

Syllabus of lectures:

1. Introduction to indefinite integral, basic properties, elementary functions integration, integration by parts, integration by substitution.
2. Rational functions integration, partial fraction technique.
3. Integration of trigonometric functions, combined techniques of integration.
4. Introduction to definite integral, simple geometrical applications (area, volume of rotational bodies, curve length).
5. Improper integral, introduction to differential equations, general solution.
6. Differential equations, initial value problem for ODEs, 1st order ODE with separable variables, linear 1st order ODEs homogenous and non-homogenous, method of variation of constant, homogenous ODEs (substitution  $z=y/x$ ).
7. nth order linear ODEs with constant coefficients and their solution.
8. Double integral, introduction and elementary methods of its calculating.
9. Jacobian and substitution in double integral, polar coordinates, geometrical applications of double integral.
10. Laplace transform- definition, properties and examples.
11. Inverse Laplace transform, application of Laplace transform for solving IVP for homogenous and non-homogenous nth order linear ODEs with constant coefficients.
12. Z-transform - definition, properties and examples.
13. Inverse Z-transform, Test No. 2
14. Z-transform for solving linear difference equations