

Syllabus M201

Module-I

Exact equations, Necessary and Sufficient condition of exactness of a first order and first degree ODE
Rules for finding Integrating factors,
Linear equation, Bernoulli's equation.
General solution of ODE of first order and higher degree (different forms with special reference to Clairaut's equation)

Module-II

General linear ODE of order two with constant coefficients,
C.F. & P.I., D-operator methods for finding P.I.
Method of variation of parameters,
Cauchy-Euler equations,
Solution of simultaneous linear differential equations.

Module-III

Introduction of Graphs, Digraphs,
Weighted graph, Connected and disconnected graphs
Complement of a graph, Regular graph, Complete graph, Subgraph;
Walks, Paths, Circuits, Euler Graph,
Cut sets and cut vertices,
Matrix representation of a graph, Adjacency and incidence matrices of a graph,
Graph isomorphism, Bipartite graph.
Discussion of related problems

Module-IV

Definition and properties of tree, Binary tree
Spanning tree of a graph, Minimal spanning tree, properties of trees,
Dijkstra's Algorithm for shortest path problem
Determination of minimal spanning tree using DFS, BFS, Kruskal's and Prim's algorithms.
Discussion of related problems

Module-V

Basic ideas of improper integrals,
Discussion of different form of improper integrals
working knowledge of Beta and Gamma functions (convergence to be assumed) and their interrelations. Related problems
Definition and existence of LT, LT of elementary functions, First and second shifting properties, Change of scale property; LT.
LT of $\frac{f(t)}{t}$. LT of $t^n f(t)$.
LT of derivative $f(t)$ and $\int f(t)dt$.
Discussion of related Problems

Evaluation of improper integrals using LT, LT of periodic and step functions,
Inverse LT: Definition and its properties;
Convolution Theorem (statement only) and its application to the

evaluation of inverse LT,

Solution of linear ODE with constant coefficients (initial value problem) using inverse LT

Discussion of related problems