

**ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM**

**V SEMESTER  
M 5300 (4)**

**MATHEMATICS**

**TIME: 5 Hrs/Week**

**Ring Theory & Vector Calculus**

**Max. Marks: 100**

**w.e.f 2017-2018**

**SYLLABUS**

**OBJECTIVES :** To enable the students to

- know the principles of abstract algebra .
- understand the theorems and problems.
- Know and understand the definition and theorems of Vector Calculus.
- Apply the theories in every branch of Science and also in commerce.

**COURSE**

**RING THEORY**

**UNIT – 1**

**RINGS-I :**

Definition of Ring and basic properties, Boolean Rings, divisors of zero and cancellation laws Rings, Integral Domains, Division Ring and Fields, The characteristic of a ring - The characteristic of an Integral Domain, The characteristic of a Field. Sub Rings, Ideals

**UNIT – 2**

**RINGS-II :**

Definition of Homomorphism – Homomorphic Image – Elementary Properties of Homomorphism – Kernel of a Homomorphism – Fundamental theorem of Homomorphism – Maximal Ideals – Prime Ideals.

**VECTOR CALCULUS**

**UNIT –3**

**VECTOR DIFFERENTIATION :**

Vector Differentiation, Ordinary derivatives of vectors, Differentiability, Gradient, Divergence, Curl operators, Formulae Involving these operators.

## **UNIT – 4**

### **VECTOR INTEGRATION :**

Line Integral, Surface Integral, Volume integral with examples.

## **UNIT – 5**

### **VECTOR INTEGRATION APPLICATIONS :-**

Theorems of Gauss and Stokes, Green's theorem in plane and applications of these theorems.

**Prescribed Text Book :** A Text of Mathematics B.Sc. Mathematics Vol – III by S. CHAND Publications(2016)

### **Reference Books :-**

1. Abstract Algebra by J. Fraleigh, Published by Narosa Publishing house. (2006)
2. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi. (2006)
3. A text Book of B.Sc., Mathematics by B.V.S.S.Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi. (2016)
4. Vector Calculus by R. Gupta, Published by Laxmi Publications. (2002)
5. Vector Calculus by P.C. Matthews, Published by Springer Verlag publications. (1998)
6. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.(1996)

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**V SEMESTER  
M 5350 (2)**

**MATHEMATICS**

**TIME: 5 Hrs/Week**

**Ring Theory & Vector Calculus**

**Max. Marks: 100**

**w.e.f 2018-2019**

**PRACTICAL SYLLABUS**

**OBJECTIVES :** To enable the students to

- know the principles of abstract algebra .
- understand the problems and practical knowledge
- Know and understand the definition and problems of Vector Calculus.
- Apply these problems in every branch of Science and also in Commerce.

**COURSE**

**RING THEORY**

**UNIT – 1**

**RINGS-I :**

- Definition of Ring and basic properties
- Boolean Rings, divisors of zero
- Integral Domains, Division Ring and Fields
- The characteristic of a ring
- The characteristic of an Integral Domain
- The characteristic of a Field. Sub Rings, Ideals

**UNIT – 2**

**RINGS-II :**

- Definition of Homomorphism
- Homomorphic Image
- Kernel of a Homomorphism
- Fundamental theorem of Homomorphism
- Maximal Ideals , Prime Ideals.

## VECTOR CALCULUS

### UNIT –3

#### VECTOR DIFFERENTIATION :

- Vector Differentiation
- Gradient, Divergence, Curl operators
- Formulae Involving these operators.

### UNIT – 4

#### VECTOR INTEGRATION :

- Line Integral
- Surface Integral
- Volume integral with examples.

### UNIT – 5

#### VECTOR INTEGRATION APPLICATIONS :-

Applications of

- Gauss Divergence Theorem
- Stokes Theorem
- Green's Theorem in plane

**Prescribed Text Book :** A Text of Mathematics B.Sc. Mathematics Vol – III by S. CHAND Publications(2016)

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