



nuclear forces. Deuteron problem. Evidence of shell structure, single-particle shell model, its validity and limitations. Rotational spectra. Elementary ideas of alpha, beta and gamma decays and their selection rules. Fission and Fusion. Nuclear reactions, reaction mechanisms, compound nuclei and direct reactions. Classification of fundamental forces. Elementary particles and their quantum numbers(charge, spin, parity, isospin, strangeness, etc.). Gellmann-Nishijima formula. Quark model, baryons and mesons. C, P and T invariance. Application of symmetry arguments to particle reactions. Parity non- conservation in weak interaction. Relativistic kinematics.

Unit V

Condensed Matter Physics

- Bravais Lattices, Reciprocal lattice, Diffraction and the structure factor. Bonding of solids, Elastic properties, phonons, lattice specific heat. Free electron theory and electronic specific heat. Response and relaxation phenomena. Drude model of electrical and thermal conductivity. Hall effect and thermoelectric power. Electron motion in a periodic potential, band theory of solids: metals, insulators and semiconductors, First and second order phase transitions. Diamagnetism, Paramagnetism and ferromagnetism, Superconductivity: type1 and type 2 superconductors, Josephson junctions. Superfluidity. Defects and dislocations Ordered phases of matter: translational and orientational order, kinds of liquid crystalline order. Quasi crystals.

Unit VI

Electronics

- Semiconductor devices (diodes, junctions, transistors, field effect devices, homo and

hetero- junction devices). Transistor amplifiers and oscillators, device structure, device characteristics, frequency dependence and applications. Opto-electronic devices (solar cells, photo-detectors, LEDs). Operational amplifiers and their applications. Digital techniques and applications (registers, counters, comparators and similar circuits). A/D and D/A converters. Microprocessor and microcontroller basics. Data interpretation and analysis. Precision and accuracy. Error analysis, propagation of errors. Least squares fitting.

25. Political Sciences

Unit I

Modern Political Analysis

Module 1. Political Science : Nature and Development

- Evolution of Political Science as a Discipline –Ancient, Modern and Contemporary Developments
- Classical and Normative Approaches
- Positivism [Behavioralism and Post - behaviouralism]
- Liberal and Neo-liberal -Marxian and Post/ Neo-marxian approaches

Module 2. Substance of Political Science

- State, Power, Authority, Legitimacy, Civil Society, Identity Politics [Caste, Gender and Religion]

Module 3. Positivist Theories

- System Analysis [David Easton]-Structural Functional Analysis [Gabriel Almond]-Communication Theory [Karl Deutsch]

Module 4. Theories of Democracy

- Elite Theory [Pareto, Mosca, Michels and Sartori]-Pluralism [Dahl]-
- Participatory and Deliberative Democracy - Public Sphere [Habermas]

Module 5. Political Culture and Political Socialization

State Eligibility Test - Syllabus 2016



Module 6. Political Development, Modernization and Political Decay

Unit II Political Thought

Module 1. Ancient Greek Political Thought

- Plato and Aristotle

Module 2. Political Liberalism

- Machiavelli, Thomas Hobbes, John Locke, J.J.Rousseau, Jeremy Bentham, J.S.Mill, G.W.F. Hegel and T.H.Green

Module 3. Contemporary Liberalism

- John Rawls and Robert Nozick

Module 4. Marxian Tradition

- Karl Marx, V.I. Lenin, Mao Tse - tung and Antonio Gramsci

Module 5. Contemporary Marxism

- Louis Althusser and Nicos Paulantzas

Module 6. Critical Theory

- Theodore Adorno and Jürgen Habermas

Module 7. Indian Political Thought

- Kautilya, M.K.Gandhi, M.N. Roy, Ram Manohar Lohia and B.R.Ambedkar

Unit III Indian Government and Politics

Module 1. Historical Antecedents and Ideological Base of Indian Constitution

- National Movement-Constitutional Developments-Nature and Composition of the Constituent Assembly-Ideological Base: Preamble, Fundamental Rights and Directive Principles.

Module 2. State and Individual

- Fundamental Rights – Directive Principles of State Policy-Globalization and Changing Nature of State-Individual Relationship

Module 3. Structure and Power

- Union Executive and Legislature: President-Prime Minister-Council of Ministers-Parliament

- State Executive and Legislature: Governor-Chief Minister – Council of Ministers-Legislature.

Module 4. Federalism and Issues in Centre-State Relations

- Nature and Constitutional Provisions of Indian Federalism-Centre State Relations
- Contentious Areas -Demand for State Autonomy-Emerging Trends-Need for Restructuring Centre – State Relations

Module 5. Secularism : Theory and Practice

- Secularism: Nature- Constitutional Provisions-Challenges
- Communalism and Communal Politics

Module 6. Party System and Electoral Politics

- Evolution, Nature and Growth of Indian Party System – Ideology, Social Base and Electoral Performance of B.J.P, Indian National Congress, Left Parties: CPI (M) and CPI-Emergence and Growth of Regional Parties- Coalition Politics- Election Commission-Electoral Behavior-Trends in Participation –Electoral Reforms

Module 7. Judiciary

- Nature and Structure: High Courts –Supreme Court-Judicial Independence-Judicial Review-Judicial Activism and Public Interest Litigation-Judicial Reforms

Module 8. Caste, Class, Gender and the Quest for Social Justice

- Caste and Identity Politics- Class and Politics: Changing Nature
- Marginalized Social Groups: Women-Children-Minorities-Scheduled Castes and Scheduled Tribes

Module 9. State and Political Economy of Development

- State and Development –Nehruvian Model of Development-Planning-Agrarian Issues-Economic Liberalization and Emerging Paradigm of Development-Changing Nature of Indian State



Module 10. Grass root Democracy

- Evolution and Growth-73rd and 74th Constitutional Amendments -Structure, Powers and Functions -Role of PRIs in Democratization and Rural Development

Unit IV Comparative Politics

Module 1. Comparative Politics: Nature and Theories

- Meaning, Nature and Evolution
- System Theories, Cultural Theories, Modernisation Theory, Dependency Theories and Class Theories

Module 2. Constitutionalism and Forms of Political Systems

- U.K, U.S.A, France, China, Canada and India
- Comparative Federalism (U.S.A, Canada and India)

Module 3. Political Structures and Governance (U.K, U.S.A, France, China, and India)

- Legislature-Judiciary- Executive- Bureaucracy - Separation of Powers - Checks and Balances

Module 4. State and Individual

- Rights and Liberties - Comparative Analysis (U.S.A, China and India)
- Multiculturalism (U.S.A, India and France)

Module 5. Party System and Electoral Process

- Political Participation, Parties and Party Systems- Interest Groups

Module 6. Problems of Nation Building in Developing Countries

- Socio Economic Issues in Nation Building (India, Brazil and Nigeria)

Unit V International Relations

Module 1. Theories and Approaches to the Study of International Relations

- Realism-Neo-realism - Structural Realism - Offensive and Defensive Realism- Idealism/ Liberalism- Neo-liberalism - Institutional Liberalism -Constructivism- System Theory- Game Theory- Communication Theory- Decision Making Theory and Dependency Theory.

Module 2. Changing Nature of Nation State

- Westphalia to contemporary times- Impact of Globalization and Information Revolution on State - Non-state Actors- Global Civil Society- International System and Global Governance.

Module 3. Power: National Interest, Ideology, and Foreign Policy

- Elements and Determinants of Power- Acquisition, use and Limitations of Power- Formulation and Promotion of National Interest- Meaning and Relevance of Ideology in International Relations- Determinants of Foreign Policy

Module 4. War and Conflict

- Types and Significance of War- Arms race- Arms control and Disarmament- NPT, CTBT, FMCT

Module 5. Approaches to Peace

- Conflict Resolution- Diplomacy- Balance of Power- Collective Security- International Law and Treaties.

Module 6. International and Regional Institutions

- UN- Origin, Growth, Provisions and Practices - Power Struggle within the UN- Reform of the UN- Regional Organizations: SAARC- ASEAN- BRICS

Module 7. International Political Economy

- North-South and South-South Cooperation, IMF, WTO and Asian Infrastructure Investment Bank (AIIB)

Module 8. Contemporary Issues in International Relations



- Terrorism- Religious - Fundamentalism- Environment and Climate Change- Human Rights- Problems of Democratic Transition (Arab Spring) - Maritime Security and Cyber Security

Module 9. Emerging World Order

- Post-cold War Developments and the Changing role of USA and China

Module 10. India in International Relations

- India as a Rising Power- Basic Features, Strategies and New orientations of Foreign Policy- Relationship with Neighbors and Big powers- USA, China and Russia.

Unit VI

Public Administration

Module 1. Introduction to Public Administration

- Meaning, Nature, Scope and Significance of Public Administration-Evolution of Public Administration- New Public Administration-New Public and Private Management

Module 2. Theories of Administration

- Scientific Management - Classical - Bureaucratic - Human Relations - Decision Making

Module 3. Approaches to Public Administration

- Structural- Functional - Behavioural - Systems - Public Choice - Ecological

Module 4. Contemporary Discourse in Public Administration

- Entrepreneurial Government- Theories of Governance - Concept of People's Participation in Administration- Development Policy and Administration

Module 5. Personnel Administration

- Recruitment- Training- Promotion- Discipline- Morale-
- Employer- Employee Relationship
- UPSC-Structures, Powers and Functions

Module 6. Principles of Organization

- Line and Staff- Unity of Command- Hierarchy - Span of Control-Centralization and Decentralization-Types of Organization- Formal and Informal Forms of Organization- Department-Public Corporation and Board

Module 7. Bureaucracy

- Theories, Types and Role- Max Weber and his Critics- Civil Servant-Minister relationship

Module 8. Financial administration

- Principles of Budget- Types of Budget- Budgetary Process- Audit- Control over Finance with Special Reference to India.

Module 9. Good governance

- Transparency and Accountability- Right to Information, ICT and Good Governance - Grievances and Redressal institutions: Ombudsman- Lokpal and lokayukta

26. Psychology

Unit I

Cognitive Processes

Module 1. Attention

- Consciousness and attention: Preconscious processing; Controlled and Automatic processes
- Functions of attention: Signal detection, Vigilance, Selective attention, Divided attention, Sustained attention and Alternating attention
- Models of attention: Selection models of attention (Early filtertheory, Attenuated filtertheory, Late filter theory, Multimode theory); Capacity model (Attention resources theory, Multiple resource model).
- Physiological basis of attention

Module 2. Perception

- Nature of perception: Perceptual organization and constancies; Depth perception; Viewer, Person and Landmark centered approaches to form perception