SOLID WASTE MANAGEMENT

1. **Solid Waste Management (SWM)**
- Types of Solid Waste
- Municipal Solid Waste
- Industrial Wastes
- Hazardous Wastes
- Bio Medical Wastes
- E-Waste
- Evolution of SWM
- SWM Rules (CPCB)
- ISWM (Integrated SWM)
- Operation of SWM

2. **Municipal Solid Waste Management (MSWM)**
- Generation
- Composition
- Classification
- Heat Value Calculation
- Density
- Mechanical Properties
- Chemical Properties
- Biodegradability
- Menthols of MSWM

3. **Collection of Solid Waste**
- Process of Collection of Different Wastes
- Recycling of Materials
- Street Management
- Design of the Collection System.

4. **Solid Waste Processing Methods**
- Treatment & Disposal
- Composting
- Biomethanation
- Bio fertilizer & Energy Production
- Incineration & Pyrolysis
- Wet Oxidation
- Palletization
- Waste Management – 3R Principle
- Landfill Rules
- Kitchen Waste (Garbage) Management

5. **Miscellaneous**

- Current Issues in SWM
- PPP Models
- Role of SW Engineering

LIQUID WASTE MANAGEMENT

1. **Liquid Wastes – Municipal, Domestic and Industrial**
    - Character
    - Composition
    - Mass Balance Approach
    - Environmental Systems
2. **Wastewater Engineering**
    - Water on Earth – Analysis
    - Types, Sources & Impacts of Water Pollutants
    - Surface & Ground Water Pollution
    - Domestic Wastewater
    - Agricultural Wastewater
3. **Wastewater Treatment**
    - Unit Operations & Unit Processer
    - Preliminary, Primary, Secondary and Tertiary Treatment which includes
    - Screening, Grit Removal, Scum Removal PST, Biological Unit, SST and others
    - Design and Analysis Concepts
    - Nature and kinetics of Biological Growth
    - Aerobic and Anaerobic Biological Processes like CSTR, ASP
    - Trickling Filter, RBC, BT, UASB, Oxidation Ponds, Anaerobic Filters, AOI Gas Stripping and Others
4. **Water Reuse**
    - Reclamation & Reuse Principles
    - Technologies of Reclamation
    - Flow Diagrams
    - Public Health & Environmental Issues in water Reuse
    - Agricultural Irrigation Principles
    - Landscape Irrigation Principles
    - Ground Water Recharge (Process, Criteria and Guidelines)
    - Industrial water Reuse Criteria's
    - Cooling Tower

HAZARDOUS WASTE MANAGEMENT

1. **Introduction to HMW (CPCB)**
    - Definition & Classification
    - Sources & Responsibilities
    - Terminologies used in HWM
    - Storage and Collection
    - Issues with HWM
    - Protection of Public Health and Environment

2. **Biomedical & Chemical Water (CPCB)**
    - Types, Management and Handling
    - Control of Biomedical Wastes
    - Control of Chemical Wastes
    - Sources of Biomedical & Chemical Wastes
    - Environmental Effects
    - Treatment and disposal Techniques
    - Health Effects
3. **Treatment Methods**
    - Physical & Chemical Methods Such as Filtration, Separation, Chemical
    - Precipitation, Oxidation & Reduction, Ozonation, Evaporation, Solidification and Stabilization
    - Remedial Action
    - Containment Techniques
    - Biological Treatment of HW
    - Phytoremediation
    - Bio filtration

WASTE MANAGEMENT RULES, REGULATION & COMPLIANCES (CPCB)

1. Rules, Regulation and Compliances for Hazardous Waste Management
2. Rules, Regulations and Compliances for E-Waste Management
3. Rules, Regulation and Compliances for Municipal Solid Waste Management
4. Rules, Regulation and Compliances for Bio-medical Waste
5. Rules, Regulations and Compliances for Plastic Waste
6. Rules, Regulations and Compliances for Batteries Waste
7. Rules, Regulations and Compliances for Construction and Demolition Waste

ENVIRONMENTAL MANAGEMENT

1. **Environmental Impact Assessment**
2. **BPCS Norms, Regulations and Compliances.**
3. **Environmental Clearances.**

Level and Syllabus:

Level of papers will be such as the syllabus of Bachelor Degree in Chemistry/Environmental Science or, Bachelor of Engineering in chemical/ Civil/ Environmental Science/ Public Health Engineering/ Bio Technology or Bachelor Degree in Planning/Architecture of Indian University as expedient.
(A) Compulsory Paper-I