PhD syllabus

Disaster Management

Understanding of key concepts in Disasters Management: Hazards, Disasters, Vulnerability, Resilience, Disaster Management, Disaster Cycle etc – Brief history of disaster management in India and world- The emerging field of disaster management- Role of social sciences and natural sciences and multidisciplinary nature of disaster management as applied disciplines Different typologies and classification of disasters, cataclysmic – slow-onset, natural-manmade etc- Critique of different classifications, what magnitude constitutes a "disaster" for the Government. Consequences and impact of disasters; Flood, cyclones, tsunamis, earthquakes, landslides, volcanic eruption, desertification, drought, salinity ingress and its causative mechanisms –Climate change, environmental stress, Biological and Technological disasters – Overview through case studies. Nature of challenges in disaster management for people and environment, Lessons (overview of the field of study and nature of functions required of different professionals learnt, Role of disaster management in contemporary times). Institutional framework of Disaster management in India. Early warning systems, Overview of all disasters.

Geology

Igneous, sedimentary and metamorphic rocks, origin-Characteristics of igneous, sedimentary and metamorphic rocks, rock structures-fold-fault-fractures-joints, plate tectonic concepts and different plate boundaries

Physics

Physical World, Units and Measurements, Motions in a Straight Line, Motion in a Plane, Laws of Motion, Work, Energy and Power, System of Particles and Rotational Motion, Gravitation. Mechanical Properties of Solid, Mechanical Properties of Fluids, Thermal Properties of Matter, Thermodynamics, Kinetic Theory, Oscillations, Waves. Electric charges & fields, Electrostatic potential & capacitance, current electricity, moving charges & magnetism, magnetism & matter, Electro magnetic induction, alternating current, electro magnetic waves. Ray optics & optical instruments, wave optic, dual nature of radiation & matter, atom, nuclei, semi conductor electronics (materials, devices & simple circuit), communication systems. Application of physical concepts in Earth and Environmental related problems.

Chemistry

Basic concept of chemistry, structure of atom, classification of elements & periodicity in properties, chemical bonding & nuclear structure, states of matter, thermodynamics, equilibrium. Solid state, solutions, elector chemistry, chemical kinetics, surface chemistry, general principles & processes of isolation of elements, the p-block elements, d & f block elements, coordinate compounds. Redox Reactions, Hydrogen, The s-Block Elements, The p-Block Elements, Organic Chemistry – Some Basic Principles and Techniques, Hydrocarbons, Environmental Chemistry.

Haloalkanes and Haloarenes, Alcohols, Phenols and Ethers, Aldehydes,Ketones and Carboxylic Acids, Amines, Biomolecules, Polymers, Chemistry in Everyday life, Chemical disasters, Geochemical concepts, chemistry in water analysis, chemistry in pollution studies.

Biology

Diversity in the Living World, Structural Organisation in Plants and Animals, Structure and Functions, Plant Physiology and Human Physiology. Reproduction, Genetics & Evolution, Biology in Human welfare, Biotechnology, Ecology. Biological disasters