Environmental Engineering

Application of science and engineering principles in order to enhance the natural environment

Water requirements:
- Need of water for various purposes. It includes topics-Quality Standards, Basic Unit Operations and Processes for Water Treatment. Drinking Water Standards, Basic Unit Operations and Unit Processes for Surface Water Treatment, Distribution of Water, Water Requirements. Sewage and Sewerage Treatment, Characteristics and Quantity of Waste water. Secondary, Primary and Tertiary Treatment of Waste water, Effluent Discharge Standards, Sludge Disposal. Domestic Waste water Treatment, Quantity of Characteristics of Domestic Waste water, Secondary and Primary Treatment Unit Operations and Unit Processes of Domestic Waste water, Sludge Disposal.

Air Pollution:
- Introduction of particulate matter into the air to pollute it. It includes topics-Types of Pollutants, their impacts and sources, Air Pollution Meteorology, Air Quality Standards and Limits, Air Pollution Control.

Municipal Solid Wastes:
- Waste or garbage that consists of everyday discarded materials. It includes topics-Generation, Characteristics, Collection and Transportation of Solid Wastes, Engineered Systems for Solid Waste Management (Recycle/ Reuse, Treatment, Energy Recovery and Disposal).

Noise Pollution:
- Excess noise that creates disturbance in the activities of human or animal life. It includes topics- Permissible Limits of Noise Pollution, Impacts of Noise, Measurement of Noise and Control of Noise Pollution.

Engineering Mathematics (As per Gate Syallabus)

- **Linear Algebra:** Matrix algebra, Systems of linear equations, Eigen values and eigenvectors.
- **Calculus:** Functions of single variable, Limit, continuity and differentiability, Mean value theorems, Evaluation of definite and improper integrals, Partial derivatives, Total derivative, Maxima and minima, Gradient, Divergence and Curl, Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems.
- **Differential equations:** First order equations (linear and nonlinear), Higher order linear differential equations with constant coefficients, Cauchy's and Euler's equations, Initial and boundary value problems, Laplace transforms, Solutions of one dimensional heat and wave equations and Laplace equation.
- **Complex variables:** Analytic functions, Cauchy's integral theorem, Taylor and Laurent series.

- **Probability and Statistics:** Definitions of probability and sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Poisson, Normal and Binomial distributions.
- **Numerical Methods:** Numerical solutions of linear and non-linear algebraic equations Integration by trapezoidal and Simpson's rule, single and multi-step methods for differential equations.