B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS **(2019-2020)**

SEMESTER – V, PAPER -5

RING THEORY & VECTOR CALCULUS

UNIT – 1 (12 hrs.) RINGS-I: -

60 Hrs.

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 (12 hrs) RINGS-II : -

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

UNIT – 3 (12 hrs) VECTOR DIFFERENTIATION : -

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

UNIT – 4 (12 hrs) VECTOR INTEGRATION : -

Line Integral, Surface Integral, Volume integral with examples.

UNIT – 5 (12 hrs) VECTOR INTEGRATION APPLICATIONS : -

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

Reference Books :-

1. Abstract Algebra by J. Fralieh, Published by Narosa Publishing house.

2. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.

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.

4. Vector Calculus by R. Gupta, Published by Laxmi Publications.

5. Vector Calculus by P.C. Matthews, Published by Springer Verlag publicattions.

6. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Ring theory and its applications

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS **(2019-2020)**

SEMESTER – V, PAPER -6

LINEAR ALGEBRA

60 Hrs

UNIT – I (12 hrs) : Vector Spaces-I :

Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

UNIT – II (12 hrs) : Vector Spaces-II :

Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotientspace.

UNIT – III (12 hrs) : Linear Transformations :

Linear transformations, linear operators, Properties of L.T, sum and product of LTs, Algebra of Linear Operators, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank – Nullity Theorem.

UNIT – IV (12 hrs) : Matrix :

Matrices, Elementary Properties of Matrices, Inverse Matrices, Rank of Matrix, Linear Equations, Characteristic Roots, Characteristic Values & Vectors of square Matrix, Cayley – Hamilton Theorem.

UNIT – V (12 hrs) : Inner product space :

Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle in Inequality, Parallelogram law, Orthogonality, Orthonormal set, complete orthonormal set, Gram – Schmidt orthogonalisation process. Bessel' s inequality and Parseval' s Identity.

Reference Books :

1. Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut- 250002.

2. Matrices by Shanti Narayana, published by S.Chand Publications.

3. Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition), New Delhi.

4. Linear Algebra by Stephen H. Friedberg et al published by Prentice Hall of India Pvt. Ltd. 4th Edition 2007.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on "Applications of Linear algebra Through Computer

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS **(2020-2021)**

SEMESTER – V, PAPER -5

RING THEORY & VECTOR CALCULUS

UNIT – 1 (12 hrs.) RINGS-I: -

60 Hrs

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 (12 hrs) RINGS-II : -

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

UNIT – 3 (12 hrs) VECTOR DIFFERENTIATION : -

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

UNIT – 4 (12 hrs) VECTOR INTEGRATION : -

Line Integral, Surface Integral, Volume integral with examples.

UNIT – 5 (12 hrs) VECTOR INTEGRATION APPLICATIONS : -

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

Reference Books :-

1. Abstract Algebra by J. Fralieh, Published by Narosa Publishing house.
2. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
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.
4. Vector Calculus by R. Gupta, Published by Laxmi Publications.
5. Vector Calculus by P.C. Matthews, Published by Springer Verlag publicattions.
6. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Ring theory and its applications

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS **(2020-2021)**

SEMESTER – V, PAPER -6

LINEAR ALGEBRA

60 Hrs

UNIT – I (12 hrs) : Vector Spaces-I :

Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

UNIT – II (12 hrs) : Vector Spaces-II :

Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotientspace.

UNIT – III (12 hrs) : Linear Transformations :

Linear transformations, linear operators, Properties of L.T, sum and product of LTs, Algebra of Linear Operators, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank – Nullity Theorem.

UNIT – IV (12 hrs) : Matrix :

Matrices, Elementary Properties of Matrices, Inverse Matrices, Rank of Matrix, Linear Equations, Characteristic Roots, Characteristic Values & Vectors of square Matrix, Cayley – Hamilton Theorem.

UNIT – V (12 hrs) : Inner product space :

Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle in Inequality, Parallelogram law, Orthogonality, Orthonormal set, complete orthonormal set, Gram – Schmidt orthogonalisation process. Bessel' s inequality and Parseval' s Identity.

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2. Matrices by Shanti Narayana, published by S.Chand Publications.

3. Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition), New Delhi.

4. Linear Algebra by Stephen H. Friedberg et al published by Prentice Hall of India Pvt. Ltd. 4th Edition 2007.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on "Applications of Linear algebra Through Computer

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS **(2021-2022)**

SEMESTER – V, PAPER -5

RING THEORY & VECTOR CALCULUS

UNIT – 1 (12 hrs) RINGS-I : -

60 Hrs

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 (12 hrs) RINGS-II : -

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

UNIT – 3 (12 hrs) VECTOR DIFFERENTIATION : -

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

UNIT – 4 (12 hrs) VECTOR INTEGRATION : -

Line Integral, Surface Integral, Volume integral with examples.

UNIT – 5 (12 hrs) VECTOR INTEGRATION APPLICATIONS : -

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

Reference Books :-

1. Abstract Algebra by J. Fralieh, Published by Narosa Publishing house.

2. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.

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.

4. Vector Calculus by R. Gupta, Published by Laxmi Publications.

5. Vector Calculus by P.C. Matthews, Published by Springer Verlag publicattions.

6. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Ring theory and its applications

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS **(2021-2022)**

SEMESTER – V, PAPER -6

LINEAR ALGEBRA

60 Hrs

UNIT – I (12 hrs) : Vector Spaces-I :

Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

UNIT – II (12 hrs) : Vector Spaces-II :

Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotientspace.

UNIT – III (12 hrs) : Linear Transformations :

Linear transformations, linear operators, Properties of L.T, sum and product of LTs, Algebra of Linear Operators, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank – Nullity Theorem.

UNIT – IV (12 hrs) : Matrix :

Matrices, Elementary Properties of Matrices, Inverse Matrices, Rank of Matrix, Linear Equations, Characteristic Roots, Characteristic Values & Vectors of square Matrix, Cayley – Hamilton Theorem.

UNIT – V (12 hrs) : Inner product space :

Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle in Inequality, Parallelogram law, Orthogonality, Orthonormal set, complete orthonormal set, Gram – Schmidt orthogonalisation process. Bessel' s inequality and Parseval' s Identity.

Reference Books :

1. Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut- 250002.

2. Matrices by Shanti Narayana, published by S.Chand Publications.

3. Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition), New Delhi.

4. Linear Algebra by Stephen H. Friedberg et al published by Prentice Hall of India Pvt. Ltd. 4th Edition 2007.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on " Applications of Linear algebra Through Computer

A.P. State Council of Higher Education
Semester-wise Revised Syllabus under CBCS, 2020-21
Four-year B.A. /B.Sc. (Hons) Domain Subject: MATHEMATICS
IV Year B.A. /B.Sc.(Hons)– Semester – V (**2022-2023)**

Max Marks: 100

Course-6B: Multiple integrals and applications of Vector calculus
(Skill Enhancement Course (Elective), 5 credits)

I. Learning Outcomes:

Students after successful completion of the course will be able to

1. Learn multiple integrals as a natural extension of definite integral to a function of two variables in the case of double integral / three variables in the case of triple integral.

2. Learn applications in terms of finding surface area by double integral and volume by triple integral.

3. Determine the gradient, divergence and curl of a vector and vector identities.

4. Evaluate line, surface and volume integrals.

5. understand relation between surface and volume integrals (Gauss divergence theorem), relation between line integral and volume integral (Green's theorem), relation between line and surface integral (Stokes theorem)

II. Syllabus: (Hours: Teaching: 75 (incl. unit tests etc.05), Training: 15)

Unit – 1: Multiple integrals-I

(15h)

1. Introduction, Double integrals, Evaluation of double integrals, Properties of double integrals.

2. Region of integration, double integration in Polar Co-ordinates,3. Change of variables in double integrals, change of order of integration.

Unit – 2: Multiple integrals-II

(15h)

1. Triple integral, region of integration, change of variables.

2. Plane areas by double integrals, surface area by double integral.

3. Volume as a double integral, volume as a triple integral.

Unit – 3: Vector differentiation

(15h)

1. Vector differentiation, ordinaryderivatives of vectors.

2. Differentiability, Gradient, Divergence, Curl operators,3. Formulae involving the separators.

Unit – 4: Vector integration

(15h)

1. Line Integrals with examples.

2. Surface Integral with examples.3. Volume integral with examples.

Unit – 5: Vector integration applications

(15h)

1. Gauss theorem and applications of Gauss theorem.

2. Green's theorem in plane and applications of Green's theorem.

3. Stokes's theorem and applications of Stokes theorem.

III. Reference Books:

1. Dr.M Anitha, Linear Algebra and Vector Calculus for Engineer, Spectrum UniversityPress, SR Nagar, Hyderabad-500038, INDIA.

2.Dr.M.Babu Prasad, Dr.K.Krishna Rao, D.Srinivasulu, Y.AdiNarayana, Engineering Mathematics-II, Spectrum University Press, SR Nagar, Hyderabad-500038,INDIA.3. V.Venkateswararao, N. Krishnamurthy, B.V.S.S.Sarma and S.Anjaneya Sastry, A textBook of B.Sc., Mathematics Volume-III, S. Chand & Company, Pvt. Ltd., Ram Nagar,NewDelhi-110055.

4. R.Gupta,Vector Calculus, Laxmi Publications.

5. P.C.Matthews, Vector Calculus, Springer Verlag publications.

6. Web resources suggested by the teacher and college librarian including reading material.

IV. Co-Curricular Activities:

A) Mandatory:

1. For Teacher: Teacher shall train students in the following skills for 15 hours, by taking Relevant outside data (Field/Web).

1. The methods of evaluating double integrals and triple integrals in the class room and train to evaluate

These integrals of different functions over different regions.

2. Applications of line integral, surface integral and volume integral.

3. Applications of Gauss divergence theorem, Green's theorem and Stokes's theorem.

2. For Student: Fieldwork/Project work Each student individually shall undertake Fieldwork/Project work and submit a report not exceeding 10 pages in the given format on the work-done in the areas like the following, by choosing any one of the following aspects.

1. Going through the web sources like Open Educational Resources to find the values of double and triple integrals of specific functions in a given region and make conclusions. (or)

2. Going through the web sources like Open Educational Resources to evaluate line integral, surface integral and volume integral and apply Gauss divergence theorem, Green's theorem and Stokes theorem and make conclusions.

3. Max. Marks for Fieldwork/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work Report: Title page, Student Details, Indexpage,

Stepwise work-done, Findings, Conclusions and Acknowledgements.

4. Unit tests (IE).

b) Suggested Co-Curricular Activities:

1. Assignments/collection of data, Seminar, Quiz, Group discussions/Debates

2. Visits to research organizations, Statistical Cells, Universities, ISI etc.

3. Invited lectures and presentations on related topics by experts in the specified are

V. Suggested Question Paper Pattern:

Max.Marks:75

Time:3 hrs

SECTION – A (Total: 10 Marks)

Very Short Answer Questions (10 Marks: 5x2)

SECTION - B (Total: 5 X 5=25Marks)

(Answer any five questions. Each answer carries 5 Marks)

(At least 1 question should be given from each Unit)

1.

2.

3.

4.

5.

6.

7.

8.

SECTION - C (Total: 5 X 8 = 40 Marks)

(Answer ALL the questions. Each question carries 8 Marks)

1. (a) or (b)

2. (a) or (b)

3. (a) or (b)

4. (a) or (b)

5. (a) or (b)

A.P. State Council of Higher Education
Semester-wise Revised Syllabus under CBCS, 2020-21
Course Code:
Four-year B.A. /B.Sc. (Hons) Domain Subject: MATHEMATICS
IV Year B.A./B.Sc.(Hons)– Semester – V **(2022-2023)**

Max Marks: 100

Course-7B: Integral transforms with applications(Skill Enhancement Course (Elective), 5 credits)

I. Learning Outcomes:

Students after successful completion of the course will be able to

1. Evaluate Laplace transforms of certain functions, find Laplace transforms of derivatives and of integrals.

2. Determine properties of Laplace transform which may be solved by application of special functions namely Dirac delta function, error function, Bessel function and periodic function.

3. Understand properties of inverse Laplace transforms, find inverse Laplace transforms of derivatives and of integrals.

4. Solve ordinary differential equations with constant/ variable coefficients by using Laplace transform method.

5. Comprehend the properties of Fourier transforms and solve problems related to finite Fourier transforms.

II. Syllabus :(Hours: Teaching: 75 (incl. unit tests etc.05), Training: 15)

Unit – 1: Laplace transforms- I

(15h)

1. Definition of Laplace transform, linearity property-piecewise continuous function.

2. Existence of Laplace transform, functions of exponential order and of class A. 3. First shifting theorem, second shifting theorem and change of scale property. Unit – 2: Laplace transforms- II

(15h)

1. Laplace Transform of the derivatives, initial value theorem and final value theorem. Laplace transforms of integrals.

2. Laplace transform of tn. f (t), division by t, evolution of integrals by Laplace transforms.3. Laplace transform of some special functions-namely Dirac delta function, error function, Bessel function and Laplace transform of periodic function.

Unit – 3: Inverse Laplace transforms

(15h)

1. Definition of Inverse Laplace transform, linear property, first shifting theorem, second shifting theorem, change of scale property, use of partial fractions.

2. Inverse Laplace transforms of derivatives, inverse, Laplace transforms of integrals, multiplication by powers of ‘p’, division by ‘p’.

3. Convolution, convolution theorem proof and applications.

Unit – 4: Applications of Laplace transforms

(15h)

1. Solutions of differential equations with constants coefficients, solutions of differential equations with variable coefficients.

2. Applications of Laplace transforms to integral equations- Abel's integral equation.

3. Converting the differential equations into integral equations, converting the integral equations into differential equations.

Unit – 5: Fourier transforms

(15h)

1. Integral transforms, Fourier integral theorem (without proof), Fourier sine and cosine integrals.

2. Properties of Fourier transforms, change of scale property, shifting property, modulation theorem. Convolution.

3. Convolution theorem for Fourier transform, Parseval's Identify, finite Fourier transforms.

III. Reference Books:

1. Dr. S.Sreenadh, S.Ranganatham, Dr.M.V.S.S.N.Prasad, Dr. V.Ramesh Babu, Fourier series and Integral Transforms, S. Chand & Company, Pvt. Ltd., Ram Nagar, New Delhi-110055.2. A.R. Vasistha, Dr. R.K. Gupta, Laplace Transforms, Krishna Prakashan Media Pvt. Ltd.

Meerut.

3. M.D.Raisinghania, H.C. Saxsena , H.K. Dass, Integral Transforms, S. Chand & Company Pvt. Ltd., Ram Nagar, New Delhi-110055.

4. Dr. J.K. Goyal, K.P. Gupta, Laplace and Fourier Transforms, Pragathi Prakashan, Meerut.

5. Shanthi Narayana , P.K. Mittal, A Course of Mathematical Analysis, S. Chand & CompanyPvt.Ltd. Ram Nagar, New Delhi-110055.

6. Web resources suggested by the teacher and college librarian including reading material.

IV. Co-Curricular Activities:A) Mandatory:

1. For Teacher: Teacher shall train students in the following skills for 15 hours, by taking Relevant outside data (Field/Web).

1. Demonstrate on sufficient conditions for the existence of the Laplace transform of a function.

2. Evaluation of Laplace transforms and methods of finding Laplace transforms.

3. Evaluations of Inverse Laplace transforms and methods of finding Inverse Laplacetransforms.

4. Fourier transforms and solutions of integral equations.

2. For Student: Fieldwork/Project work; Each student individually shall undertake Fieldwork/Project work and submit a report not exceeding 10 pages in the given format on the work-done in the areas like the following, by choosing any one of the aspects.

1. Going through the web sources like Open Educational Resources on Applications of Laplace transforms and Inverse Laplace transforms to find solutions of ordinary differential equations with constant /variable coefficients and make conclusions. (or)

2. Going through the web sources like Open Educational Resources on Applications of convolution theorem to solve integral equations and make conclusions. (or)

3. Going through the web source like Open Educational Resources on Applications ofFourier transforms to solve integral equations and make conclusions.

4. Max. Marks for Fieldwork/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work Report: Title page, Student Details, Indexpage,

Stepwise work-done, Findings, Conclusions and Acknowledgements.

5. Unit tests (IE).

b) Suggested Co-Curricular Activities:

1. Assignments/collection of data, Seminar, Quiz, Group discussions/Debates

2. Visits to research organizations, Statistical Cells, Universities, ISI etc.

3. Invited lectures and presentations on related topics by experts in the specified area.

V. Suggested Question Paper Pattern: Max.Marks:75

Time:3 hrs

SECTION – A (Total: 10 Marks)

Very Short Answer Questions (10 Marks: 5x2)

SECTION - B (Total: 5 X 5=25Marks)

(Answer any five questions. Each answer carries 5 Marks)

(At least 1 question should be given from each Unit)

1.

2.

3.

4.

5.

6.

7.

8.

SECTION - C (Total: 5 X 8 = 40 Marks)

(Answer ALL the questions. Each question carries 8 Marks)

1. (a) or (b)

2. (a) or (b)

3. (a) or (b)

4. (a) or (b)

5. (a) or (b)

A.P. State Council of Higher Education
Semester-wise Revised Syllabus under CBCS, 2020-21
Four-year B.A. /B.Sc. (Hons) Domain Subject: MATHEMATICS

V SEMESTER **Max Marks: 100**

Course-6B: Multiple integrals and applications of Vector calculus

(Skill Enhancement Course (Elective), 5 credits)

I. Learning Outcomes:

Students after successful completion of the course will be able to

1. Learn multiple integrals as a natural extension of definite integral to a function of two variables in the case of double integral / three variables in the case of triple integral.

2. Learn applications in terms of finding surface area by double integral and volume by triple integral.

3. Determine the gradient, divergence and curl of a vector and vector identities.

4. Evaluate line, surface and volume integrals.

5. Understand relation between surface and volume integrals (Gauss divergence theorem), relation between line integral and volume integral (Green's theorem), relation between line and surface integral (Stokes theorem)

II. Syllabus: (Hours: Teaching: 75 (incl. unit tests etc.05), Training: 15)

Unit – 1: Multiple integrals-I

(15h)

1. Introduction, Double integrals, Evaluation of double integrals, Properties of double integrals.

2. Region of integration, double integration in Polar Co-ordinates,3. Change of variables in double integrals, change of order of integration.

Unit – 2: Multiple integrals-II

(15h)

1. Triple integral, region of integration, change of variables.

2. Plane areas by double integrals, surface area by double integral.

3. Volume as a double integral, volume as a triple integral.

Unit – 3: Vector differentiation

(15h)

1. Vector differentiation, ordinaryderivatives of vectors.

2. Differentiability, Gradient, Divergence, Curl operators,3. Formulae involving the separators.

Unit – 4: Vector integration

(15h)

1. Line Integrals with examples.

2. Surface Integral with examples.3. Volume integral with examples.

Unit – 5: Vector integration applications

(15h)

1. Gauss theorem and applications of Gauss theorem.

2. Green's theorem in plane and applications of Green's theorem.

3. Stokes's theorem and applications of Stokes theorem.

III. Reference Books:

1. Dr.M Anitha, Linear Algebra and Vector Calculus for Engineer, Spectrum UniversityPress, SR Nagar, Hyderabad-500038, INDIA.

2.Dr.M.Babu Prasad, Dr.K.Krishna Rao, D.Srinivasulu, Y.AdiNarayana, Engineering Mathematics-II, Spectrum University Press, SR Nagar, Hyderabad-500038,INDIA.3. V.Venkateswararao, N. Krishnamurthy, B.V.S.S.Sarma and S.Anjaneya Sastry, A textBook of B.Sc., Mathematics Volume-III, S. Chand & Company, Pvt. Ltd., Ram Nagar,NewDelhi-110055.

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6. Web resources suggested by the teacher and college librarian including reading material.

IV. Co-Curricular Activities:

A) Mandatory:

1. For Teacher: Teacher shall train students in the following skills for 15 hours, by taking Relevant outside data (Field/Web).

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These integrals of different functions over different regions.

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3. Applications of Gauss divergence theorem, Green's theorem and Stokes's theorem.

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2. Going through the web sources like Open Educational Resources to evaluate line integral, surface integral and volume integral and apply Gauss divergence theorem, Green's theorem and Stokes theorem and make conclusions.

3. Max. Marks for Fieldwork/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work Report: Title page, Student Details, Indexpage,

Stepwise work-done, Findings, Conclusions and Acknowledgements.

4. Unit tests (IE).

b) Suggested Co-Curricular Activities:

1. Assignments/collection of data, Seminar, Quiz, Group discussions/Debates

2. Visits to research organizations, Statistical Cells, Universities, ISI etc.

3. Invited lectures and presentations on related topics by experts in the specified are

V. Suggested Question Paper Pattern:

Max.Marks:75

Time:3 hrs

SECTION – A (Total: 10 Marks)

Very Short Answer Questions (10 Marks: 5x2)

SECTION - B (Total: 5 X 5=25Marks)

(Answer any five questions. Each answer carries 5 Marks)

(At least 1 question should be given from each Unit)

1.

2.

3.

4.

5.

6.

7.

8.

SECTION - C (Total: 5 X 8 = 40 Marks)

(Answer ALL the questions. Each question carries 8 Marks)

1. (a) or (b)

2. (a) or (b)

3. (a) or (b)

4. (a) or (b)

5. (a) or (b)