# Syllabus:

# Ph. D.

**ESE-901: Current Environmental Issues & trends**

1. Global Environmental Issues: Climate Change, Ozone layer depletion, Biodiversity Conservation
2. National Environmental issues: Water Pollution Management, Air Pollution,Vehicular pollution management, E-waste, Desertification Issues, Wild Life and Forest Management
3. Industrial Ecology
4. National Environmental Policy
5. Ecomark Scheme
6. ISO 14000
7. Carbon Trading
8. Bioprospecting
9. Biopiracy

**ESE-902: Bioremediation.**

1. Bioremediation of Polluted sites– role of microbes & plants; microbial degradation of environmental pollutants; Bioremediation practices & technologies.
2. Molecular basis of bioremediation process, molecular research techniques, biomarkers, biosensors
3. Biosorption; Microbial biosorption; Mechanisms of biosorption & bioaccumulation; Chemical and physical aspects of sorption process.
4. Phytoremediation: Mechanisms & techniques of Phytoremediation.
5. Degradation of lignocellulosic compounds, anaerobic treatment for biogas generation;
6. Waste Water Treatment: Aerobic & Anaerobic

**ESE-903: Environmental Geomicrobiology & Phycotechnology**.

1. Frontier research areas in Earth Sciences; Rocks– Origin & composition; Rock and sediment chemical analysis; Petrography; Instrumentation in geochemical analysis (AAS, XRF, ICP ).
2. Geomicrobiology – Basic concepts and techniques, FISH, Geomicrobiology of Carbonates.
3. Phycotechnology applications– Culturing & preservation techniques; Biopolymers; Accessory pigments & their functions; Cyanobacterial biofertilizers; Cryptrobiotic crusts – their environmental significance.
4. Photobiological and fermentative hydrogen production– basic metabolic process & research needs.
5. Bioindicators, bioaccumulators and moderators of pollution