Tamil Nadu – The Tamil Nadu Public Service Commission recruitment procedures –Conduct of Examinations – Reforms in Examination – Appointment in various cadres – Pay scales – Promotion - Re-appointment.
4. **Training of Civil Servants:-** All India Services – Tamil Nadu State Civil Services – Indian Institute of Public Administration – Training in Abroad – Training in Field Services in India – Training of Subordinate Civil Servants in Tamil Nadu.

Unit XII: State Government:-

1. **The Governor:-** The office of the Governor – Constitutional Responsibilities of Governor – The Appointment and Removal of Governor of a State – Legal Administrative – Financial – Powers of the State Governor – The Relationship between Governor and the Chief Minister and the Ministry – The Emergency powers of Governor of the State.
2. **The Chief Minister and the Council of Ministers:-** The Appointment of Chief Minister and the Council of Ministers – The tenure of the Chief Minister and the Council of Ministers – The powers of Chief Minister – The Relationship between Chief Minister and the Council of Ministers – The function of giving advice to the Governor.
3. **State Government:-** The powers of State Government – The seventh schedule of the Constitution – The function of State Government.
4. **State Secretariat:-** The concept of separation of policy making and execution – The organization of Secretariat – Policy making in State Government – The Minister – Secretary relationship – The functional domain of Secretariat.
5. **State Legislature:-** State Legislature in India – The evolution from Government of India Act, 1909 – 1919 and 1935 – The constitutional provisions regarding powers of State Legislature – The power to discuss subjects – The powers of the Speaker, Chief minister – Leader of opposition – Party whips – The privileges of Members of State Legislative Assembly – The responsibility of Chief Minister and Council of Ministers to the Assembly – The tenure of State Legislatives.
6. **High Court:-** The hierarchy of Courts in India – The Supreme Court and High Courts of India – The appointment of Judges of High Courts –The Appointment and Removal of Judges of High Court – The collegium system – Law Commission Recommendations – The Jurisdiction of High Courts – The Original and appealing side of the High Court.
7. **Administration of Law and Order:-** The Maintenance of Law and order – The responsibility of States – The role of district administration – the Maintenance of Law and order in big cities – the Commissionarate system – The emergency powers of the President and the role of the Governor.

Unit XIII: Union – State Relations:

- 1. Legislative Relations:** Constitutional Seventh schedule – List-I, List-II and List-III – The Legislative powers of the Union and States.
- 2. Administrative Relations:** The Union – State relative Administrative Powers – Constitutional Provisions of the Executive powers of the President and the Governor – The Union node to State governments.
- 3. Judicial Relations:** The power of the Supreme Court – The directions of the Supreme Court – The Directive powers of Supreme Court.
- 4. Financial Relations:-** Constitutional provision of Centre – State Financial Relations – The seventh schedule – The taxing power of Union – and States - The appointment of Finance Commission – Finance Commission Recommendations – The reforms in Financial Relations – The G.S.T

Unit XIV: Financial Administration:-

1. Meaning, Nature and Scope and significance of financial Administration - Budgetary process – Preparation- enactment and execution.
2. Types of Budget – PPBS- ZBB- Performance Budget - Resourcemobilization – Tax Revenue - Non Tax Revenue.
3. Tax Administration in India: Direct Tax-Indirect Tax - Public Debt Management.
4. Local finances.
5. The Constitutional Provisions of the Financial Administration art 112
– the other provisions – Votes on account – etc. – The budget cycle –Preparation – Enactment and Execution – The role of Ministry of finance – The role of Administrative heads – (Controlling Officer) The network of Treasuries – The accounting and auditing of Accounts
– Pre-auditing – Post Auditing and concurrent auditing.
6. Executive Control of Public Expenditure:- The Role of controlling officer – The administrative heads – The drawing of money - Treasuries – The accounting and realising and flow and control of funds.
7. Parliamentary Control of Public Expenditure:- Constitutional Provisions regarding enactment and control public expenditure – The Privileges of Members of Legislatures – Discussion and debate over Public Expenditure. The standing Committees of Indian Parliament – The PAC, EC and COPU and the Departmentally Related Standing Committees. (DRSCS)
8. Auditing , Accounting and Argumentation of Revenues: The Comptroller and Audit General of India – (CAG) The role CAG in accounting and auditing of account of Union and States – The Auditing of Public Sector Undertaking.

Unit XV: District and Local Administration:

1. The role of District Collector in District Administration – The Changing role of District Collector – The Local Governments in India – Rural and Urban.
2. The 73rd and 74th Constitutional Amendment Acts – The new dispensation of Local Government.
3. Political Process: Political parties in India – Multi Party System – The Election Commission in India – The Representation of People Act. The political role of Bigger parties.
4. Pressure Groups: The Pressure Groups based on various functions. Agricultural – Industrial and Tertiary Sectors. The demand Groups in various sectors.

XVI: Issues in Public Administration:

1. Political and permanent Executive
2. Generalists VS Specialists
3. Integrity in Public Administration;
4. People's participation administration – Direct and Indirect; Ombudsman Institution in India.
5. Lok Ayukta and Lok Pal.
6. Administrative Reforms in India: First Administrative Commission – Second Administrative Commission.

17. Business Administration (Post Graduate Degree Standard)

Subject Code: 385

1. Management Concepts

The development of Management thought-Pre scientific management era – Human relation era – Social sciences era – Management sciences era. Definitions of Administration and Management – Basic Principles and Process of Management. Functions of Management Planning, Organising, Staffing, Directing, Coordination and Controlling. Management by objectives – Process of MBO – Management by Exception.

2. Managerial Economics

Introduction to Economics; Nature and Scope of Managerial Economics – Significance in Decision-Making and Fundamental Concepts - Objectives of a Firm - Role of Economic Analysis in managerial decisions. The Concept of Profit. Nature and Measurement of Profits - Profit Maximization - Profit Planning and control – Profit Policies – Cost Volume Profit Analysis. National Income – Definition, Concepts and Various Methods of its Measurement– Inflation, Types and Causes - National Income and Economic Welfare - Business Cycles and Business Forecasting – Measuring Business Cycles Using Trend Analysis

3. Organisational Behaviour

Organisational Behaviour : Importance – Historical Development of Organisation Behaviour- Understanding Individual Personality- Perception-Learning-Values-Attitude- Job Involvement – Organisational Commitment – Job Satisfaction – Emotions – Emotional Intelligence – Spiritual Quotient. Understanding groups: Meaning of group and group dynamics – Theories of Group Dynamics – Group Cohesiveness – Team Building- Management of change-Organisational Culture-Management of Conflict-Organizational Citizenship Behaviour.

4. Human Resource Management

Functions of HRM – Managerial Functions and Operative functions – Organisation of HRM Department – Qualities and Qualification of HRManagers – HR Policies - Environmental influences of HRM – HRM Challenges – HRM Strategies. Recruitment and Selection- Job Analysis- Job Evaluation- Performance Appraisal-Training and Development- Quality of Working Life-e HRM

5. Research Methodology and Statistics

Research – Meaning – Types – Nature and scope of research – Review of Literature - Problem formulation – Statement of research Objective – Value and cost of information – Research Questions – Research Gap - Decision theory –Research process – Research designs – Experimental Research.

Methods of data collection-Sampling – Measure of Central Tendency-Measure of Dispersion-Testing of Hypothesis- Correlations- Regression- Multivariate Analysis-Research Report

6. Operations Management

Operations Management concept, objectives and types –Characteristics of Modern Operation Management – Differences between Services and Goods – Operation Strategy – Supply Chain Management – Warehousing and Supply Chain Strategies – Supply Chain Dynamics. Operations Planning- Work study: Objectives, Procedures – Method Study and Motion Study - Work Measurement and Productivity. Total Productive Maintenance- Materials management and Purchase Management- Project management-Quality Control – Quality Movement – Continuous Improvement – Tools – Total Quality Management (TQM) concepts – ISO Quality Certification – Quality Assurance.

7. Marketing Management

Marketing – Definition – Importance – Concepts in Marketing, Marketing Concepts – Traditional and Modern Concepts – Marketing Environment, Marketing Strategies – Kinds of Marketing Strategies – Marketing Mix Concept – Marketing Research and Information – Objectives and Process. Consumerism – Problems of consumer protection – Developments in Consumer Protection in India - Government and Marketing – Neo Marketing Trends – e-Marketing – Tele-marketing – Green Marketing – Event Marketing – Viral Marketing – Direct Marketing- Ethics in Marketing & Advertisement.

8. Management Information System & E-commerce

Data, Information, Intelligence, Information Technology, Information System, Functional Information Systems, DSS, EIS, KMS, GIS, International Information System-Data Base Management System-Role of information management in ERP, e-governance, Data Mining, Business Intelligence, Pervasive Computing, Cloud computing, CMM. Electronic Commerce: Technical Components of E-Commerce Functions of E-Commerce - Advantages and disadvantages of E- Commerce - Electronic Commerce and Electronic Business- Electronic Commerce Technology - Building the E-Business application- Avoiding legal issues- Web strategy: Attracting and retaining visitors - Search Engines and Portals - Cyber service -Online Banking.

9. Accounts and Auditing

Basic Accounting concepts - Kinds of Accounts. Double Entry Book Keeping - Journal and Ledger Accounts- Subsidiary books- Trial balance - Errors – Types of errors - Rectification of errors – Bank reconciliation statement – Manufacturing - Trading - Profit & Loss Account - Balance sheet. – Accounting for non-trading Institutions-Income & Expenditure Account- Receipts and Payment Accounts and Balance sheet – Accounting for depreciation – methods of depreciation – Preparation of accounts from incomplete records. Auditing-Origin-Objectives-Types- qualities of an Auditor- Audit programmes- verification and valuation of Assets and Liabilities. Investigation-objectives of investigation-Audit of computerized-Accounts-electronic auditing

10. Financial Management

Finance Functions – Nature And Scope – Evolution Of Finance Function – Its New Role in The Contemporary Scenario – Goals Of Finance Function – Maximising Profit Vs Wealth – Cost – Risk – Return- Trade Off – Concept Of Time Value Of Money – Future Value And Present Value And The Basic Valuation Model - Sources Of Short Term Financing – The Management Of Working Capital- Cash Management Strategies- Receivables Management-Sources Of Long Term Finance- Cost Of Capital And Capital Structure- Economic Value Added (EVA) -Risk & Uncertainty -Risk Management- Return on Investment.

18. Town and Country Planning

**Single Paper Consisting of the subjects Town Planning (Post Graduate Degree Standard),
Civil Engineering (Degree Standard) & Architecture (Degree Standard)**

Subject Code: 382

18.1. Town Planning (Post Graduate Degree Standard)

Unit – I: Introduction to Planning – Scope and Content

Planning System in India, Regional Plan, Master Plan, Structure Plan, Detailed Development Plans, City Corporate Plan and Smart City Plan. New Town concepts, case studies in India & U.K. – Concept of Region, Types of Region, Techniques of Regional Analysis, Growth Model, Regional disparities, Resources in Regional development. Multi-level Planning – Regional Planning in India, Regional Plan case Studies, USA, U.K., Japan.

Unit – II: Planning Theory and Techniques

Process of evolution of human settlement planning - Principles in Planning – Rationality in Planning, Blueprint and Process mode, Disjointed Incremental mode of Planning, Normative versus Functional mode of Planning – Type of planning surveys, data identification for various plan preparation. Delphi, Trade off-game, Simulation models, Gravity analysis, Lowry model, Threshold analysis, Multivariate analysis – Optimization and economic analysis methods in project formulation and implementation, PBBS – URDPFI Guidelines.

Unit – III: Urban Sociology, Economics, Geography: Theories and Applications

Socio-economic groups, structures and Institutions as related to urban and rural communities - Ecological processes and structures in Indian Cities - Social Change & Economic Development - Agglomeration economics- Economics of scale, Multiplier effect concept, scope, limitation - Basic and non-basic activities of economics base, methods of base identification - Land-use determinants, Locational Dynamics of urban Land-use - Spatial organization of Urban settlements - City-region, Urban Sprawl and Fringe - Urbanization in India and Tamil Nadu with reference to settlements and population distribution.

Unit – IV: Environmental Issues Related to Planning

Components of Environment – Classification of Environmental Resources - Purpose and Objectives in Environmental Protection - Institutional and Legal Support in management of the Environment – Environmental Policies, and issues - Environmental Impact Assessment Practice in India - Types, Conceptual Approach and Phases of EIA – Impact Identification - Public Participation in the Process of Environmental Decision Making Process - Environmental Concepts – Sustainable Planning – Eco Cities, Compact Cities, Smart growth, Sponge city, IGBC Rating Systems applicable for Towns.

Unit – V: Urban Infrastructure Net Work Planning Issues

Obligatory and Discretionary Services, Implication of Urban Form and Size on Services, Norms and Standards, National Building Code, 2016. National and Local guidelines – Demand Strategy, Issues and Tasks, Operation and Management Aspects of each Service - Water Supply, Sewerage / Drainage, Solid Waste Management, Roads and Street Lighting - Priority, Placement Network Options, Effective System Analysis – Private and Public partnership and innovative concepts and practices in Infrastructure Development.

Unit – VI: Project Formulation and Implementation

Types of Project, Project Cycle, Identification, Selection, Preparation -Capital Investment Programme, Internal Rate of Return, Net present Value - Cost- Benefit & Analysis, Social Cost Benefit analysis, Budgeting, Tamil Nadu Transparency in Tender Rules - Appraisal techniques – Project Proposal and objectives, Current base line conditions, Financial and Economical Appraisal, Socio cultural assessment - Process Monitoring – Key issues, Monitoring Schedule, Data collection, Design, strategy, Impact Evaluation – Approaches, Key issues, Alternative to large scale qualitative Evaluation designs.

Unit – VII: Planning Legislation and Legal Framework

The concept of law, Indian Constitution. Rights of Ownership and development of property. Statutory control as a positive tool in plan preparation and implementation - Evolution, scope and Significance of Planning Legislation. History and survey of development of planning legislation in India - Panchayat Act, Municipality Act, Corporation Act, TNULB Act, Land Acquisition, Rehabilitation and Resettlement Act,2013. Provisions in the above acts related to functions, powers, role and responsibilities of local bodies including elected representatives and officers - 73rd and 74th CAA and their implications on planning and development. Local Body finance, revenue, expenditure and resource mobilization - T & C Planning Act of Tamil Nadu 1971, The Ancient Monuments and Archaeological Sites and Remains Act, Tamil Nadu Combined Development and Building Rules 2019, The Tamil Nadu street vendors scheme, The Tamil Nadu Real Estate (Regulation and Development) Act, 2016.

Unit – VIII: Issues in Traffic and Transportation Planning

Highway classification - Traffic characteristics – Horizontal and Vertical alignment, Land use & Transportation relationships - Sight distance – Cross- sectional elements – at grade and Grade separated intersections - Volume Count – Origin and Destination – Parking and Public Transport - Surveys – Inventory of Transport facilities – Methods of Survey – Different modes – Capacities – Limitations – Planning Aspects - Coordination – Para Transit modes – Private transport – Urban Transportation Planning Process – Trip Generation – Trip Distribution – Modal Split – Trip Assignment, Congestion pricing, Non Motorized Transport, Transit Oriented Development, Bus Rapid Transit System, Unified Transport Authority

Unit – IX: Remote Sensing and G.I.S., In Planning

Basics of Remote Sensing and GIS. - Classification of spatial and non- spatial data application of spatial data in urban and regional planning - Identification of required spatial data layers - Coding schemes – digitization of spatial data – editing spatial data usable for the given planning problem – Land use Suitability Analysis, Land use Modeling, Existing Land use Preparation using Mobiles, Satellite Imageries, Aerial Photographs, Drones in Physical Planning.

Unit – X: Current Trends and Issues in Planning

Concepts of sustainable urban development, sustainable Transportation,E – Governance, HRIDAY, Rurban Mission, Swatch Bharat Mission, AMRUT, National Health Mission, Public private partnership, local bodies and urban finance. Land Pooling concept, Transfer of Development Right, Accommodation Reservation, Formulation of Re-development and Urban Expansion Plans - Local Area Plans, Town Planning Schemes - Special Economic Zone, Value Capture Finance Policy Framework – Swiss Challenge Model, Industrial Corridor, Coastal Zone Management Plan.

18.2 Civil Engineering (Degree Standard)

UNIT I: Building Materials, Construction Practices and Concrete Technology

Properties and Classification of cement, lime, bricks, stone and timber - Uses and Tests – materials for acoustics and insulation - construction details and supervision for masonry - Design of Brick Pier and Wall – Damp Proofing courses – Shoring, scaffolding and Underpinning – Ventilation and Fire resistant construction – Green Building Concept - Types of concrete – testing of fresh and hardened concrete – mix design – quality control – special concreting techniques - concreting equipment – centering and shuttering – slip and moving forms – construction joints.

UNIT II: Engineering survey, Town Planning, Urban Engineering and Construction Management

Survey – Basic principles - Classification - computation of areas and Volume – Levelling – Fly levelling – L.S and C.S – Contouring – Traversing - Heights and Distances - Tacheometry – Use of EDM and Total Station – Global Positioning System – Concepts and applications of Remote sensing.

Urbanisation- Trends in India- Planning process– stages, type of survey, collection of data- Development of new towns – urban modern and satellite towns - Smart cities - levels of planning.

Construction management – Construction planning and scheduling – preparation of different types of schedules – methods of scheduling – CPM - PERT – resource planning - Construction Contracts.

Types of estimates - Detailed estimates for different types of buildings - methods of valuation – depreciation – fixation of rent- rate analysis- Quantity estimation

UNIT III: Strength of Materials, Analysis of Structures, Design of RC Elements, Prestressed Concrete and Steel Elements

Simple stress and strain - elastic constants- relationship - stress and strain in two dimensions, compound stresses- principal stresses- thin and thick cylinders - Bending moments and shear forces in statically determinate beams- simple bending theory - flexural shear stress - deflection of flexural members – torsion of circular section - Short and long columns.

Analysis of statically determinate trusses and arches

Working stress method (only for liquid retaining structures) - limit state design concepts - design of members subjected to flexure, shear, compression and torsion - Prestressed concrete: analysis and design of pre-tensioning and post tensioning beam.

Design of tension and compression members, beams and beam-columns, column bases - Design of bolted and welded connections.

UNIT IV: Geotechnical Engineering and Pavement Design

Properties of soils - soil classification – Compaction - permeability and seepage – soil stresses- Compressibility and Consolidation - Shear strength – Laboratory and in - situ tests. Sub-surface investigation - scope, drilling bore holes, sampling, penetrometer tests, plate load test – stability of slopes - foundation types - foundation design requirements – shallow foundations – Types and Design of isolated and combined footings - bearing capacity - effect of shape, water table and other factors- stress distribution - settlement analysis in sands and clays – deep foundations - pile types, dynamic and static formulae - load capacity of piles in sands and clays.

Design and construction of bituminous and concrete roads - Drainage of roads - Maintenance of roads.

UNIT V: Hydraulics, Water Resources, Water Supply and Environmental Engineering

Hydrostatics - applications of Bernoulli equation, Laminar and turbulent flow in pipes, pipe networks - concept of boundary layer and its growth - flow in channels, rapidly varied flow - tanks and pipes - Hydrologic cycle - Rainfall - draw down – recuperation test – well yield - Water resources of Tamil Nadu – Water policy – flood control – drought management.

Water quality standards – Intakes - Estimation of demand - Unit processes and operations for water treatment - Maintenance of treatment units - Conveyance and distribution systems of treated water - Rural water supply- Advanced water treatment.

Collection of waste water- Design of sewers - Sewage pumping - Characteristics of sewage - Primary, secondary and tertiary treatment of sewage- Sludge disposal - effluent standards - industrial wastewater management – Rural sanitation – solid waste management.

18.3 Architecture

(Degree Standard)

Unit – I: Human Settlements Planning

- Origin of Human settlements In India & the rest of the world – River valley civilizations (Indus Valley, Mesopotamia, Egypt & China) –Traditional planning principles in India – Vernacular architecture of India – approaches & concepts – Classical & Medieval planning in Europe - Evolution of modern planning concepts – Garden city concept, Neighbour hood concept, Geddesian triad, etc.
- Elements of Human settlements – functions & linkages, Structure & form
- Urban Planning & Renewal.
- DCR
- Issues in contemporary Urban planning.

UNIT – II: Urban Studies – Urban Design, Urban Housing & Conservation

- Urban Design – need, aspects, scope & components of urban space - Historic urban form of Greek, Roman, Medieval, Renaissance, Modern & post-modern periods-Indian Urbanism – temple towns, Mughal city form, medieval cities, colonial urbanism, planned capital cities Theorizing & Reading urban space – Imageability & townscape elements, genius loci, collective memory, historic reading of the city & its artefacts by Rossi, social aspects of urban space, gender & class, contribution of Jane Jacobs, William Whyte - Issues of Urban space.
- Housing issues in the Indian Context, Socio-Economic aspects, Housing Standards, Site Planning & Housing Design, Housing Process.
- Conservation – Definition, understanding the need & purpose, Adaptive re-use, International agencies & their role in conservation - Conservation In India – Role of ASI & INTACH – policies & legislations, case studies – craft issues – Conservation practice – listing, documenting, assessing architectural character, structure report & developing guidelines – Urban Conservation – Conservation Planning – Heritage tourism.

UNIT – III: Environmental Studies, Site Planning & Landscape Ecology

- Environment, Ecosystems & bio-diversity – Environmental Pollution, Human population & social issues with relation to the environment – Environmental laws in India.
- Site Planning – Introduction to basic terminologies, Methods of surveying, Instruments & Application, Leveling, Site Drawings, Importance of Site Analysis – On-site & off-site factors, Study of micro climate, Site Diagramming, Site Context, Site planning & Site layout principles.
- Introduction to Landscape Architecture – Elements of Landscape Design – plant material, water & forms, Garden Design – Japanese, Italian Renaissance & Mughal, Site Planning – Organisation of spaces – circulation, built form and open spaces, site planning and micro climate, site planning for neighborhood parks, children's play area and campus development – Landscaping of Functional areas – Urban open spaces and principle of urban landscape – Street landscaping, landscape design for waterfront areas and functional areas in urban centers – green roofs and walls – Street lighting.

19. Basics of Engineering (Degree Standard)

Subject Code: 422

Unit-I: Mathematics

Matrices: Eigenvalues - Eigenvectors of a real matrix - Cayley - Hamilton theorem - Similar and Orthogonal transformations - Reduction of a quadratic form to Canonical form by orthogonal transformation. Ordinary differential equations: Order and degree - Higher order linear ODE with constant coefficients - Method of undetermined coefficients - Method of variation of parameters - Cauchy's and Legendre's linear equations. Functions of several variables: Partial derivatives - Total derivatives - Euler's theorem - Implicit functions - Jacobians - Taylor's theorem - Maxima and Minima. Integration: Definite and indefinite Integrals - Techniques of integration using integration by parts and Trigonometric Integrals - Double Integrals - Change of order of integration - Volume Integrals. Vector Calculus: Vectors and scalars - Gradient and Directional derivatives - Divergence and Curl - Applications of Green's theorem, Gauss divergence theorem and Stoke's theorem. Complex variables: Analytic functions - Verification of Analyticity - Construction of Analytic functions - Conformal Mappings - Bilinear transformations. Complex Integration: Cauchy's integral theorem - Cauchy's fundamental theorem - Cauchy's residue theorem - Taylor's and Laurent's series - Contour integration (excluding poles on the real axis). Laplace transform: Existence of Laplace transform - Laplace transform of elementary functions- Properties - Laplace transform of Periodic functions - Inverse Laplace transform - Convolution theorem - Solution of linear second order ODE by Laplace transform technique.

Unit-II: Engineering Physics

Mechanics: Newton's laws of motion – gravitation – work, energy and power - Properties of matter : Elasticity – moduli of elasticity - Sound : intensity level – reverberation – Ultrasonics : production, detection and applications - Thermal Physics : Thermal expansion - thermal stress - expansion joints - bimetallic strips - thermal conductivity- heat conduction in solids – flow of heat through compound media – Thermodynamics – Laws of thermodynamics – Carnot engine - Applied Optics : Interference – Young's double slit experiment - anti-reflection coatings - Diffraction - Lasers – principle and applications – CO₂ and Nd:YAG laser - semiconductor lasers – applications of Lasers – Optical fibres: classification (index & mode based) - principle and propagation of light in optical fibres - acceptance angle and numerical aperture - fibre optic communication system - Quantum Physics : Photoelectric effect– dual nature of matter and radiation – Heisenberg's uncertainty principle - Schrödinger's wave equation - Physics of Materials : Crystal structures – unit cell – packing factor – Superconductivity : Properties and applications - Magnetisation of matter: Magnetic dipole moment – atomic magnetic moments- magnetic permeability and susceptibility - Magnetic material classification : diamagnetism –

paramagnetism – ferromagnetism – Semiconductors : Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap - extrinsic semiconductors – Dielectric materials: Matter polarization and relative permittivity - dipole moment and polarization vector -polarization mechanisms: electronic, ionic, orientational, interfacial and total polarization- frequency dependence - dielectric strength and break-down in gases, liquids and solids.

Unit-III: Engineering Chemistry

Fuel - Classification of fuels - Calorific value - Solid fuel - Liquid fuel - Gaseous fuel - Octane number - Cetane Number -Lubricants - Classification - Greases - Solid Lubricants. Water - Sources - Classifications - Softening process - Desalination - RO Method - Internal treatment - Treatment of Water for Municipal purposes. Plastics - High polymer - classification - Polymerization techniques - Thermoplastics - Thermosetting resins - examples. Rubber -“Types of Rubber - Vulcanisation - Properties-Unvulcanised and Vulcanised. Natural Rubber - Synthetic Rubber - examples. Refractories - Classification - Manufacture of Refractories - Magnesite - Silica - Zirconia -Chromite. Abrasives - Natural - Artificial-Abrasive paper & cloth. Corrosion: Dry and Wet corrosion - Factors affecting corrosion- Different types of corrosion. Productive coating - Hot dipping- metal cladding, electro deposition - Organic Coatings - Paints - Varnishes. Cement and lime- setting and hardening. Explosives- classifications- characteristics-requirements for good explosives- nitrocellulose- TNT- TNB- DNB-PETN- RDX. Alloys- purpose of making alloy- types of alloys- Ferrous alloys. Electrochemistry- conductors and non-conductors - Kohlrausch law - Electrochemical cell- reversible and irreversible cells - EMF - Concentration cell- polarization - over voltage, decomposition potential. Fuel Cells. Nano Chemistry-Basics-distinction between molecules, Nano materials and bulk materials. Size dependent properties and applications of Nano Materials

Unit-IV: Basics of Computer Engineering

Computer Organisation - CPU and Microprocessor [ALU, Control Unit and Bus Structure] - Data Storage [Primary, Secondary and Virtual] - Input and Output Devices.

System Software - Assembler - Compiler - Loader - Linker - Operating Systems.

Programming Languages - Classification of Programming Language, Algorithm, Flow chart, Pseudo code, High-Level Languages – Fundamental concepts of C Programming.

Basic Computer Networking - Network Components [Routers, Bridges, Gateways] - ISO-OSI Reference Model - LAN - WAN - Client-Server Architecture - Internet - World Wide Web.

Applications - Office Tools - Word processor - Spreadsheet - Power point - Introduction to Database concepts - E-mail - Browser.

IT Enabled Services - E-Governance - E-Commerce - Multimedia.

Unit-V: Basics of Civil and Mechanical Engineering

Introduction to Engineering mechanics - Units and Dimensions - Laws of Mechanics - Coplanar Forces - Static Equilibrium of Rigid body - Moment of force - free body diagram - friction - laws of friction - sliding friction - wedge friction - Rolling resistance - Lader friction - Friction in screws - Screw jack - Belt friction - Properties of surfaces and solids - Centroids and centre of mass - line and areas - Rectangular, circular, triangular areas by integration - T-section, I- Section, Angle section, Hollow section - Area moment of inertia of plane areas - Parallel axis theorem – Perpendicular axis theorem, Polar moment of Inertia, Principle moment of Inertia Mass moment of inertia- Centroid of the simple solids - Dynamics of particle - Displacement, velocity and acceleration - Different types of motion - Rectilinear , Curvilinear and Projectile motions - Newton’s II-law of motion - Work Energy equation - Impulse and momentum principles.

Unit-VI: Basics of Electrical and Electronics Engineering

Ohm's law – krchoff's laws – introduction to DC and AC circuits - single phase and three phase circuits – Power and Power factor, Unbalanced and Balanced loads, Operating principles of moving coil and moving iron instruments (voltmeters and ammeters) – wattmeters, multimeter, energy meters and megger, Construction and principle of operation: DC motors- DC generators-Transformers- Induction motors, Characteristics of PN junction diode - zener diode- half wave and full wave rectifiers - Bipolar junction transistor (CC,CE,CB configurations), SCR, Amplifiers- Operational amplifiers – Inverting and Non-inverting amplifiers, Binary number system- logic gates- Boolean algebra - Half and full adders-Flip-flops - registers and counters- A/D and D/A conversion, Types of analog and digital signals- Modulation and Demodulation(amplitude and frequency) Communication systems: Radio- TV- Fax- Microwave- Satellite and optical fibre.

Unit-VII: Principles of Management

Management - Definition, Evolution of Management Philosophies, Types of Business, Environment Analysis - Planning- Types, Steps, Forecasting, MBO, MBE. Organizing – Departmentation, Line and Staff Authority, Delegation and Decentralization. Staffing - Manpower Planning, Recruitment and Selection, Training, Performance Appraisal. Directing – Theories of Motivation, Leadership Styles, Power and Politics, Change Management, Conflict Management, Communication in Business- Controlling Types, Control Techniques, Budgetary and Non-Budgetary Control.

Unit-VIII: Total Quality Management

Quality – Definitions, Vision, Mission and Policy statements-Dimensions of Product and Service Quality- Contributions of Quality Gurus-Deming, Juran, Crosby, Masaaki Imai, Feigenbaum, Ishikawa. Costs of Quality- Continuous Process Improvement- PDCA, Quality Circle, 5S, Kaizen-Statistical Process Control (SPC), 7QC Tools, New Management Tools of Quality, Bench Marking, 6 sigma, Quality Function Deployment (QFD), POKAYOKE, Total Productive Maintenance (TPM), Business Process Reengineering (BPR), Quality Certifications.

Unit-IX: Environmental Science and Engineering

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ. Environmental pollution: Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Energy management and conservation, New Energy Sources - Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy. Sustainability and management - Development , GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols-Sustainable Development Goals-targets, indicators and intervention areas. Climate change- Global, Regional and local environmental issues and possible solutions. Concept of Carbon Credit Carbon Footprint. Environmental management in industry- Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socio-economical and technological change.

20. Stenography in English (Diploma Standard)

Subject Code: 378

Unit - I

1. Importance of Stenography
2. Consonants
3. Grammalogues
4. Phraseography
5. Circles and Loops
6. Initial and Final Hooks

Unit - II

1. Compound Consonants
2. The Halving Principle
3. The Doubling Principle
4. Medial Semicircle

Unit - III

1. Prefixes and Negative words
2. Suffixes and Terminations
3. Contractions
4. Special Contractions

Unit - IV

1. Advanced Phraseography
2. Intersections
3. Usage of Political Phrases
4. Usage of Legal Phrases

Unit - V

1. Note-taking and Transcription
2. Legislature Reporting
3. Techniques for improving Speed

அலகு 1

- 1 சுருக்கெழுத்தின் முக்கியத்துவம்
- 2 மெய்யெழுத்துக்கள்
- 3 தனிக்குறிச் சொற்கள்
- 4 சொற்றொடரியல்
- 5 வட்டங்கள் மற்றும் சுழிகள்
- 6 ஆரம்ப மற்றும் இறுதி கொக்கிகள்

அலகு 2

- 1 கூட்டு மெய்கள்
- 2 பாதியாக்கும் முறை
- 3 இரட்டிப்பு முறை
- 4 நடு அரைவட்டம்

அலகு 3

- 1 முன்னொட்டுகள் மற்றும் எதிர்மறை சொற்கள்
- 2 பின்னொட்டுகள் மற்றும் இறுதி வார்த்தைகள்
- 3 சுருக்கங்கள்
- 4 சிறப்புச் சுருக்கங்கள்

அலகு 4

- 1 மேம்பட்ட சொற்றொடரியல்
- 2 வெட்டும் முறை
- 3 அரசியல் சொற்றொடர்களின் பயன்பாடு
- 4 சட்ட சொற்றொடர்களின் பயன்பாடு

அலகு 5

- 1 குறிப்பெடுத்தல் மற்றும் விரிவாக்கம் செய்தல்
- 2 சட்டமன்றம்-குறிப்பெடுத்தல்
- 3 வேகத்தை மேம்படுத்துவதற்கான நுட்பங்கள்