MATHEMATICS
(SEMESTER 1 –: 60) (SEMESTER 2 – 60 PERIODS)

CHAPTER 1
CALCULUS

1.1 Double integrals

- 1.1.1 Sum of integrals over closed domains a bounded and rectangular partitioned one
- 1.1.2 Geometric significance of a double integral
- 1.1.3 Conditions of the functions integrability over a closed bounded and rectangular domain
- 1.1.4 The rules of calculation by using simple integrals (Fubini's theorem)
- 1.1.5 Properties of double integrals
  - 1.1.5.1 Linearity of the double integral
  - 1.1.5.2 Integrability over the union of two non-overlapping domains
  - 1.1.5.3 Inequalities of double integrals
  - 1.1.5.4 The average theorem
- 1.1.6 Substitutions in double integrals
  - 1.1.6.1 Geometric significance of the Jacobean
  - 1.1.6.2 Double integrals in polar coordinates
  - 1.1.6.3 Approximation of double integrals
- 1.1.7 Geometric and physical applications of double integrals
  - 1.1.7.1 Evaluation of areas into planes
  - 1.1.7.2 Finding volumes into space
  - 1.1.7.3 Calculation of areas into space
  - 1.1.7.4 Finding the masses and locating the centroid of a figure into plane
  - 1.1.7.5 Finding the moments of inertia of figures into planes

1.2 Triple integral

- 1.2.1 Sum of integrals over a closed domain a bounded and cubic, partitioned one
- 1.2.2 Geometric significance of a double integral
- 1.2.3 Conditions of the functions integrability over a closed domain, bounded and cubic partitioned one
- 1.2.4 The rules of calculation by using simple integrals
- 1.2.5 Properties of triple integrals
  - 1.2.5.1 Linearity of triple integrals
  - 1.2.5.2 Integrability over the union of two non-overlapping domains
  - 1.2.5.3 Inequalities of triple integrals
  - 1.2.5.4 The average theorem
- 1.2.6 Substitutions of variables into triple integrals. Geometric significance of a Jacobean
- 1.2.7 Approximations of triple integrals
- 1.2.8 Geometric and physical applications of the triple integrals
  - 1.2.8.1 Calculating volumes into space
  - 1.2.8.2 Calculating masses and locating centroid of solids into space

CHAPTER 2
LINE INTEGRALS AND SURFACE INTEGRALS

2.1 Line integrals

- 2.1.1 Integral of a differential form
  - 2.1.1.1 Definitions, properties and physical interpretation
  - 2.1.1.2 How to calculate a line integral
  - 2.1.1.3 The exact differential forms
  - 2.1.1.4 Determination of scolar potential
  - 2.1.1.5 Integration factors

2.1.1.6 Green formula, application over the Plainfield area
2.1.1.7 Conditions to frame a line integral free from the path, and depend on extremities

2.2 Surface integrals
2.2.1 Definitions, properties
2.2.2 Method of calculation
2.2.3 Relation with double integral
2.2.4 Application: mass and center of mass of a material surface

2.3 Vertical calculus
2.3.1 Stocks formula, vectorial form and physical interpretation
2.3.2 Divergence formula, physical interpretation rotational field

CHAPTER 3
SERIES

3.1 Numerical series
3.1.1 Definition, sum of series, convergence and divergence of a numerical series
3.1.2 The ration test (CAUCHY)
3.1.3 Numerical series with positive terms
3.1.3.1 The ratio tests of convergence (CAUCHY and ALEMBERT)
3.1.3.2 Test of comparison with the series $\sum\left(\frac{1}{n}\right)^{\alpha}$ (RIEMAN test)
3.1.4 Absolutely convergence of series
3.1.5 Convergence tests of a series with no conditions terms
3.1.6 Alternating numerical series, test of LECHNIZ and De DIRICHLET
3.1.7 Operations over numerical series

3.2 Entire series
3.2.1 Definitions, convergence and divergence of the entire series
3.2.2 ABED'S theorem and segment of convergence
3.2.3 Operations over numerical series
3.2.3.1 Sum and product of two entire series
3.2.3.2 Derivation of series and the series of derivative
3.2.4 Development of a function into an entire series, Taylor's series
3.2.5 Entire series into the complex set circle of convergence

CHAPTER 4
DIFFERENTIAL EQUATION

4.1 First order differential equation
4.1.1 Homogeneous equation
4.1.2 Equations who could be changed into a homogeneous equations
4.1.3 Linear first order equations (Bernoulli)
4.1.4 Total differential equations, equations that could be changed into total differential equations
4.1.5 Claimant equation and LaGrange equation
4.1.6 Approximation of differential equations of the first order (method of Euler)

4.2 Differential equations of higher order
4.2.1 Linear homogeneous equations, properties of solutions
4.2.2 Linear homogeneous equations of order n, with constant coefficients
4.2.3 Linear non homogeneous n order equations with constant coefficients

CHAPTER 5
PROBABILITIES

5.1 Notions of probability
5.1.1 Events, probabilities and conditional probability
5.1.2 Formula of total probabilities